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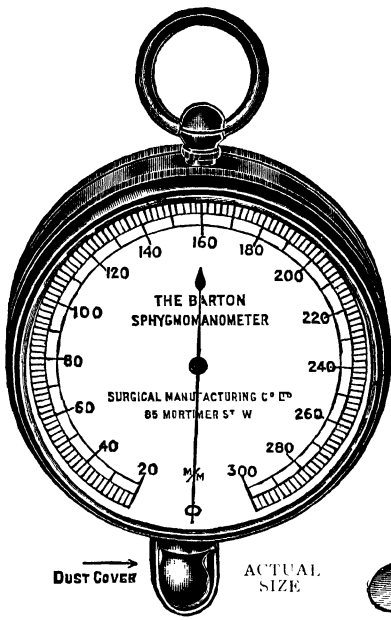
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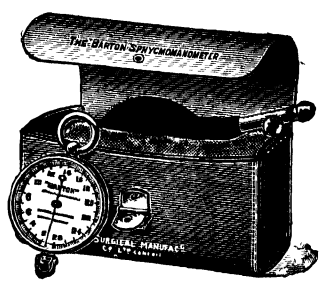
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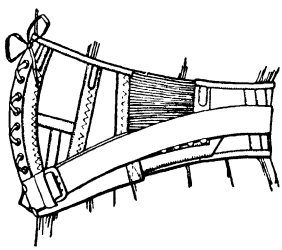
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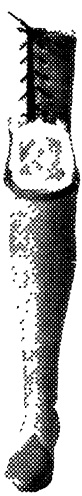
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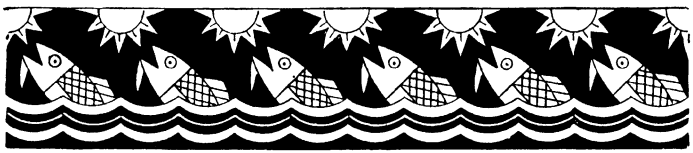
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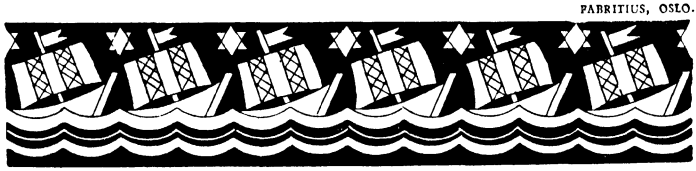
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IN
TREATMENT

VOLUME FOUR

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1928

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PREFACE

THIS is the fourth compilation of the signed articles which have appeared weekly in *The Lancet* since 1923 under the title "Modern Technique in Treatment."

The management of most of the pathological conditions commonly encountered in practice has now been reviewed. The articles, however, will continue to appear as occasion warrants, under their familiar title, and will be written in response to invitation in accordance with the original scheme, namely, to provide the practitioner with concise information upon modern medical and surgical procedure.

We propose to commence the publication shortly of a further series of articles from the pens of recognised authorities, designed to promote a better understanding between the practitioner and the pathologist. It is often difficult for those whose duties and responsibilities must sever them from the activities of the laboratory to assess the significance of pathological reports in relation to clinical findings. The articles will serve to interpret such aids to diagnosis as the pathologist can supply to the practitioner, so that the best results may be obtained from their increasing opportunities for co-operation.

EDITOR OF "THE LANCET."

September 1928.

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MODERN TECHNIQUE IN TREATMENT

I

THE TREATMENT OF CHRONIC APPENDICITIS

By R. J. McNeill Love, M.S.Lond., F.R.C.S.Eng.,

Surgical First Assistant, London Hospital; Emergency Surgeon, Mildmay Mission Hospital

The term " chronic appendicitis " in its widest sense includes all those cases which are not acute, and therefore includes the interval appendix. In cases which have been tided over an acute attack by means of expectant treatment, the appendix should be removed after infection has subsided and before recurrence is likely. Commonly the time selected is about three months after convalescence from the acute attack ; a longer interval subjects the patient to the risk of another acute attack, especially in young patients. It is estimated that 80 per cent. of patients of all ages relapse within two years after an initial attack of acute appendicitis without appendicectomy. In these cases a definite diagnosis has presumably been made, and therefore, unless any other lesion is suspected, a gridiron incision gives suitable exposure. As a rule surprisingly little pathological change is found in an appendix which was known to have been acutely inflamed or even the cause of an abscess a few months previously. A few limited adhesions, a stricture or a fibrotic tip are commonly the only legacies of the acute attack.

Chronic appendicitis may present as one of two more or less definite clinical entities—i.e. the intermittent, and the chronic dyspeptic type.

The Intermittent Type

The intermittent type is characterised by recurrent attacks of pain, sometimes colicky in nature, which originate in the neighbourhood of the epigastrium or umbilicus, and are later referred to the appendicular region. Vomiting may occur, but is not a marked feature. After an interval varying from a few

hours to a few days the symptoms abate, leaving a temporary local soreness in their wake. On examination some deep tenderness can usually be elicited in the lower right quadrant, and occasionally a thickened or concretion-containing appendix can be palpated through a thin abdominal wall.

On removal the appendix is found to contain a concretion or possess a stricture, the symptoms presumably being due to spasmodic efforts of the organ to overcome the resultant obstruction.

The Dyspeptic Type

The dyspeptic type of chronic appendicitis is less definite in its symptomatology, and may mimic almost any chronic abdominal condition. Generalised abdominal discomfort is more or less constant and may be aggravated by exercise. Hæmatemesis and even melæna may occur, but the periodic remissions of symptoms so characteristic of gastric or duodenal ulcer are not marked. Symptoms are not relieved by recumbency or pregnancy, which fact may assist in the differential diagnosis of visceroptosis. Neurosis is a commonly associated condition, being partly due to prolonged ill-health, and sometimes aggravated by injudicious treatment. The discomfort associated with renal conditions is usually limited to the side of the lesion, whereas, although the tenderness of chronic appendicitis is commonly localised to the right iliac fossa, the actual pain is referred more centrally. Suspicions of pelvic disease may be aroused by the history of the case, pain is commonly referred to the lower part of the back, and routine examination usually reveals the cause of the trouble.

On removal this type of appendix may show generalised or local fibrosis, especially of the tip. In other cases the organ may be transformed into a mucocele, or even an empyema.

Differential Diagnosis

The various conditions which must be borne in mind in the differential diagnosis of chronic appendicitis may be summarised as follows :

Thorax.—Prodromal dyspepsia of phthisis.

Upper Abdomen.—Gastric and duodenal ulcers, gall-stones, chronic pancreatitis.

Central Abdomen.—Visceroptosis, tuberculous or chronic simple adenitis, colitis.

Pelvis.—Pyosalpinx.

Genito-urinary.—Renal calculus, chronic pyelitis.

Central Nervous System.—Neurasthenia.

It will be seen from this summary how many are the pitfalls waiting to entrap the unwary. The public, and even some practitioners, think that chronic disease of the appendix can be diagnosed with certainty by a single abdominal palpation, but

in fact it is not easy to decide whether or not the condition is present. Even when symptoms continue after removal of an apparently normal appendix they are sometimes ascribed to "adhesions," until the real cause of the trouble is discovered or manifests itself later.

Exhaustive examinations and repeated observations are usually necessary, particularly with the dyspeptic type, and even then a tentative diagnosis may only be made by a process of exclusion. The mimicry of chronic gastric ulcer by a diseased appendix has been referred to above, and may even be carried to the length of hyperacidity and hypertonicity. If the organ is diseased, removal will probably relieve the symptoms and may restore physiological balance—i.e. the hyperacidity and hypertonicity associated with appendicular gastralgia may disappear. Similarly, persistent colitis may be maintained by a diseased appendix, and if definite symptoms and disability are present, then laparotomy may be justifiable in order to ascertain the condition of the appendix, and to estimate its influence on other abdominal organs.

Much has been written regarding the value of barium meals or enemata in the diagnosis of chronic appendicitis. Distortion or kinking of the appendix, retention of barium after the emptying of the cæcum, and tenderness on palpation have all been mooted as diagnostic of pathological changes. However, much must depend on chance as to whether opaque media enter the appendix, or, having entered, how long the medium will be retained. Moreover, palpation of any appendix which is distended will naturally elicit tenderness. In the experience of most surgeons, radiography is of little value in the diagnosis of chronic appendicitis.

Conservative Treatment

Having considered the differential diagnosis from other surgical conditions, consideration should be given to teeth, diet, mode and habits of life, particularly with regard to smoking, overwork and lack of exercise. Conservative lines should especially be considered in connexion with neurasthenics and elderly patients, especially females.

Operative Measures

If improvement is unsatisfactory then operation is seriously considered, particularly under the following circumstances:

1. Recurrent cases, especially if colic is well marked, as the diagnosis is then usually correct.

2. In children, as prolonged dietetic treatment and restriction of activities are obviously unsuitable. Also the neurotic element can usually be excluded, and the risk of acute exacerbations is greater than in adults.

3. When the appendix, if diseased, may be exerting a malign influence on other abdominal organs—e.g. stomach, colon. If in the absence of physical signs, symptomatic treatment does not relieve the patient and no marked neurotic element is present, then the condition of the appendix should be verified.

4. In a few cases, if a family predisposition to acute appendicitis exists, appendicular symptoms may justify appendicectomy, both from the risk of an acute attack, and to relieve the patient of a natural dread of a sudden dangerous illness.

In considering the treatment of chronic appendicitis, appendicectomy is, of course, indicated in all genuine cases.

If, in the event of an error of diagnosis, some other condition is present which is amenable to surgical treatment and may be dealt with through the laparotomy wound, little harm is done, but good exposure must be obtained in order that other lesions may be readily recognised.

With regard to the means of approach, the gridiron incision provides adequate exposure if no other pathological lesion is present. However, complete exposure is impossible through this incision, and the upper abdomen and pelvis are out of reach for surgical procedures. The surgeon who explores the pelvis by means of one finger inserted through a gridiron incision merits, and often obtains, the derision of the gynæcologist.

Battle's incision, which consists in inward displacement of the rectus muscle has nothing to commend it. If prolongation of the incision is necessary, intercostal nerves are seriously jeopardised, and in any case they are likely to be crushed if the vessels which accompany them are injured. Injury to these nerves results in risk of subsequent ventral or inguinal herniæ. Therefore in chronic cases the most suitable incision is undoubtedly the right paramedial, as laparotomy for chronic appendicitis is probably the opportunity of a lifetime to explore the whole abdomen, and it is universally accepted that chronic appendicitis is frequently associated with, and possibly the cause of, such conditions as gastric or duodenal ulceration and gall-stones.

The incision commences at the level of the umbilicus, one inch from midline, and extends downwards for about four inches. The anterior sheath of the rectus muscle is divided and separated inwards until the inner border is exposed. The muscle is then retracted outwards and the posterior sheath of the peritoneum divided, the deep epigastric vessels being ligatured if necessary. The cæcum is withdrawn and the appendix removed. Systematic examination is then made of the abdominal contents, particularly the stomach and duodenum, biliary apparatus and the pelvis. Should other conditions be present which are amenable to surgical treatment, the incision may be prolonged in either direction as far as necessary, the rectus and its nerve supply being safely displaced outwards.

In conclusion, mention must be made of the so-called carcinoma, or the cancroid appendix. The condition occurs most

commonly in young adults, and is uncommon, only two cases occurring in 750 consecutive appendicectomies by the writer. It is usually revealed by acute infection superimposed on the chronic condition. On removal the appendix is markedly thickened and may be one inch in diameter. Microscopically the condition is one of spheroidal-celled carcinoma. The condition is relatively innocent, secondary deposits being recorded in only 12 per cent. of cases.

II

THE TREATMENT OF THE FUNCTIONAL DYSPEPSIAS

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Purely functional dyspepsia is probably less common than is supposed, and before treating a case as such it is well first to eliminate by thorough investigation all possibility of organic disease within the abdomen. For this purpose a careful and detailed clinical history is more important than any other method of investigation. If this shows that real *pain* (as opposed to mere discomfort) or vomiting or wasting has been a prominent symptom it is almost certain that organic disease is present, although the absence of these does not necessarily mean that the case is functional. The organic conditions chiefly to be thought of are carcinoma, gastric or duodenal ulcer, gall-stones and chronic appendicitis. Early carcinoma is, of all organic conditions, the most difficult to exclude. The most suspicious symptoms of it are loss of appetite and wasting, along with some gastric discomfort, and if these come on in a man of middle age who has previously had a good digestion, carcinoma should be thought of. In ulcer cases pain is always present and is characteristically "punctual," appearing at a definite time after meals and, especially in duodenal cases, being temporarily relieved by the taking of more food. In ulcer, too, the symptoms occur in attacks with relatively long periods of good digestion between. The absence of vomiting and hæmatemesis are of no importance in the diagnosis. In gall-bladder dyspepsia pain is present but is "unpunctual," and flatulence or a feeling of "distension" are prominent symptoms. The patient is usually a stoutish married woman of middle age. Appendix dyspepsia can only be diagnosed with certainty by the results of exploration.

Diagnostic Aids

Accessory diagnostic aids are furnished by test-meals and X-ray examination. The test-meal, rarely decisive in ordinary practice, can usually be dispensed with. In gall-bladder and appendix cases and in chronic gastric ulcer it is of little help; in

chronic duodenal ulcer a high curve is very constant and its absence should throw doubt on the diagnosis; in carcinoma low acidity is the rule but, and especially in an early case, the presence of even free HCl does not negative the possibility of cancer. Chronic gastritis is perhaps the only organic condition which can be detected by a test-meal alone (excess of mucus). It is, however, comparatively rare and is certainly too often diagnosed. Its treatment does not concern us here.

X-ray examination, especially if it is done by an expert, is of far greater value than the test-meal. A negative result, however, should not be allowed too much weight if the clinical history points the other way. It is of most help in the detection of *chronic* ulcers and of carcinoma, but in the earliest stages of the latter even X-rays may fail to reveal the disease, and the only method of making a diagnosis early enough to give operation a chance is by exploration. Doctors should have the moral courage to insist upon this if the symptoms are suggestive and do not disappear after a month's treatment on functional lines.

Visceroptosis is, in women, the cause of much difficulty in diagnosis, as its symptoms may sometimes simulate those of organic disease, real pain, and even vomiting, being occasionally caused by it. If radiographic investigation fails to show organic disease, and if the symptoms persist after treatment for the visceroptosis on the usual lines, it may be necessary to resort to exploration.

Two Great Groups

Organic disease having been eliminated, the functional cases may be divided for purposes of treatment into two great groups: (1) the hypersthenic (hypertonic); (2) the asthenic (atonic).

The hypersthenic cases are commoner in men and are characterised by increase of gastric tone, a tendency to pyloric spasm, and superacidity of the contents. The asthenic cases are met with chiefly in women, are frequently associated with the presence of gastroptosis and show diminution of tone and motility, and often, though by no means always, subacidity of contents. The chief symptoms in the hypersthenic cases are "acidity" and hunger-discomfort; in the asthenic group, flatulence, "slow digestion," and a "sinking" sensation when the stomach is empty.

In both groups there is a nervous basis. In the hypersthenic, nervous irritability and exaggerated reflex excitability; in the asthenic, nervous exhaustion and depression. The recognition of the underlying nervous factor is of great importance, for it means that *treatment must first be directed to the nervous system.* This involves an inquiry into the patient's whole mode of life with the object of getting rid, so far as possible, of all causes of physical, mental, and emotional strain. Sometimes it is advisable to send the patient away for a holiday, choosing a bracing inland place for the asthenics and a more sedative one for the

hypersthenics. In the more severe cases of the asthenic type complete rest in bed may be required, along perhaps with abdominal massage and other forms of physical treatment. Even in the milder cases rest in the recumbent position for a short time before and after meals is of great value. In the abolition of emotional causes of exhaustion psychotherapy is often of help. In all cases, whether hypersthenic or asthenic, regular meals, well cooked, attractively served, and preferably eaten in company should be insisted upon, but the wholesale extraction of teeth in functional dyspepsia—still too often done—is strongly to be deprecated. The dietetic and medicinal treatment in the two groups may be considered separately.

Hypersthenic Type

(*a*) *Diet.*—In this type the diet must be planned to meet the excess of acidity. There are two views as to how this may best be done. Some believe in giving foods which "fix" the free acid by combining with it and so rendering it harmless. Proteins do this, and so the supporters of this line of treatment allow meat and other animal foods freely. Others take the view that the protein foods stimulate the production of gastric juice, and so confine the diet largely to carbohydrates. I am an adherent of the first view, and allow meat and other animal foods, but limit starches and sugars. Fats are given freely, seeing that they tend to restrain secretion; but all direct stimulants of secretion should be forbidden, chief of these being salt, spices, pickles, and the extractives contained in soups and gravies. Alcohol is also a stimulant of secretion. Sour things should naturally be interdicted where the acidity is high, and tea (except China) comes under the same ban because of its tannic acid.

(*b*) *Drugs.*—The drugs useful in this type are those which restrain secretion and relax spasm, those which neutralise secretion, and those which are nerve sedatives. Belladonna acts in the first of these ways and may be given in 10 or 15 drop doses in water before breakfast or in a smaller dose before each meal. The best antacids are the carbonates of bismuth and magnesia or magnesium oxide, and these may be given in full doses about two hours after meals. If the magnesia causes diarrhœa some calcium carbonate may be substituted for it. Sometimes it is more convenient for the patient to carry the antacid in the form of a lozenge (troch. bismuth. co., absorbent lozenges, etc.).

The bromides are the best nerve sedatives, and may be given along with the antacid in such doses as are indicated.

The Asthenic Type

(*a*) *Diet.*—The diet in this type should be arranged not with a view to the state of the gastric secretion, but in order to suit the impaired motor power. Meals should therefore be small,

frequent, and dry, for a large meal and the weight of fluid tend to over-distend an atonic stomach. Bulky foods such as vegetables (with a few exceptions like spinach, asparagus, and the white part of cauliflower) should be avoided, and so should raw fruits. Crisp toast and rusks should be substituted for bread, and potatoes taken sparingly, and only if mashed. Articles which stimulate secretion (condiments, etc.) are now of use, and alcohol in not too dilute a form may often be taken with advantage at meals.

(*b*) *Drugs.*—These are of use to stimulate secretion and increase tone, and a mixture of small doses of a soluble alkali (sod. bicarb., gr. v.) with nux vomica and a bitter infusion before meals meets most indications. The exhibition of acids after meals and of "ferments" of any kind is rarely called for. In overcoming constipation, which is often present, the more tonic aperients (aloe, cascara, rhubarb, and senna) should be chosen.

III

THE TREATMENT OF FRACTURES OF THE CLAVICLE

By Ernest W. Hey Groves, M.D., B.Sc., M.S.Lond., F.R.C.S.Eng.,

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Fracture of the clavicle is a very common injury both in children and in adults. Treatment should be directed to the rapid restoration of the function of the shoulder-joint, the actual position of the bones or the deformity being a secondary consideration. It may be that sometimes the prevention of deformity is considered to be of paramount importance, but these cases, usually young women, are exceptional and require special treatment.

Bad results after fractures of the clavicle are nearly always the consequence of elaborate methods of immobilisation intended to "set the fracture" correctly, which tie the arm to the side for a long period and so produce stiffness of the shoulder. A consideration of two types of case will serve to prove the contention that preservation of the function of the shoulder-joint is much more important than elaborate fixation of the fragments. In the first place, patients from whom, for some reason or other, the clavicle has been altogether removed, whether for new growth or osteomyelitis, show excellent and unimpaired function of the arm and shoulder; in the second place, the victim who survives an accident so serious that because of other injuries the broken clavicle has had no treatment but a simple sling will have a perfectly strong arm, though the collar bone may have united with some degree of angulation and with much excess of callus.

Fractures without Displacement

In all those cases, therefore, in which fracture of the clavicle is unaccompanied by displacement no immobilisation is required. This applies both to greenstick fractures in children and to fractures of the outer end of the clavicle in the neighbourhood of the coraco-clavicular ligaments in adults. The arm should be supported in a sling which should take a good hold of the elbow and support the weight of the limb. Every day light

massage should be applied to the neck, shoulder muscles, and arm, and the limb should be lifted up to a position of full abduction and supported in this position during most of the massage treatment. In three weeks to a month firm union and good function should be secured.

Fractures with Moderate Displacement

The main problem of treatment concerns cases of fracture of the middle of the clavicle with marked displacement of the bony fragments. The sternal end of the bone is drawn upwards by the sterno-mastoid muscle, whilst the acromial end is displaced downwards by the weight of the arm and inwards by the pectoralis major. It is not easy to influence the position of the sternal fragment, and treatment must therefore be directed to bringing the distal or outer fragment into as good alignment as possible with the inner end of the bone. Two adjustments are necessary —viz., the lifting of the shoulder which takes the outer end of the clavicle with it, and the pulling of the shoulder backwards, so as to exert traction on the clavicle and reduce the inward displacement of its outer end. Both these adjustments are usually quite easy, even without the use of an anæsthetic, although the latter may be necessary in the case of a nervous, frightened patient. It is, however, more difficult to maintain this reduction than to effect it in the first place. The time-honoured methods which have found so conspicuous a place in text-books consist in fixing the arm to the chest by means of bandages or adhesive strapping. But these methods are quite contrary to the principle of conservation of the shoulder-joint function, which, as explained above, should be the main object aimed at. Particularly is this true of Sayre's method in which after shaving the chest the arm and chest are enveloped in adhesive plaster and so left for several weeks.

The most important act in adjustment of the fracture is the backward pull of the shoulder. The surgeon should stand behind the patient and pull both shoulders back, keeping the body in position, if necessary by means of his knee placed between the shoulder-blades. Whilst the shoulders are strongly held back, they are fixed in this position by a figure-of-eight bandage which goes over each shoulder and under each axilla, crossing over the middle of the back. Or, instead of the simple bandage, a straight splint may be applied across the back of the shoulders which are then tied back to it. It is a matter of opinion whether the simple bandage or the splint is the more efficient method and a few further words may be said about each. The figure-of-eight bandage ought to be put on over a vest, which will prevent the skin from becoming rubbed or sore. The bandage itself should be of stout material—e.g. calico—so that it will not stretch, and if in an out-patient there is any doubt as to its being tampered with, it is wise to use a wet starched bandage

(made from crinoline muslin). The splint is perhaps neater and lighter than the bandage if it is made of a piece of three-ply wood, but it is apt to get out of position if the patient is at all round-shouldered, when the splint rides upwards. This should be prevented by the use of adhesive strapping which fixes the splint to the body below.

After the backward adjustment of the shoulder has been made and fixed, the arm as a whole is raised and so supported by a firm sling, which runs under the elbow and over the opposite side of the neck. It is better to have this made of a band of calico or other firm material 6 inches wide than to trust to the ordinary triangular sling. The band sling should be securely adjusted at the elbow (making a slit or pocket in the sling for the bony joint) and both elbow and the neck should be protected by soft felt or wool from undue pressure.

After-treatment.—After the fracture has been adjusted and fixed an X-ray should be taken to determine the relative position of the fragments, which may, if necessary, be modified when the bandages are readjusted. But it is quite unnecessary to secure perfect anatomical restitution and a certain amount of overlapping or of angulation can be ignored without fear of a bad result. The third day after the accident, and on every following day, the arm is released from its sling and some massage and movements administered. The method and degree of this after-treatment are very important and should only be undertaken by a responsible person accustomed to work with the surgeon. Careless manipulation quite defeats the object of the treatment, and if a trustworthy masseuse is not available it is much better to leave the arm untouched for a week or for the surgeon himself to undertake the dressing. For the first week or ten days (we are still considering a case where there was marked displacement) the daily after-treatment should be carried out with the patient in a recumbent position on a hard couch with the affected shoulder over the edge. In this way the tendency for the shoulder to drop down or to be pulled forwards will be prevented. The figure-of-eight bandage or the back splint need not be disturbed. The sling is removed from the elbow, massage is given to the muscles of the neck and arm, and the shoulder is gently moved to a moderate degree of abduction. This abduction movement need only be done once in each treatment. After about ten days or a fortnight the bandage and splint may be removed from the back of the shoulders and the treatment carried out with the patient sitting up.

Fractures with Considerable Displacement

If the displacement of the fracture should be considerable, taking an upward and forward angulation, and if this occurs in a leisured person it may be wise to begin the treatment by a week or two in bed. The mattress should be firm and hard,

the patient should lie at the side of the bed with the shoulder and arm over the edge supported on a stool which is on a level lower than that of the bed. In this way the weight of the arm makes the shoulder fall outwards and backwards, and as the muscle spasm subsides the bone comes to lie in a good line.

Complications

There is probably no long bone in the body the fractures of which are so seldom accompanied by serious complications, or which so seldom require operative treatment. Text-books all mention an alarming list of possible special complications of fracture of the clavicle, these being injuries to the brachial plexus, the subclavian vessels, and the pleura or lung. It is true that such injuries may be associated with a break of the collar bone when a severe direct blow has been received on the shoulder or over the root of the neck. We became familiar with these complex injuries during the war. But in any such composite injury, the fracture of the clavicle is only a minor incident and its treatment should be relegated to a secondary place. The idea that splinters of the broken bone may be driven into the vessels, nerves, or pleura is probably far-fetched if not entirely imaginary, whilst the idea that excess of callus may cause injurious pressure on these structures is still less supported by fact.

Non-union of a fracture of the clavicle is exceedingly rare, so much so that its possibility may be ignored. For these various reasons open operative treatment of the fractured clavicle is practically never required unless an exposure is demanded for some other reason, and then the broken bone may be fixed by some form of internal fixation, the use of kangaroo suture after drilling being generally the best.

IV

THE TREATMENT OF VARICOSE ULCER

By George F. Stebbing, M.B., B.S.Lond.,
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Varicose ulcers owe their characteristics to the faulty circulation of the blood through the limb on which they occur. The dilated and inelastic veins allow the venous blood to stagnate and the defective blood flow causes malnutrition of the limb. The subcutaneous veins are generally most diseased and, therefore, the skin and subcutaneous tissues suffer most, but the whole limb is affected to a greater or less extent as is shown by loss of tone of the muscles and ligaments and excess of extravascular fluid. In uncomplicated cases of varicose veins this defect of the circulation is only present when the foot is below the level of the pelvis ; when the patient is horizontal, or the foot raised, the venous return is not impeded and there is a good circulation in the limb.

The faulty nutrition of the limb predisposes to indolent ulcer in two ways : (1) The skin becomes more susceptible to injury and infection. (2) The process of repair is hindered. When an injury occurs, and sometimes without a visible wound, the skin becomes inflamed and phlebitis and lymphangitis cause occlusion of the vessels and still further impairment of the circulation. There is no direct connexion between the extent of the varicose veins and the susceptibility to varicose ulcer. A patient may have large varicose veins and yet maintain a good enough circulation to keep the skin healthy, while a patient with little apparent varicosity may have serious malnutrition of the skin. Phlegmasia alba dolens and thrombosis of the femoral veins may lead to lesions that are indistinguishable from varicose ulcer.

When an ulcer has appeared secondary changes are set up. Septic infection occurs in the skin and surrounding tissues and they become hard, œdematous, and inelastic ; cicatrisation, the extent of which depends upon the severity of the septic infection, leads to further impairment of the circulation and delay in healing. Long-standing and improperly treated ulcers may cause these secondary changes to affect the skin and subcutaneous tissues of the whole circumference of the limb and to extend from the knee to the foot. The infection may spread through the deep fascia by the veins and lymphatics causing adhesion of tendons

to their sheaths, myositis, periostitis and occlusion of the deep vessels, and trophic changes in the foot. Varicose ulcers are not, as a rule, painful. Pain is generally a sign of phlebitis or inflammation under the deep fascia.

Varicose ulcers have to be distinguished from indolent ulcers occurring in a scar which is surrounded by healthy skin ; infective ulcers such as those due to syphilis, tubercle, etc. ; ulcers associated with disease of the underlying bone, and carcinomatous ulcers, which are generally, but not always, due to malignant changes in an old neglected varicose ulcer.

Preventive Treatment

All patients with varicose veins should sleep with their feet raised above the level of the pelvis. This is most easily effected by placing under the mattress a skeleton wooden wedge the same width as the bed, seven inches high at the bottom and decreasing to nothing at the level of the patient's hips. Such a wedge can be easily made of wooden laths fastened to two triangular pieces of wood. No other treatment is needed, unless there are signs of defective circulation such as atrophy of the skin, œdema after standing, and loss of tone of muscles and ligaments. If these signs be present the patient should be advised to lie with the feet raised for an hour in the middle of every day, and to wear a support such as crepe bandages or a well-fitting elastic stocking reaching from the toes to half-way up the thigh. The stocking should be made in two parts, one reaching from the toes to the tubercle of the tibia, and the other from the middle of the thigh far enough down to overlap the upper edge of the lower part. If the stocking is in one piece it constricts the veins about the knee during movements of the limb. The support should be put on each morning before the leg is put out of bed—i.e. before the veins become distended with blood.

Small Early Ulcers

Any graze, pustule, or inflammation of the skin, no matter how apparently trifling, should be regarded as serious if it occurs in a limb that shows signs of defective circulation. The patient should be advised to lie up entirely with the foot raised until the lesion is healed. The sepsis should be treated with warm boric compresses, which should be always moist and not applied too hot, the skin being easily injured by heat. When the ulcer is clear it should be covered by a dressing that does not require changing too often. Even the most careful dressing tends to damage the newly formed epithelium. Unna's paste, to which 1 part in 16 of boric acid or 1 part in 8 of balsam of Peru has been added, is a very satisfactory dressing. In these small ulcers it does not need changing more than once a week ; the ulcer will generally heal in a fortnight.

When the ulcer is healed it is advisable for the patient to lie up for a further week or more, according to the size and thickness of the scar, and during this time gentle massage, vibromassage, and radiant heat (not more than 180° F.) are valuable aids to getting a healthy scar. When the patient gets about again the preventive treatment outlined above should be carried out. It is not advisable to perform any of the many operations on the veins that have been suggested. None improves the circulation in the limb and many make it worse.

Large or Chronic Ulcers

In these cases the secondary changes referred to above are always present. For this reason the methods of treatment that would be applied to large and chronic ulcers elsewhere are not applicable. If the ulcer be excised its site will still have the imperfect circulation that is the initial cause of the condition; and for the same reason sliding flaps and tube grafts give unsatisfactory results. The treatment should be directed to prevent further impairment of the already defective circulation by extension of infection, and to promote rapid healing with minimal scar formation. The patient should rest with the foot elevated, warm boric compresses being applied until the ulcer is clean and the erythema has subsided. This does not generally take more than a few days and then, if the granulations are bright red and healthy in appearance, healing can be hastened by covering the surface of the ulcer with Thiersch grafts, which should be taken from the arm rather than the thigh, the blood-supply of the latter often being impaired. The grafted ulcer can be covered with a dry gauze bandage, which should not be moved for five or six days. When the grafts have taken Unna's paste or a mild antiseptic dressing should be applied, and not changed more often than necessary.

If the ulcer be very slow in cleaning or if the skin at its edge forms a hard dense fibrous ring, the granulations are generally purple in colour and pulpy and unhealthy in appearance. Such an ulcer may be curetted and the fibrous ring removed. To do this properly an anæsthetic is necessary, and all the tissue down to the deep fascia should be removed. Boric compresses are then applied until healthy granulations form, and these may then be covered with grafts. This method of treatment takes a long time, often many weeks, and it is only successful in a proportion of the cases in which it is tried. Healing may be hastened by ultra-violet radiation, given as a graduated general body bath; during the period of cleaning the ulcer concentrated local applications of ultra-violet radiation may be given, but only minimum doses must be given, since the poorly nourished skin readily vesicates.

The patient should be kept at rest after the ulcer is healed, and the scar treated in the same way as those of small early

ulcers. Freedom from recurrence depends largely on the length of rest after healing and on the care with which after-treatment is carried out.

Intractable Ulcers.—If the ulcer has been present or recurring for many years and is situated in a large area of discoloured indurated skin, and particularly if the deep structures have been affected to such an extent that the ankle is almost fixed, it is often not worth while to undertake the many months treatment necessary to heal such an ulcer. The resulting scar breaks down almost as soon as the patient gets up, and returns to the same condition as when treatment was started. Such ulcers should be treated by the ambulatory method, the object then being to prevent them from getting worse rather than to persuade them to heal.

Amputations.—In cases in which suppurative phlebitis has occurred below the deep fascia and the ankle is fixed by matting of the surrounding structures, it is often impossible to get the ulcer clean, and no treatment will obviate the necessity of frequent dressings. The inconvenience of this and the crippling resulting from the deformity may be so severe as to make amputation necessary. It should be performed through the lower third of the thigh ; the badly nourished tissues below the knee make a poor stump.

Ambulatory Treatment

Patients are often unable to lie up for the time necessary to heal a varicose ulcer. There is then always a serious risk of development of the secondary changes above referred to, even if they are not already present. It is difficult to impress on patients the seriousness of what appears to be a slight graze or septic spot, but they must be made to understand that it is only by prolonged and careful treatment which they themselves must conscientiously carry out, that they can be spared a life-long disability. The preventive treatment outlined above should be adopted and the ulcer cleaned by boric compresses—a long week-end in bed is a great help in doing this. Unna's paste should then be applied from just above the malleoli to the tubercle of the tibia (no matter how small the ulcer may be) and this should be changed about once a week. Crepe bandages or an elastic stocking should then be put on over the dressing.

Note on the Application of Unna's Paste

Zinc and gelatin paste of the B.P.C. (commonly called Unna's Paste) is often wrongly applied. The container should be stood in water just warm enough to melt it (about 100° F.), and a bandage three inches wide prepared of a roll of white gauze four layers thick, or of soft crinoline quite free from starch or dressing. The ulcer to be dressed should be clean, and the skin around

should be washed and dried by a spirit lotion which should be allowed to evaporate. The part to be covered should then be painted with a thick coat of the jelly, by means of a brush or cotton-wool swab, and immediately covered by a single layer of the bandage, which must be evenly and firmly applied. It should be applied firmly enough to make the jelly bulge through its interstices, and to avoid creases and ridges in the bandage it may be cut into lengths as often as necessary as it is bound on. Another thick coat of jelly is applied and then another layer of bandage until about six layers are in position. Nothing should be allowed to touch the dressing until it is firmly set. It may then be covered with a light bandage, unless the patient is going to wear a crepe bandage or elastic stocking over it. To remove the dressing it should be saturated with warm water.

V

THE TREATMENT OF HAY-FEVER

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Hay-fever, as is well known, is a paroxysmal rhinorrhœa caused by a sensitiveness of the patient to grass pollen. This pollen affects the hay-fever patient in the eyes and mucous membrane of the nose and throat because only in these situations can pollen get into contact with his circulating blood. Grass pollen plus the serum of a hay-fever subject makes a poison-mixture for man, causing serous exudations and œdematous swellings in whatever tissue it penetrates ; hence the symptoms of hay-fever. The pollen cross-fertilising the grasses is air- not insect-borne ; it will travel many miles on light summer breezes and much further on a strong wind. In such a grassy land as England it is difficult to escape from the pollen cloud which covers the country from about May 20th until July 15th. These dates vary a little according to the weather and become slightly later as one travels northward towards Scotland ; but the commencement and finish of the pollen varies less than one would expect because vegetative processes depend more upon daylight than upon temperature, and with the pollen cloud the hay-fever season begins and ends.

The specific diagnosis—i.e. that the paroxysmal rhinorrhœa is caused by grass pollen—may be made in two ways :

1. The rhinorrhœa must coincide with the pollen cloud. If the symptoms begin much before May 20th or last much after mid-July, then either the case is not one of hay-fever at all or there is some other complicating factor which must be detected if successful treatment is to be given.

2. The disease can be produced artificially, but only in a hay-fever subject, by bringing a minute quantity of the pollen into contact with the sufferer's plasma. This can be done quite easily in the eyes, nose, or throat, or, indeed, any mucous membrane ; but as a diagnostic test it is better to scratch down through the hard dry epidermis, say of the forearm or of the leg, and to place either pollen, or better still, an extract from pollen, on the abraded surface. Nothing will happen in a normal person, but the hay-fever patient

will show within a few minutes a weal at and around the area of abrasion, and surrounding the weal there will be an erythematous blush. This constitutes the well-known skin reaction for hay-fever. It can be produced at any time of the year so long as a supply of grass pollen is available.

It follows from what has been said in the first paragraph that the serum of a hay-fever patient, when mixed with a little grass pollen, can be tried out as an urticarial mixture by injecting it into the skin of any normal man.

Treatment may be prophylactic or therapeutic. Prophylactic treatment consists (1) in avoidance of the pollen, or (2) in desensitising to grass pollen by inoculation.

Avoidance of Pollen

The pollen grains are of considerable size, something like 20μ; it is therefore possible—though seldom practicable—to filter the atmosphere of any room by arrangements less elaborate than those used in Prof. Storm van Leeuwen's "asthma chambers" in Leyden; cotton-wool is a sufficient filter. Even when no special precautions are taken, a quiet dust-free room, with windows closed, gives comparative freedom from pollen. The well-to-do sufferer can fly the country during the summer months, but it will need a good stretch of salt water to give absolute safety if the wind is blowing strongly off shore.

The amount of pollen, and therefore the intensity of symptoms, will be mitigated by (*a*) distance from a hay field; (*b*) any considerable altitude; (*c*) dull or showery weather; and per contra bright sunny weather, hay fields, river valleys, and travelling by railway or motor will increase the symptoms by increasing the pollen.

On special occasions—e.g. during a motor run in the country—the danger points can be protected: (1) the eyes by closely fitting goggles; (2) the nose by tufts of cotton-wool or small linen filters in the nostrils (both of these devices are very irksome); (3) the throat by strict nose-breathing.

Whatever the patient may try it is difficult for him to avoid the pollen and yet retain the common amenities of life.

Prophylactic Desensitisation (Leisurely)

(*a*) Prophylactic desensitisation can be made by subcutaneous injections of a grass pollen vaccine. The method which has been used since 1910 is to give weekly injections, commencing in March if possible, and continuing right up to the commencement of hay-fever when they must be discontinued or if necessary replaced by therapeutic (smaller) doses. For the purpose of measuring doses of pollen vaccine one "unit" is taken as equal to the amount of extract which can be obtained from one-millionth

of a gramme *Phleum pratense* pollen. It is as well to begin the prophylactic course with some rather small dose, say from 10 to 60 units of pollen, according to the intensity of the hay-fever in previous years or judging by the skin reaction. From this amount the dose can be quickly increased at the weekly re-inoculations till something between 200 units in the more sensitive cases and 500 units in the less sensitive is being given regularly. If after any of these inoculations there is a reaction in the patient —either pain at the site of inoculation, or still more important, a general urticaria, angioneurotic œdema, or asthma, then the dose is too large or has been increased too rapidly. In either event it is better to go back to a smaller dose, the optimum inoculation being a little less than that which causes a reaction. With reasonable care seriously unpleasant reactions are very rare and can be counteracted by subcutaneous injections of adrenalin—say 0·2 to 0·3 c.cm. of the 1/1000 solution. If a reaction is in doubt it is better to continue with the same dose till the doubt is settled.

Prophylactic Desensitisation (Intensive)

(*b*) In recent years an intensive course of prophylaxis has been in use, following the plan which has been so successful in dealing with other sensitisations—e.g. horse asthma. In this intensive course the injections are made every day or as frequently as is practicable and the dose is increased as rapidly as is compatible with the absence of reactions. This may in the end prove to be the more effective method because it more closely follows the daily needs and idiosyncrasies of the patient, and because it need not be started so early in the season. On the other hand, it makes more demands on the time of the patient and certainly more on the judgment of the inoculator.

Commencing with a safe dose—say from 10 units for the very sensitive to 50 units for the only slightly sensitive patient—the dose is increased by 50 per cent., or even 100 per cent. at first, and then by a less percentage as it gets larger or a general reaction becomes more feared. A pronounced reaction can be counteracted by an injection of adrenalin and is followed by a much reduced dose.

As an illustration of how the intensive course is likely to run, here is a hypothetical list of pollen injections. The patient is supposed to be very sensitive, therefore the initial dose is very small. One or two of the injections are supposed to have been overbold and the consequent reactions will be seen to have affected the succeeding doses. For a less sensitive person the initial dose might have been larger, the increase of doses perhaps more bold, the final doses considerably stronger, and, if necessary, the course might have been continued longer. May 1st is a reasonable date for the commencement of an intensive course.

May 1st: 10 units; May 2nd: 20; May 3rd: 30; May 4th: 45; May 5th: 60; May 6th: 90 (strongish reaction, ∴ 0·25 c.cm. of adrenalin 1/1000); May 7th: 50; May 8th: 70; May 9th: 100; May 10th: 140; May 11th: 200 (slight reaction); May 12th: 200 (very doubtful reaction); May 13th: 200; May 14th 250; May 15th: 320; May 16th: 400; May 17th: 550; May 18th: 700; May 19th: 850 (doubtful reaction); May 20th: 900; May 21st: 1100; May 22nd: 1300; May 23rd: 1500 units. Here a spell of fine weather is supposed to have started the pollen cloud and so have made any further *prophylactic* treatment imprudent for this very sensitive patient.

Therapeutic Treatment

1. After the commencement of the pollen cloud specific desensitisation may still be practised, but as with other forms of vaccine therapy the doses must be much smaller than for prophylaxis; it may be impossible to give more than 2 to 5 units, it is seldom necessary or prudent to give more than 100 units for a dose. As in prophylaxis a "reaction" is to be deprecated. The size of dose must be estimated from (*a*) the sensitiveness of the patient as judged by his past history or from his skin reaction; (*b*) the condition of his eyes and mucous membrane at the time of inoculating; and (*c*) the reactions, if any, from past doses. The intervals between doses vary with their size from, perhaps, 24 hours with the very smallest up to, say, a week for the largest. This treatment has, in the writer's experience, failed dismally with some people, but with others has been so strikingly successful that they declare they will not be bothered with prophylaxis for the future.

2. Shock doses are as applicable to hay-fever as to any other of the asthma-urticaria group. If immunity is evolved in the business it is certainly non-specific, for almost everything imaginable has been used as antigen: tuberculin, typhoid vaccine, peptone, milk, the patient's own blood reinjected intramuscularly, even sulphur emulsified in oil. The object is to cause a shock with a rigor or two, and in the writer's opinion the effect is by suggestion. The method is not popular and is not advocated here.

3. Pollantin is an anti-pollen serum from immunised horses. Applied locally it gives temporary relief to slight symptoms, but seems unable to help the more severe cases. It is less used now than in former years.

4. Avoidance of pollen. This has been spoken of generally under prophylaxis. Lotions (e.g. warm normal saline) wash away pollen grains, and thick ointments protect the underlying mucous membrane but cannot be made to coat all the sensitive surfaces. Cauterisation substitutes cicatricial tissue for mucous membrane and in skilled hands any specially

sensitive spots can be treated in this way. Carbolic partly kills and partly anæsthetises the mucous membrane.

5. Anæsthetics will temporarily deaden the intolerable local itching, sprays of cocaine, morphia, anæsthesin, etc., may be instanced, but no medical man need be told the difficulties, dangers, and limitations of such treatment.

6. Adrenalin, to a lesser degree pituitrin, or any proprietary combination of these gland products, are in a class by themselves. They have a specific action on all the asthma-urticaria syndrome, checking the symptoms and affording instant though transient relief, whether injected hypodermically or applied locally. For hay-fever they can be administered as a spray of the 1/1000 adrenalin or a lotion containing a tenfold dilution of the same. Such applications seem to be free of bad after-effects and to lead to no "habit."

7. Suggestion treatment cannot be eliminated when dealing with any of the asthma-urticaria syndrome, least of all in hay-fever. It is well in the writer's mind that single doses of a pollen vaccine sometimes act miraculously in this way. It is more than probable that cauterisation of the nose, once so fashionable, owes much to this factor of suggestion. Anything associated in the patient's mind with cause or cure of hay-fever will act accordingly. There seems to be no evidence that an abnormal mentality plays any part in producing hay-fever.

For therapeusis small inoculations, as described in No. 1 above, are advisable, combined with any palliative treatments which may help, but in really serious cases strong prophylactic measures are necessary.

VI

THE TREATMENT OF BREAST CANCER

By W. Sampson Handley, M.S.Lond., F.R.C.S.Eng.,
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In spite of the prevailing medical and lay pessimism about the results of operation for cancer, a pessimism which is founded upon out-of-date experience, the outlook in breast cancer is a very hopeful one, always provided that the disease is detected early and dealt with promptly. The treatment of breast cancer is a difficult enterprise, not to be entered upon lightly, nor without due study of the pathology of the disease. The primary growth is near the surface and is apparently much easier to deal with than, for instance, a cancer of the cervix uteri. But whereas the uterus has a simple and well-defined lymphatic drainage, the breast has multiple and complicated connexions with the lymphatic system which make the surgeon's problem difficult. The first local spread of the carcinoma through the breast is facilitated by the particularly rich network of intramammary lymphatics. It takes place, not by the slow process of infiltration but by the more rapid method of permeation —the growth of plugs of cancer cells along the lymphatic vessels of the breast. Some authors, with little pathological knowledge, still speak of permeation as a hypothesis. It is necessary to state that its occurrence and frequency have been established beyond doubt or question by repeated observation. In correspondence with the high development of the intramammary lymphatic system the breast possesses numerous and free communications with the rest of the lymphatic system. As a result the disease is able to pass early and easily to parts beyond the breast. Many of the mammary lymphatics run straight back into that part of the fascial lymphatic plexus which lies upon the great pectoral muscle. This is the largest single lymphatic plexus in the body, and gives the disease access ultimately to the whole of the parietal tissues, if time be allowed for permeation to spread. Hence the wide dissemination of skin nodules seen in some late cases of breast cancer.

Another route of dissemination, and one which has attracted undue attention because it is patent to clinical observation, is the embolic invasion of the axillary glands of the same side

leading to their early enlargement. It has been shown that if once the axillary glands are attacked the prognosis for the future must be cautious, even after an efficient operation. If the axillary glands are still free from disease the chances appear to be four to one that an operation will rid the patient of her disease. If the axillary glands have been invaded, the chances of prolonged freedom from recurrence are about one in four. This is a most significant fact.

It is, however, very rare for recurrence after operation to occur in the axilla itself, even if the axillary glands are in an advanced stage of disease, if the axilla has been properly cleared by a practised surgeon. Clearly, therefore, invasion of the axillary glands is not in itself the explanation of the blight which falls upon the patient's prospects when axillary infection occurs. Some other serious event has occurred, an event of which axillary gland invasion is the mere accompaniment and index.

Parasternal Invasion of the Thorax

This event is an invasion, simultaneous with the axillary gland invasion, of the glands on the mesial side of the breast, those, namely, of the internal mammary chain lying behind the costal cartilages just outside the border of the sternum. These glands lie beyond the range of operation and their condition cannot be determined by any clinical method. Unsuspected early invasion of these glands, only manifesting itself after a period which is usually about three years, but which may be as long as 14, is now the most frequent cause of failure after a well-planned operation for breast cancer. The method of meeting this danger will be discussed later. The evidence upon which this conclusion is based is a study of the recurrences after a scientifically planned operation. Local and axillary recurrences are reduced almost to zero, and more than half the recurrences are found either as nodules at the inner ends of the upper intercostal spaces, or show themselves in the supra-clavicular triangle, the glands of which are connected with the internal mammary chain.

Epigastric Invasion of the Abdomen

The lower and inner margin of the breast reaches to within an inch of the ensiform cartilage, a region in which the body cavity is ill-defended against the insidious attack of permeation. At the tip of the ensiform the only layer which intervenes between the permeated fascial lymphatic plexus and the subserous fat is the linea alba, and this layer is penetrated by lymphatic vessels. Fortunately, by removing the dangerous portion of the anterior layer of the rectus sheath it is possible to guard against invasion by this route and in recent years abdominal recurrence has become relatively rare.

Method of Operation

Two stages are traceable in the evolution of the operation for breast cancer: (*a*) the empirical stage in which the surgeon was guided by a clinical study of previous results; (*b*) the rational stage in which he is guided by knowledge of the mode of spread of the disease. The final and best product of the first stage was the operation of Halstead. The work of Stiles, and subsequent English work on dissemination, has shown radical defects in the original Halstead method, and it may be said that the modern operation for breast cancer is largely a British product. Its aim is to remove intact in a sheath of healthy tissue the primary growth, along with the surrounding permeated area of the lymphatic system and the embolically invaded glands. For such an operation the name amputation of the breast is a misnomer. The operation must be accurately centred on the primary growth and will therefore differ in each case with the situation of the primary growth in the breast. Operative details are here out of place, but it must always be remembered that the disease spreads centrifugally and roughly in a circle from its point of origin, and that the primary plane of spread is the fascial lymphatic plexus, not the skin. Removal of a maximal area, 10 in. or 12 in. in diameter, of the deep fascia is perhaps the most important and difficult part of the operation. Failure in this respect and unnecessary ablation of skin appear to be the defects of the original Halstead method.

Many technical variations are possible in the operation. Some operators prefer to dissect the axilla before removing the breast, believing that thus bleeding is minimised. Personally I prefer first to define and dissect up, along with the breast, the large circle of deep fascia in which the growing edge of the disease lies. After the axillary dissection this circle cannot be defined with such precision.

Diathermy in Breast Surgery

I have been much impressed of late with the advantages of the diathermic knife over the scalpel in breast surgery. The whole operation except at the apex of the axilla can be performed as rapidly, and with less bleeding and shock, by diathermy. The risk of implantation is done away with. The peripheral edge of deep fascia does not need actual removal provided only that the diathermy knife passes along its plane so as to destroy the permeated lymphatics. This is an important simplification of the operation. The wound may be closed after diathermy just as after a cutting operation and healing is usually satisfactory and painless.

Routine Prophylactic Use of Radium at the Operation.—For the last six years I have made it a rule at the termination of the radical breast operation to take precautions against possible or

probable parasternal invasion of the thorax by burying radium tubes for 24 hours along the line of the internal mammary glands, placing a tube also in contact with the lowest of the supraclavicular glands at the lower and inner angle of the posterior triangle. In my private cases this policy has justified itself by a diminution of 10 per cent. in the recurrence rate. I believe that no operation for breast cancer can in future be regarded as adequate which does not take steps to deal with the danger of parasternal invasion.

Lead treatment is recommended by Blair Bell as a routine supplement to operation, but some years must elapse before a judgment of its value can be formed. The method has some striking successes to its credit, but it is necessarily attended by a certain risk.

Post-operative Treatment.—A post-operative course of X-rays, sufficient merely to stimulate the normal tissues while depressing the vitality of any surviving cancer cells, seems to be a reasonable precaution, but on no account should large doses of high voltage X-rays be employed. The "old-fashioned" type of X-ray treatment appears to give the best results.

Treatment of Recurrences

With the advent of radium, and increased knowledge how to use it, the prospect in many cases of recurrence, formerly untreatable, has become a hopeful one. This applies especially to recurrence in the supraclavicular triangle, which if detected early can now be treated by excision of glands combined with the use of radium, or by buried radium alone. Such cases may have no further recurrence for ten years or longer.

The same thing is true of recurrence in the sternum, a very painful and common, and formerly quite untreatable, mode of recurrence. Buried radium tubes used on the encirclement principle will frequently suppress the sternal trouble.[1] Of course, in such cases the disease has often spread to the intrathoracic glands, and after a period of activity and freedom from pain, lasting perhaps several years, thoracic metastases terminate existence in a quick and merciful way. Much longer periods of freedom and health may, however, be secured. I have at present under my care in hospital a patient who had a sternal recurrence six years ago. This was suppressed by buried radium. The patient would have passed from observation had it not been for the recent development of secondary carcinoma of the cervical vertebræ. The sternal disease has not recurred.

If treated early on these lines sternal recurrences can mostly be held in check for a considerable period, and exceptionally a permanent cure of the disease after the failure of a radical

[1] "The Encirclement Method of using Buried Radium Tubes," by W. Sampson Handley, *Brit. Jour. of Radiology*, November 1925.

operation may be attainable. Anyhow, relief of pain and the prevention or cure of external ulceration can generally be counted upon.

For cases of widespread dissemination, where operation and radium are both useless, X-rays may be tried, but lead treatment appears to provide a more hopeful alternative.

Prognosis in Breast Cancer

Breast cancer may be fatal in three months or only after 40 years. In the most acute forms, with "inflammatory" manifestations, prognosis is easy. In the more chronic forms it is impossible until near the end. The disease may creep about in the tortuous recesses of the parietal lymphatic plexus for years without even giving rise to a subcutaneous nodule. Ultimately, at some point or other, permeation penetrates the defences of the body cavity, attacks the bones, or reaches the cranial cavity. When once evidence of visceral disease has declared itself it is rare for life to be prolonged for more than a year, and a definite forecast of the future can be given.

VII

THE TREATMENT OF LUPUS VULGARIS

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The successful treatment of lupus vulgaris, which entails the destruction of the disease with the minimum of scarring, is fraught with difficulty. The clinical types and phases of the disease are so varied that no single method of treatment is suitable for all cases, and, to obtain the best results, not only a knowledge of the different forms of treatment is necessary, but the right selection of the method best adapted to the peculiarities of the individual case. As it is a local disease of the skin, due to the presence of tubercle bacilli *in situ*, the treatment is essentially local. At the same time, the value of the local treatment can be greatly enhanced by combining it with a suitable tonic régime on general medical principles, with plenty of fresh air, good food, outdoor exercise and sunshine, or, where the last is unobtainable, with artificial sunlight from an arc lamp. There is no internal specific for lupus. Thyroid extract, which once had a reputation in this connexion, has almost been forgotten; tuberculin injections have not fulfilled their early promise, and since they are liable to light up latent foci of tuberculosis elsewhere, they are now comparatively rarely employed, except in extensive ulcerated cases, where injections of Koch's tuberculin (T.R.) or tuberculin (B.E.) may be of service in healing the ulceration.

The main objects of local treatment are: (1) the complete removal of the diseased tissue; and (2) the production of as little scarring and disfigurement as possible. The methods employed may be conveniently considered under the headings of surgical, physical, chemical, and radiotherapeutic.

Surgical Methods

Excision.—Where practicable, when the lesions are not too extensive, and are situated on covered parts of the body, excision is the most satisfactory treatment, and even on the face, in the hands of a skilled operator, excellent results may be obtained by it. The incision should be made at least a quarter

of an inch beyond the diseased area, and not only the skin, but the superficial half of the subcutaneous fat should be removed. After the excision the surface should be grafted. Krause's deep grafting should be employed rather than Thiersch grafting, since, with the latter, the wound does not heal rapidly, and the scar is liable to be uneven, occasionally keloidal, and may be followed by contraction. Deep grafting consists of transplanting a piece of skin of the exact shape and size of the tissue excised, taken from some suitable part, such as the thigh. The graft should be cut as deep as the fat layer, the fat being scraped off before it is put in position, and it should be slightly larger than the required size to allow for shrinkage. After being placed in position, it is neatly sutured to the edges of the wound. Where the lupus occurs about the mouth, eyelids, and nose, it may be difficult to get the graft to hold, and in such cases some form of plastic operation may be resorted to, employing grafts from a neighbouring part with pedicles, which can be severed when the graft has healed in place.

Scraping is a simpler method than excision, but the results from it are more uncertain. It is apt to leave unsightly scars, and if not sufficiently drastic may lead to a dissemination of the disease by opening up the lymphatics. It should be done under a general anæsthetic by a Volkmann spoon, methodically, thoroughly, and firmly, and should reach down to the subcutaneous tissue. Owing to the hæmorrhage associated with scraping, it is difficult to distinguish healthy from diseased tissue, except by the feeling of resistance to the spoon, the lupus being so much softer than the healthy tissue. The hæmorrhage is, as a rule, too profuse to be controlled by pressure, but can be stopped by ironing the surface with a Paquelin cautery. In spite of the most careful scraping, small diseased foci are apt to be left. To obviate this, the raw surface should be dabbed over with pure carbolic, or smeared with zinc chloride paste, made fresh by pounding up a small quantity of zinc chloride in a mortar with glycerine and water. The surface should then be covered with an aseptic powder, and a dry dressing applied. When the wound has healed, it should be carefully examined for foci of the disease which may remain. This is best done by a diascope, or piece of glass pressed down on the lesion, when the diseased foci can be detected as semi-translucent brownish specks. These may be dealt with by cauterisation with a fine pointed Paquelin cautery, or by acid nitrate of mercury drilled in by a glass pen.

Scarification is a somewhat neglected method, which is useful for the destruction of small lesions about the face, as it causes comparatively little scarring. It consists of chopping up the nodule by a number of criss-cross incisions, either by a sharp tenotome, or by a special instrument devised for the purpose with several parallel blades. The bleeding is controlled by pressure, followed by the application of powdered permanganate of potash,

or zinc chloride paste. It may be necessary to repeat the scarification should any disease persist after healing.

Physical Methods

Cauterisation.—Reference has already been made to the use of the actual cautery for the destruction of persistent foci of disease after scraping, and for the control of hæmorrhage. For this purpose, the Paquelin cautery, with a point of suitable size, at a dull red heat, is superior to the electro-cautery, as it is more easily controlled and manipulated. The disadvantages of the use of the actual cautery, however, are that it is liable to destroy healthy as well as diseased tissue, and to be followed by a hypertrophic scar. As the burning is almost instantaneous, small lesions can be destroyed by this means without the necessity of a general anæsthetic.

Freezing with solid carbon dioxide is a useful treatment, especially in lupus of the verrucose type. For warty patches situated on the extremities, freezings, repeated at intervals of about a week to allow healing to take place in the interval, give better results than any other form of treatment. The exposures should be from 30–60 seconds, with firm pressure, the applicator being of suitable size. After the freezing, the exposed area should be covered with a simple aseptic dressing until healing has taken place.

Chemical Methods

The most important caustics are pyrogallic acid, salicylic acid, permanganate of potash, silver nitrate, zinc chloride, and acid nitrate of mercury. Both pyrogallic acid and salicylic acid were once largely used in the form of plasters, generally combined with creosote, or as paste spread on lint. These were applied continuously to the lupus patch, until sloughing of the diseased tissue took place. This treatment during recent years has fallen largely into disuse, owing to its tediousness and the pain associated with it. The same criticism may be made with regard to permanganate of potash, which was employed as a powder spread over the patch, and then covered with cotton-wool, or as a 10 per cent. solution painted on daily. Silver nitrate is still used in the form of a pencil, which is drilled down into the nodule, and is of some service in lupus of the mucous membranes. Acid nitrate of mercury is the most useful of the caustics, and is of special value in destroying isolated nodules. It consists of one part of mercury dissolved in two parts of nitric acid (specific gravity 1·5). It is applied either on a piece of cotton-wool twisted on a match, or by a glass pen, and should be kept in contact with the nodule for at least a minute. The application causes the diseased tissue to become white and opaque, and results in the formation of a brownish crust, which becomes

detached when healing takes place. Where the caustic is applied to small areas comparatively little discomfort is caused by it, but if the patches be of the size of a sixpence or larger, there may be severe pain for some hours after the application.

Radiotherapeutic Methods

Phototherapy.—Apart from excision phototherapy is generally recognised as the most permanent treatment of lupus, and the one that produces the least disfigurement, the resultant scar being sometimes so slight as to be almost unnoticeable. This method is so tedious, however, that its use has to be restricted to lupus of the face and neck, or of the thin skin over joints, where it is important to avoid contracture. Long experience of its use has shown that a cure can be effected in 60 to 70 per cent. of cases, provided the patient has the time and patience to have the treatment properly carried out. Where failure has taken place, it has generally been because the lupus is too deeply situated for the irradiation to be effective, or because the diseased tissue was covered with a cicatrix impermeable to the rays. The selection of the best type of lamp is a matter of opinion; the technique should be learned in one of the hospital departments where it is in use.

X-rays have been extensively used in the treatment of lupus in the past, but their indiscriminate employment for this purpose has done more harm than good. In my experience it is impossible to destroy the lupus tissue by this means without causing an X-ray burn, possibly followed by epithelioma. It has recently been shown that cancer developing in old cases of lupus vulgaris has been much more common since the introduction of the X-rays than it was previously. On this account they should be used with the greatest caution. I have found that they are of service for the healing of superficial ulcers in lupus as a preliminary to phototherapy, and for lesions in certain situations, such as the eyelids or the mucous membranes, which cannot be dealt with satisfactorily by actinic rays owing to the difficulties of exerting the requisite pressure.

Radium is rarely used in this connexion. Its action is similar to the X-rays, and the results from it are not so satisfactory as those from phototherapy.

Conclusion

Unless the disease has been completely removed by excision, recurrences are so liable to take place that the patient must be kept under observation and examined periodically, any foci of disease being immediately dealt with. As a general rule, where the lesions are of limited extent, and situated on covered parts of the body, excision followed by deep grafting is the best treatment. Where they are too extensive for excision they should

be scraped and cauterised. For lupus on the face phototherapy gives the best results, and where the disease has attacked the mucous membrane, scraping followed by the application of lactic acid, or silver nitrate, or the actual cautery is the most useful method.

VIII

THE MEDICAL TREATMENT OF CANCER OF THE STOMACH

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In no form of malignant disease are the results more depressing than in carcinoma of the stomach. The absence of early symptoms gives the patient little warning and the obscurity of the physical signs often leads to delay in diagnosis. It must be added that, even when diagnosis has been made very early, the results of treatment, whether surgical, medical, or radiological, are seldom less disappointing.

In a later paragraph it will be laid down that surgery plays a most important part in the treatment of gastric carcinoma. There are, however, many cases which are unsuitable for operation on account of the patient's general condition or the extent of the local lesion ; there are others where surgery is not indicated even apart from these factors ; and there are yet others which call for medical treatment when surgery has failed. The medical treatment of cancer of the stomach is therefore a problem frequently before every medical practitioner.

Curative Measures

Attempts at curative treatment fall under three headings : (*a*) surgical, (*b*) medical, and (*c*) radiological, two of these forms of treatment being frequently combined.

Surgical.—Excision of the primary growth still presents the greatest hope of cure. It should be attempted whenever possible. In this connexion it must be remembered that pyloric growths producing gross gastric retention, with dilatation of the stomach and profuse vomiting, are not infrequently small in size and relatively easy to remove surgically.

Medical.—Curative medical treatment usually takes the form of intravenous injection of salts of the heavy metals, such as copper, lead, and selenium. Great caution is necessary, and the results so far have been interesting rather than encouraging. Attempts to cure cancer of the stomach by special diets have

been uniformly unsuccessful. The Wassermann reaction should be determined in every suspected case, benign gummata having occasionally been mistaken for malignant growths.

Radiological.—Deep X-ray therapy may be tried, but should never be substituted for surgery in operable cases. I have frequently seen amelioration of symptoms follow its employment, but never cure. The implantation of radium or radon by a minor surgical operation is often a preferable form of radiological treatment; the growing edge of the carcinoma can in this way be attacked and localisation of treatment is easier.

Palliative Measures

The treatment of symptoms and complications again falls under the heading of surgical, medical, and radiological.

Surgical.—The commonest use of surgery in cancer of the stomach is for the prevention of obstruction. Remembering that pyloric obstruction is a frequent cause of death in these cases, the practitioner will be at pains to secure a short-circuiting of pyloric growths at a stage when such a procedure is practicable. The selection of such a site for the stoma that subsequent blockage does not occur is a matter of surgical technique which is outside the scope of the present article. Surgical operations for the prevention of pain by nerve-section are infrequently required.

Medical.—Here two main aspects of the disease overshadow all others; they are (1) obstruction, and (2) pain.

(1) *Obstruction.*—The necessity for the surgical prevention of obstruction has already been emphasised. Cases are met with fairly often in which the extent of the disease or the patient's low condition preclude such operations. Obstruction of the cardiac orifice is not here considered; its treatment does not materially differ from that of œsophageal obstruction.

In inoperable pyloric obstruction the treatment of greatest value and most frequently neglected is *gastric lavage*. It cannot be over-emphasised that gastric lavage is a procedure which patients, with very little practice, can themselves perform with ease and considerable advantage. A soft rubber tube, of about the calibre of the little finger, and if possible furnished with a single large opening half an inch above the tip, should be selected. The patient should be taught to pass this at first daily, later as often as required, and the stomach should be washed with normal saline until relatively clean and empty. Sodium bicarbonate solution is useful if there is any excess of mucus, and opiates may be added later by this route if there is an indication for them. Gastric lavage should never be delayed until the time when it is an increased burden to the patient; he should, on the contrary, learn its value in the early days, just as a patient in the early days of an attack of pneumonia will learn to appreciate the value of oxygen and call for it gladly, even in the delirium preceding the crisis.

Diet is of great importance. Patients with carcinoma are seldom hungry, and there is no evidence that forced nutrition has any effect in delaying the progress of their malady. If therefore hunger is allayed there is no reason for attempting to provide a large diet. The problem of obstruction remains the most prominent. Foods containing cellulose, such as green vegetables, brown or branny breads, fruits other than orange-juice and soft bananas should be excluded, together with meat or fish in any large pieces, unless obstruction in any degree be absent. Soups, carbohydrate gruels, milk, glucose solutions, and orange-juice are the foods of choice when obstruction is threatened, and alcohol is, in my opinion, a most valuable adjunct in these cases on account of its calorie value, sedative effects, and ready assimilation.

There is nothing illogical in the combined use of such foods with gastric lavage; a partially obstructed stomach frequently relieved by lavage will allow the progress of more fluid than such a stomach treated in any other way. In inoperable cases of severe pyloric obstruction nutrient enemata must be employed to relieve thirst.

(2) *Pain.*—Much of the pain and discomfort of cancer of the stomach is due to obstruction, and should be avoided by the measures described above. There remain the pains of nerve involvement or due to the spread of the disease elsewhere. Analgesics, such as bromides, pyramidon, allonal, and diacetate are often valuable in the early stages. Luminal is sometimes very effective in controlling nausea and vomiting.

When the diagnosis is quite definite and pain and discomfort are prominent, there is little to be gained by delaying the use of opiates. In my experience, much needless suffering is caused through the mistaken belief that a stage in the disease will be reached when morphia in any form will become ineffective. As regards cancer of the stomach, this is a profound error. It is seldom necessary to give more than small doses of omnopon, or of such time-honoured preparations as tr. chloroformi et morphinæ co. or tr. opii, in order to secure ease for the patient, provided that gastric lavage is used to allay the symptoms of obstruction.

The personal attitude of the doctor towards his patient is at no time of greater importance than in these cases, and a steady optimism in the face of tragedy is both helpful to the patient and justified by the progress of medical science.

IX

THE TREATMENT OF INSECT BITES AND STINGS

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Insect venoms may have one or several of the following effects : (*a*) hæmolytic ; (*b*) neurotoxic ; (*c*) irritant—producing local inflammation ; (*d*) producing profound and even fatal shock.

Mosquitoes, Midges, and Flies

The nature and source of the poison introduced by a mosquito or gnat has been for long supposed to be the secretion of the salivary glands, but Nuttall and Shipley in 1903 and Schaudinn in 1904 showed that the evidence for this is far from conclusive. Nuttall and Shipley could find no evidence of hæmolysis or delayed coagulation produced by an emulsion of the salivary glands of *Culex pipiens*. Schaudinn found that the irritation of a mosquito bite was due, not to the saliva, but to an enzyme contained in a commensal yeast which is a constant inhabitant of the œsophageal diverticula of the mosquito. The yeast cells are injected into the wound by the insect when feeding, but are mostly sucked back again if the mosquito is allowed to finish its meal. In the last year or two several deaths have been reported following mosquito bites which were apparently highly septic. It seems likely that these results have been due to the mosquitoes having temporarily harboured virulent streptococci in addition to the normal yeast cells. Horse-fly bites also are often highly septic, and cases are on record where anthrax has been inoculated by the bite of a horse-fly.

Individual preventive measures against mosquito, midge, and fly bites consist in keeping the insects at a distance either by smoke from a fire or from tobacco, or by the application to the skin of some essential oil, such as that of citronella, which is a constituent of numerous proprietary articles designed for the purpose. A useful prescription is :

℞ Ol. cedri, ℥iss.
Ol. citronellæ, ℥iiiss.
Spt. camphoræ ad ℥i, misce.

This should be smeared on the skin of the exposed parts as often as is necessary. Cod-liver oil used in the same way has been highly recommended. The irritation of a mosquito or fly bite may be allayed by gently rubbing the puncture with a moist cake of soap, or by applying a 1 per cent. alcoholic solution of menthol, or 1–20 watery carbolic lotion. Hydrogen peroxide or weak ammonia solution dabbed on is also useful. If the bite shows any signs of being a septic one, it is important that measures should be taken at the earliest moment to combat the sepsis, either by constantly renewed hot boric fomentations or, if a limb is implicated, hot saline arm or leg baths; or Bier's treatment or antistreptococcal serum also may be advisable.

Lice, Bugs, and Fleas

Methods for the destruction of lice, bugs, and fleas scarcely come within the scope of this article, but it may be mentioned that as a preventive against the bites of fleas the application to the skin of oil of pennyroyal, oil of birch tar (which has the not unpleasant smell of Russia leather), or oil of lavender; or the dusting of powdered pyrethrum, menthol, or camphor into the socks or underclothing is of service. It should be remembered that fleas breed in cracks in floors and wainscots, that unoccupied fleas usually lie in wait on the floor, so that anti-flea preparations should be applied chiefly to one's legs or their coverings.

The irritation of a flea bite can be allayed by applications of 1–20 carbolic acid lotion or by the following ointments:

℞ Ac. carbol., ℥ x.
Menthol, gr. v.
Zinc oxide, ʒi.
Adipem prep. ad ℥ i.

or

Hyd. ammon., gr. x.
Liq. picis carb., ʒi.
Ung. paraffin B.P. ad ℥ i.

Or by applying one drop of:

Ac. carbol. } Partes æquales.
Spt. vini meth. }

Some fortunate individuals appear to be naturally distasteful to fleas, and others possess, or acquire, a relative immunity to the effects of their bites. The irritation caused by poison hairs of "woolly-bear" caterpillars may be allayed by bathing with a weak solution of ammonia or 1–20 carbolic lotion, or the application of moist sodium bicarbonate. Castellani and Chalmers advise bathing with a 2 per cent. sodium bicarbonate lotion followed by the application of a 10 per cent. ichthyol ointment.

Kirkland (1907) advised that the following lotion should be well rubbed in :

℞ Ac. carbol., gr. xxx.
Zinc ox., ℥iv.
Aq. calcis ad ℥viii.
M. ft. lotio.

Harvest Bugs

The familiar " harvest bugs," which are really the six-legged larval forms of various species of the acarid *Trombidium*, are normally parasitic on various insects, but readily attack man when he gives them the opportunity by walking through the grass or vegetation on which they are living.

These larvæ are usually supposed to burrow into the human skin, or at least to penetrate the hair follicles, but Ewing in U.S.A. (1921), as a result of some careful observations on his own leg and ankle, found that this was not so. The mites were from three to seven times too large to enter a sweat pore or hair follicle and were merely attached by their mouth parts, about 80 per cent. on the smooth surface of the skin and 20 per cent. at the bases of hairs with their mouth parts thrust down the hair follicles. The characteristic burning sensation began in a few hours and increased for 36 hours.

Protection from the attacks of these larval mites can be obtained by sprinkling flowers of sulphur or powdered naphthaline into the stockings and underclothes from the knee downwards. The mites can be removed by mopping the skin with benzine or petrol or taking a warm salt bath, and the itching can be allayed by one of the ointments suggested for flea bites.

Bees, Wasps, and Hornets

The sting of a bee, wasp, or hornet is always painful and may be dangerous. Danger may arise on account of the situation of the sting—e.g. in the tongue or fauces—when the great swelling which ensues in these regions may obstruct respiration and cause death from suffocation. Such accidents are apt to happen to those who devour fruit without inspection sufficient to detect a concealed wasp.

It is often stated that the serious symptoms of collapse and even death which occasionally follow a bee or wasp sting in a healthy person are due to the sting having penetrated a vein so that the venom is injected directly into the circulation. This may sometimes be the case. Another explanation may be that occasionally patients become anaphylactic to bee or wasp venom, and certainly some of the cases described have shown symptoms which might be explained as profound

anaphylactic shock. It may be possible also that the venom of individual insects may, under certain conditions, be of exceptional potency.

The sting of the bee and wasp is complicated, but its working is entirely reflex, so that it is easy to get a severe sting from a bee's abdomen which has been for many hours separated from its thorax. The poison sac and glands are usually left behind by the bee attached to the sting. The poison-forming apparatus consists of a long acid-forming gland and a much smaller alkali-forming one. A detailed study of the poison of some 25,000 bees was published by Joseph Langer in 1897. He found it to consist of formic acid plus an organic base. The pure poison placed on uninjured skin produced absolutely no irritant effect, but caused a marked reaction on the mucous membrane of nose or eye. The slightest break in the skin surface, or a needle puncture through a drop of the poison caused typical effects—i.e. local necrosis surrounded by hyperæmia, œdema, and infiltration of leucocytes. Further studies on bee poison were published by F. Flury in 1920. He had investigated the poison from some hundred thousand bees and found that apart from the formic acid a considerable portion seemed to be lipoid in character. By hydrolysis he was able to split off cholin, glycerol, phosphoric acid, palmitic and other fatty acids, an indol derivative, presumably tryptophane, and an unidentified non-nitrogenous component. The latter he believed to be the active component of bee poison. It produced hæmolysis and behaved like the hæmolytic saponins. Flury regards bee poison as a complex of lecithin with basic components, showing resemblances on the one hand to the protein-free sapotoxins, and on the other to poisons of the cantharidin type. Some snake venoms include saponin-like poisons (krotalotoxin and ophiotoxin) which account for their hæmolytic properties. The potency of cantharidin as an irritant poison explains the local inflammatory reaction resulting from a bee sting.

Treatment of a bee or wasp sting consists, first of all, in removing the sting. This should *not* be laid hold of with forceps or fingers and pulled out. Such a proceeding will squeeze the poison sac and force more poison into the wound. The sting should be lifted or scraped out with the blade of a knife or the edge of a long finger-nail. The application usually recommended is solution of ammonia. It is important that this should be dabbed on and not rubbed, or it will rapidly remove the epidermis. In the absence of ammonia, gentle rubbing with a moist cake of soap may be tried. The application of a bag of washing blue is a household remedy of great popularity. Hot fomentations are useful in relieving the pain of severe stings. While the poison of the bee is acid, it was pointed out by E. R. Speyer in 1919 that

that of the wasp is alkaline and that therefore in the case of wasp stings an acid application, such as vinegar, should be more effective in relieving the pain than an alkali.

J. F. D. Donnelly (1898) recommended $\frac{1}{6}$ gr. of cocaine dissolved in a few drops of water and rubbed on the puncture with the finger. He found that this almost removed the pain, and a second application 1–2 hours later completed the cure. One would expect hypodermic injections to be even more effective. Pugnat (1918) found that the immediate local application of a saturated solution of aloes in alcohol was of material benefit in treatment of wasp stings and insect bites. He found that if the solution were rubbed in immediately no local or general reaction took place. Langer, in his experimental studies, found that bee poison was very rapidly destroyed by pepsin, but I can find no record of this preparation having been used clinically.

The treatment of cases where sudden collapse follows the sting of a bee must be on the usual lines for the treatment of shock and collapse.

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X

THE TREATMENT OF CHRONIC GONORRHŒA IN WOMEN

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Chronic gonorrhœa in women is one of the most difficult diseases to cure completely. The patient may have had a discharge for some years which she has neglected, through ignorance of its significance, or she may have had an attack of acute gonorrhœa and abandoned treatment too early. In any case, the practitioner usually has the condition brought to his notice through some other illness, which when traced to its origin reveals an old gonococcal infection as the primary source. The superimposed illness may be an arthritis of one or more joints, the joints most frequently affected being elbow, wrist, finger-joints, knee and ankle. When other possible foci of infection, oral or intestinal, have been excluded, a patient may be found to have a discharge which, she says, is of long-standing, and causes her no trouble. Again, the patient's symptoms may be purely pelvic, she may complain of menorrhagia, of pain in one or both iliac fossæ, or of sacral backache, but will stoutly deny that she has a discharge. The persistent practitioner will frequently find evidence of old-standing infection on pelvic examination, and such an examination should become recognised as an essential part of a general overhaul. Sometimes also after patient investigation a suggestive previous history is obtained—an attack of severe cystitis some time before, or a baby with ophthalmia neonatorum. There may be a history of pyrexia after an easy childbirth, followed by a considerable period of pelvic illness with menorrhagia, and even sometimes metrorrhagia; finally there remains a vaginal discharge, mostly slight, which causes little inconvenience. In many cases, on examination, old patches of staining will be seen round urethral or Bartholin orifices, and by massage of the anterior vaginal wall gleet or muco-pus can be expressed from the urethra. Vaginal examination will almost certainly reveal a chronic cervicitis, with an erosion and muco-purulent exudate, and often thickening of the Fallopian tubes. The discharge will contain

mainly secondary organisms. Gonococci are rarely found in such cases unless from a urethral film. The gonococcus is, of course, intracellular at this stage, within polymorph or epithelial cells; therefore douching or painting alone cannot eradicate the disease. The complement-deviation test for gonorrhœa is of doubtful value in the chronic stage, while cultures mostly grow only staphylococci.

The practitioner may know well that the disease is a chronic gonorrhœa, but he should be chary of making his diagnosis known to the patient or her husband unless the previous attack of gonorrhœa is admitted or the gonococcus has been definitely isolated. The diagnosis may well be left at "chronic urethritis or cervicitis," but the importance of the lesion and of the discharge as a focus of infection must be stressed. Many puerperal septicæmias are undoubtedly due to a chronic gonorrhœa.

Local Measures

Treatment must consist primarily in keeping the patient clean and comfortable, by clearing away obvious discharge by careful douching, at the same time taking care to avoid over-douching. The douche material used depends on the type of discharge and on the practitioner's own preference.

Patients left to themselves frequently choose lysol douches and these, if not thoroughly mixed, or if used too strong, seem to make her more sore and less comfortable than before. My preference in very purulent cases is for a douche of 1 per cent. lactic acid, or of sanitas, or of liq. sodæ chlorinatæ 1 in 80, or weak pot. permang. In less purulent cases a plain douche of hypertonic saline, or of boracic, or of zinc-alum powder in equal parts, ʒ 1 of powder to each pint of douche water, is useful and comfortable. Bladder and urethral washouts must, of course, be done with bland, non-irritating drugs. I use 1 in 8000 permanganate solution or boracic ʒ 1 to pint, or 1 in 6000 biniodide of mercury, taking care that none of the biniodide solution remains in the bladder.

The accepted drug for application to the cervix in gonorrhœa has for long been one of the preparations of silver: but though these salts have a wide field of usefulness, I do not use them exclusively. Saturated solution of pot. permang., 20 per cent. mercurochrome, and 1 in 100 acriflavine are among other useful drugs. An important point to remember when painting the cervix is that any adherent muco-pus must be dissolved with liq. potassæ, or better still, with a saturated solution of sodii bicarb. before the antiseptic paint is applied. In painting erosions of cervix, a solution of picric acid is sometimes useful, or 10 or 15 per cent. picric in alcohol may be employed. No

useful purpose is served, however, by undue use of caustic substances in painting the cervix. Soluble pessaries of contramine, lactic acid, or of ordinary sulphur or of protargol are sometimes placed against the cervix, and kept in position by a dry tampon which is removed 12 hours later; or tampons soaked in one of the glycerine preparations may be preferred —e.g. glyc. boracis, glyc. ac. tannic., or glyc. with 5 per cent. ichthyol and 2 per cent. lactic acid. This last is a most useful tampon, though in some patients if it is continued for more than a few days an irritant vaginitis results. Small lesions such as Nabothian cysts on the cervix must be punctured; Skene's ducts and ducts of glands of Bartholin, if infected, must be washed out with an antiseptic solution twice or three times a week.

This treatment is only satisfactory when carried out by a well-trained gynæcological nurse, or by the doctor himself. Self-douching by the patient is useless; a good nurse will accomplish in three weeks what it will take the patient three months to achieve.

In addition to local applications measures directed towards raising the patient's resistance are required if the disease is to be eradicated.

Vaccines

Vaccines have had periods of disrepute. To get a really good result from their administration, it is necessary to have a vaccine freshly made from organisms of a vigorous strain. The vaccine may either be autogenous or stock. If a stock vaccine is used it must come fresh from a reliable source, otherwise both practitioner and patient will be disappointed with the result.

The best vaccine for a chronic gonorrhœa contains gonococci and secondary organisms combined, the usual mixed vaccine consisting of gonococci, staphylococci, streptococci, and diphtheroid bacilli. The first dose for a woman in average health should be from 25–40 millions, depending on her body-weight. After a week, if the patient has not had a reaction, the dose may be doubled. A reaction is indicated by rise of temperature and pulse-rate from 6–24 hours after the injection, by headache, sickness, or backache, or by a general feeling of malaise. Should there have been a slight reaction only, an addition of 50 per cent. to the previous dose may be given a week later. When a really marked reaction occurs the dose should be repeated at the next injection, instead of being increased. The injections are best given at intervals of a week to begin with, and later at intervals of 10–14 days. Too frequent doses seem to induce a negative phase and to retard recovery.

After eight to ten doses of vaccine, even if the patient has improved, there should be a rest of a couple of months; then

another series of vaccines or another method of accessory treatment may be begun.

Non-specific Protein Therapy

"Non-specific protein therapy" has many advocates at the present time, and has proved of great use. It is simple and inexpensive; a drawback is the considerable reaction—local or general—so that the patient has to be prepared to lie up, or at least "go slow," for 24 hours after an injection.

For housewife or business woman alike, an injection on a Saturday afternoon is convenient, the patient arranging to be in bed not later than four or five hours afterwards. The reaction usually begins with rise of temperature and pulse-rate, the maximum rise—which may be 102° F.—occurring 8–12 hours after injection. During this period, naturally, the patient feels far from well, and usually aches all over. Some patients experience no general reaction, but complain of very severe pain and stiffness at the site of injection. The injections should be intramuscular, the gluteal muscles being generally chosen in women. It is best for the patient to have no other drug, but should the reaction be too severe, 10 gr. of aspirin will make her comfortable.

Before starting protein injections it is wise to make sure that the patient is not subject to asthma or hay-fever. Such patients tend, a few seconds or minutes after injection, to have a marked vasomotor reaction, with severe flushing of face and neck, suffusion of conjunctivæ, very rapid pulse and a feeling of suffocation, or as if the head would burst. Administration of hypodermic injection of 10 minims of adrenalin (1 in 1000), P. D. & Co., usually clears this at once, but if it does not do so completely, the dose can be repeated in 10 minutes. Such reactions are rare.

There is usually an exacerbation of the discharge for 24 hours after the injection, followed by improvement. A marked leucocytosis while the reaction is at its height gradually subsides till, in a few days, the white count is practically normal. These injections may be repeated weekly; four are usually enough. The materials most frequently used are milk, a collosal silver preparation, or T.A.B. or some similar vaccine. Milk is prepared by standing it in a boiling water-jacket for 10–15 minutes. A clean, boiled test-tube can be three-parts filled with milk, stopped with flamed cotton-wool in the usual way, and stood in a steriliser or small enamelled basin of water, which is then brought to the boil and boiled for at least 10 minutes. The doses of milk usually given are 4, 5, 8, and 10 c.cm. in successive weeks.

Sometimes *B. coli* vaccine is given at the same time as the milk injection; or a dose of electrargol (collosal silver) may

be given intravenously, followed immediately by a small hypodermic dose of mixed gonococcal vaccine. Sometimes T.A.B. is given weekly in doses of ½ to 1 c.cm. till three or four doses have been given. The underlying idea of all these injections is the same.

The Glycerine Drain

In a chronic gonococcal endometritis with discharge and menorrhagia, great relief is often obtained by using the glycerine drain.

This simple method was introduced by Dr. Remington Hobbs, and as usually practised consists in gentle dilatation of the cervix to No. 7 or 8 Hegar. About 2 c.cm. of pure glycerine is then injected into the cavity of the uterus from a sterile 5 c.cm. syringe; a small rubber drainage-tube is inserted through the internal os and is left to drain into the vagina, which is lightly packed with iodoform gauze; the gauze is removed in 24 hours, the rubber drain 24 hours later. In a multipara an anæsthetic may not be required; only a very short anæsthetic is required in any patient, and the patient is in no way upset by the manipulation.

This method has usually to be repeated, in a chronic case two or three times, at intervals of three weeks or so. Some gynæcologists prefer to pack the uterine cavity with 50 per cent. glycerine and iodine, or with 5 per cent. mercurochrome in glycerine.

Diathermy

Where there is a chronic urethritis of some duration, in my opinion there is no treatment so effective as diathermy, as suggested and practised by E. P. Cumberbatch and J. W. Arthur Robinson.

By means of a diathermy machine with special electrodes a temperature of 112° F. in the patient's urethra can be reached and maintained for 10 to 15 minutes without causing pain, and most obstinate cases of urethritis have been completely cleared up. Similarly, in cases of chronic cervicitis, a heat of 112·5° to 113° F. can be safely borne by the cervix for 10 to 15 minutes; a cervical electrode, shaped like a uterine sound, but containing a thermometer is used. This penetrating heat is highly inhibitory to the gonococcus, and the patient has no discomfort; but rash applications of 115° to 120° F. invariably produce pain, from pelvic congestion, which may persist for a couple of weeks. This treatment gives admirable results in cases of gonococcal arthritis, the joints clearing up sometimes as if by magic. Before administering diathermy treatment the

practitioner must have careful tuition, since inexpert handling will inevitably produce pain or even severe burns.

One last word ; if a married woman has a chronic gonorrhœa, time, patience, and money are thrown away on treating her if her husband has old, untreated prostatitis or vesiculitis.

XI

THE TREATMENT OF FEMORAL HERNIA

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The treatment of femoral hernia is governed by two factors. First, it is anatomically impossible to control the neck of the sac from without, palliative treatment by a truss is therefore at best unsatisfactory. Secondly, strangulation is more frequent than in any other variety of external hernia, and when it occurs is of a more dangerous type. For these reasons treatment by operation is, in most cases, the wiser course. Advanced age or disease may render any operation inadvisable, but the risks of a general anæsthetic may be avoided by the use of local anæsthesia, which is particularly well suited to operations upon femoral and inguinal herniæ. Treatment by a truss is less objectionable in the larger herniæ. Where the sac is lax and a good impulse is felt on coughing, and where the canal is large enough to admit two fingers, the risks of strangulation are very much less than in the common type of hernia which is small, tense, and gives hardly any impulse on coughing. In large herniæ, however, it is difficult to find a truss which can be tolerated by the patient.

The majority of femoral herniæ are irreducible from their first appearance ; if the attempt succeeds, there is no tendency for the contents to remain reduced, for the crural ring, once forced, remains patent owing to ligamentous nature of its boundaries. It is impossible to apply any pressure which will effectively keep the peritoneal sac closed. The mass which can be felt in Scarpa's triangle in these cases consists for the most part of alternating membranous and fatty coats ; a swelling the size of a walnut will usually contain a sac no larger than the last phalanx of the little finger. When such a sac has been emptied, only the contents are returned to the abdomen, and the coverings remain as an elastic mass in Scarpa's triangle. The small sac lying in this mass cannot be effectively controlled by the pad of the truss. The funnel-shaped neck lies deeply under the inner end of Poupart's ligament, and must always remain open, inviting recurrence.

Again, a femoral truss can neither be kept in place nor worn with comfort. Movements of the body occur around

certain planes, and leave their impress on the surface as flexure lines upon the skin, of which the creases in the palm are the best-known examples. The flexure line corresponding to movements between thigh and trunk, well seen in the obese, runs transversely across Scarpa's triangle from the pubic spine on the inner side to the region of the top of the great trochanter. The pad of an inguinal truss lies wholly above this line, and moves with the trunk. The pad of a femoral truss must lie athwart it, and can therefore never rest firmly on subjacent parts, or be free from discomfort.

The frequency of strangulation in femoral hernia is accounted for by the unyielding nature of the structures surrounding the neck. When strangulation occurs, these same factors lead to early gangrene and perforation of the intestine. Further, the symptoms of strangulation may not be associated by the patient with the presence of a femoral hernia, which she knows to be there. Zachary Cope has observed that the peritoneum of the posterior abdominal wall, from which the sac of a femoral hernia is derived, is less sensitive than the anterior abdominal peritoneum which lines an inguinal sac. Localised pain is sometimes so inconspicuous that the patient may mistake the vomiting and colic of a strangulation for symptoms of food poisoning, and may take an aperient, making matters infinitely worse.

For these two reasons, the inefficacy of the truss and the danger of strangulation, the patient should be advised to submit to operation unless there are cogent reasons for avoiding this course.

Type of Operation

An operation designed for the radical cure of any hernia should fulfil three requirements: the isolation and emptying of the peritoneal sac, the closure of the sac at its neck, and the repair of the hernial opening at its commencement, in order to prevent the formation of a fresh sac.

The special features of femoral hernia are concerned with the character of the hernial opening. The crural canal, along which a femoral hernia passes, is a compartment of the femoral sheath, and its wall is derived from the fasciæ lining the abdominal cavity. It is closed above by a fibrous diaphragm, the septum crurale. Normally it contains loose fat. It transmits a number of lymphatic vessels, by which lymph passes from the deeper subfascial inguinal glands surrounding the femoral vein to the external iliac group of abdominal lymph glands. It also acts as a resilient washer lying beside the femoral vein as it passes under Poupart's ligament, and allowing that vessel to expand when, under conditions of muscular exercise, the volume of blood returning along it may increase as much as eight- to ten-fold. Because of this

relationship to the femoral vein, any method of closure which fastens down the inner end of Poupart's ligament to the pubis, whether by suture or by a metal staple, is unsound. Such a procedure depresses the ligament along its whole length, and makes it constrict the femoral vein. Moreover, as this ligament is an integral part of the attachment of the abdominal musculature, it will not remain in its new position. Stitches cut out, while staples are apt to work loose from the bone and so cause serious trouble.

The operations for femoral hernia are of two main types: those where the sac is approached from above Poupart's ligament through the inguinal canal, and those where it is approached directly from Scarpa's triangle. The former approach allows the sac to be tied off at its neck, and is also satisfactory from the point of view of closure of the canal, but it does not permit the isolation of the sac from its surroundings. In the operation performed entirely from above, the whole sac with all its coverings has to be pulled under Poupart's ligament into the inguinal incision, thereby tearing an unnecessarily large hole in the fibrous structures of the canal and rendering closure difficult. It is only necessary to remove the peritoneal sac. The remaining coverings should be left undisturbed in the crural canal, as they help in the obliteration of the space.

The approach from below does not permit direct access to the neck of the sac. The wall of the bladder is not uncommonly drawn down into the crural canal on the inner side of an old-standing hernia, and can only be stripped off the neck of the sac with some difficulty. If the surrounding tissues have been cleared without the aid of direct inspection, it is very easy to include the bladder in the stitch which transfixes the neck of the sac, or even to cut away part of its wall. The combined route is therefore preferable in all cases.

The Standard Operation

1. An incision is made along the line of the inguinal canal, and is then carried vertically downwards for 2 inches over the saphenous opening. As in all curved incisions, it is advisable to scratch the skin transversely before cutting in order to ensure accurate approximation afterwards. The wound is deepened to expose the external oblique over the length of the inguinal canal, the inner end of Poupart's ligament, and the coverings of the femoral sac. Cutaneous vessels, which are very numerous, are secured with pressure forceps as they are encountered, and tied off.

2. The coverings of the hernia are now divided in turn with Mayo scissors till the peritoneal sac is opened. The interior is inspected, and any contents returned to the abdomen. If they are adherent at the neck no attempt is

made to detach them till later. The edges of the sac are caught with fine forceps, and all coverings stripped off by blunt dissection till the peritoneal sac is freed right up into the crural canal. The neck is clamped with a pair of artery forceps and the remainder of the sac cut away.

3. The inguinal canal is now opened by incising first the external oblique and then the cremaster muscle. The cord or round ligament is lifted from its bed and held out of the way in the loop of a pair of tissue forceps, exposing the posterior wall of the inguinal canal consisting of transversalis fascia. This is incised immediately above and parallel to Poupart's ligament. If the forceps which grasp the neck of the sac are now thrust upwards the latter is pushed up into view through the soft extraperitoneal fat. The forceps are then removed, the neck caught up, and brought into the wound. In this situation it is very easy to free any omentum which is adherent, and, by trimming the edges, to close the opening in such a manner that no dimple is left on the abdominal surface of the peritoneum.

4. The hernial opening is now closed at its abdominal end by extending the attachment of the conjoined tendon further along the ilio-pectineal line, so that it lies close to the femoral vein, and interposes a barrier of muscle between the abdominal cavity and the crural canal. The crural canal itself is reinforced by drawing the fatty coverings of the sac into the empty space left by its removal. With the right hand two or three mattress sutures of stout catgut are passed first through the lower edge of the conjoined tendon, then through Astley Cooper's ligament (the thickened upper edge of the pectineus fascia on the ilio-pectineal line), then down through the crural canal into the fatty coverings of the sac which have been left in situ, then back through the crural canal to the conjoined tendon. Meanwhile the forefinger of the left hand is kept on the femoral vein, pressing it outwards out of the way. When these sutures are tied, the lower edge of the conjoined tendon is drawn down to the pelvic brim just inside the femoral vein, and a fatty plug from the saphenous opening is drawn up under Poupart's ligament, forming a firm yet resilient pad.

5. The cord is now replaced, the cremaster and external oblique muscles sutured, and the skin wound closed.

Operation in Large or Recurrent Hernia

In old-standing femoral herniæ, or in those which have recurred after operation, the peritoneum and its coverings become adherent to all structures under Poupart's ligament, so that satisfactory isolation of the neck from below is impossible. In such cases, after exposing and opening the sac as in the standard operation, Poupart's ligament should be divided $\frac{1}{4}$ of an inch

from its pubic attachment and thrown outwards. This procedure makes the exposure of the peritoneum and repair of the canal much more easy, and, in a difficult case, involves much less damage than an attempt to clear an adherent sac from below. Division of Poupart's ligament is better than detachment of the pubic spine. No disability follows if the ligament is carefully sutured at the end of operation.

In some old femoral herniæ the protrusion becomes so large that Poupart's ligament is dislocated forwards, and the neck of the sac comes to lie in front of, as well as internal to, the femoral vessels. The method of repair outlined above is not sufficient in such cases. After removal of the sac and closure of the peritoneum by the inguinal route, the weak area must be repaired with strips of fascia lata ½ inch wide, and taken from the whole length of the thigh. Gallie's needle as sold for plastic operations with fascia lata is too large for this operation, and a similar needle only an eighth of an inch wide is better. The fascial strips are passed from the conjoined tendon down to Astley Cooper's ligament, up through the edge of Poupart's ligament, and then back to the conjoined tendon. This suture is continued inwards until the whole weak area is bridged by a lacing of fascial strips, only allowing comfortable room for the femoral vein and artery to pass into the thigh. No attempt should be made to draw the fascial bands tight; they protect the gap by their own strength rather than by drawing surrounding parts together. This method has proved very successful even in large and old-established femoral herniæ.

Femoral Hernia in Childhood.—While the majority of femoral herniæ are seen in adult women who have borne children, they may also occur in childhood. Before puberty the incidence in both sexes is the same, and such herniæ probably occur in congenital sacs. In these the sac may be closed from below, and Gimbernat's ligament sewn to the fascia over the pectineus. It is better, however, to operate by the combined route as in adults.

There are only two *complications* of importance—injury to bladder and thrombosis of femoral vein.

Gross injury to the bladder is very unlikely to occur if the operation is carried out by the combined route. Slight hæmaturia occurring on the day after operation may be due to disturbance of the wall of the bladder by blunt dissection, or possibly to a stitch having penetrated part of the musculature. If the condition of the wound is satisfactory, a catheter should be tied into the urethra for 48 hours, to prevent any overfilling of the bladder and tension of its walls.

Thrombosis of the femoral vein is due to injury of the wall of the vessel. It is perhaps more likely to occur after the operation performed entirely through the inguinal canal, as the dislocation of the sac from above involves forcible pulling upon structures

which are firmly adherent to the vein. Clean dissection lessens the risk of thrombosis. Stagnation of the circulation is a contributory factor, and for this reason gentle daily massage to the thigh should be employed and movements of the limb encouraged during the immediate post-operative period.

XII

THE TREATMENT OF SCARLET FEVER

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Whether the patient is isolated in hospital or at home, the general lines of treatment are the same. The room must be well ventilated with as much light as possible. A warm, stuffy room is bad, and, as long as the patient is warm in bed, conditions approaching open-air treatment are best—especially in septic cases. Daily tepid sponging with soap and water is necessary while the patient is in bed. During convalescence warm baths may be taken. The bowels must be attended to ; an enema the first day or so, as long as there is a temperature, and then simple aperients. At the time of the rash the patient must be comfortably warm in bed—preferably among blankets—and should have a soft woollen garment next the skin. A couple of hot-water bottles are usually sufficient, but more may be necessary if the rash is not coming out well and is poor in colour. If this is not sufficient hot packs or mustard packs may be given to bring the rash out and a little ice to the head if the temperature rises above 104° F. Whisky is useful in sharp cases as a stimulant, or brandy if the patient is sick. Sleep is important, and this may be induced by tepid sponging and warm drinks such as toddy. If this is not enough a little bromide or paraldehyde may be given. The paraldehyde is best given by the rectum. Morphia may be needed if the patient is very restless, but it is not always well borne. At the end of three weeks the patient is allowed to sit up wrapped in blankets for a few days before being dressed. The risk of the individual catching cold must not be forgotten. Drugs play a small part in the treatment of scarlet fever. Diaphoretics are really unnecessary and the Milne treatment has now been given up.

Diet

Milk is sufficient at first. After the temperature falls give porridge, milk puddings, etc., and later fish ; after about three weeks increase to an ordinary diet. In septic cases the diet must be such as to maintain the strength of the patient. In nephritis

it is best to restrict the diet to milk or arrowroot, etc., with occasionally some stewed fruit and cream. Fluids should be given freely in all cases of scarlet fever.

The Care of the Mouth, Nose, and Throat

In ordinary simple cases of scarlet fever in an adult a mild antiseptic gargle is sufficient. A teaspoonful of liq. thymol co. in a glass of warm water is a pleasant mouth-wash and gargle. The child requires a little more care, as it is unable to attend to the toilet of the mouth itself. The throat may be left alone, but the tongue and mucous membranes should be thoroughly cleansed with swabs of cotton-wool dipped in a mild antiseptic solution such as thymol solution, using a swab-holder or the index-finger sheathed in a thin layer of cotton-wool. The mucous membranes may then be swabbed over again in the same way with a solution of boroglycerine. Finally, the tongue and lips are anointed with a mixture of boric ointment and vaseline flavoured with peppermint to keep them moist and soft. Ill patients, whether adults or children, should have the toilet of the mouth thus attended to after feeds.

Septic and Toxic Cases

If the case is a septic one, with profuse nasal discharge and patching on the tonsils, the nose and throat may be gently irrigated or sprayed with mild lotions such as boric lotion, eusol, thymol, or normal saline. Actual swabbing of the fauces is sometimes necessary, but in a restless patient this form of local treatment is probably unwise. The discharge from the nose should be mopped up and not allowed to stain the pillows and sheets. In septic cases sleep is essential and to produce it, to stimulate the appetite, and to improve the condition of the patient generally, nothing is better than open-air treatment—even in winter.

In toxic cases the usual methods must be adopted to get the rash out, and salines may be given either rectally, subcutaneously, or intravenously, but the patient often fights against all such endeavours to assist him. Stimulants such as whisky or brandy are given and hypodermic injections of camphor in oil or — better still — caffeine-sodio-salicylate. Unfortunately, the outlook in toxic cases is extremely bad. Vaccines have been tried, especially for septic cases, but have not proved of much use; neither have injections of polyvalent serum been very successful either in septic or toxic cases, except in a few instances where the particular serum seemed to suit the patient, and given in large doses of 100 to 150 c.cm. In toxic cases the administration of the whole blood of a convalescent scarlet fever patient—as recommended by Zingher—has been of great benefit, but this form of treatment, too, has often been disappointing.

It is certainly worth trying; 100 c.cm. at least of the donor's blood is withdrawn rapidly in sterile syringes which have been immersed in 1 per cent. sodium citrate solution, and injected intramuscularly into the thigh of the patient. In favourable cases there is—following the injection—a fall of temperature and pulse-rate, and the patient rapidly improves.

Scarlet Antitoxin Treatment

Evidence is increasing that scarlet antitoxin, when injected early enough and in sufficient dosage, blanches the rash, lowers the temperature, and improves the general condition of the patient, so shortening the disease and lessening the likelihood of complications. The most marked benefit is seen in the restless semi-delirious patient of the toxic type—the antitoxin apparently neutralising the toxæmia. In the septic case improvement often follows the injection of the antitoxin though complications may still result—especially if the serum is not given sufficiently early. In many patients the antitoxin apparently lessens the subsequent desquamation, but in others this is not so, probably because the serum is given too late. Concentrated scarlet antitoxin should be given intramuscularly in doses of 10 to 40 c.cm. or more to moderately severe cases. In mild cases 10 c.cm. is probably sufficient, but large amounts must be given in toxic cases and preferably intravenously, if possible; failing this intramuscularly into the outer aspect of the thigh. Concentrated antitoxin is better than unconcentrated serum, as there will be less risk of serum reactions following in the shape of rashes which are sometimes accompanied by slight temperature; the rashes are mainly urticarial in type.

The Care of the Patient during Convalescence

Otitis media should be treated with fomentations which are soothing and often hasten discharge from the ear. Paracentesis should not be delayed if it seems likely to be called for. *Otorrhœa* requires gentle douching with warm boric lotion or hydrogen peroxide—many prefer merely to mop up the discharge and consider douching or syringing dangerous. A *superficial mastoid abscess* requires a simple incision right through the periosteum, but if the mastoid cells are involved a more radical operation is called for. *Rhinitis* is treated on general lines. If it is due, as it often is, to a K.L.B. infection, 1500 units of antitoxin will dry up the rhinorrhœa. If the otorrhœa or rhinitis continue and tend to become chronic, then the removal of the tonsils and adenoids is the only thing to do and often clears up the discharges. *Adenitis* is treated by fomentation and, if necessary, by an incision where the abscess, which sometimes results, is ripe. *Arthritis* seldom requires treatment other than warmth to

the parts, unless suppuration occurs, when drainage is necessary. *Nephritis* is treated in the usual way by promoting diaphoresis and keeping the bowels well open with Epsom salts or jalap (dose 30–60 g.). If convulsions occur, blood-letting should be performed. The urine, especially during the nephritic period (sixteenth to twenty-sixth day) requires to be examined daily, as there is always the danger of a sudden toxic nephritis occurring. Only a trace of albumin may be found in routine examination, but the patient may die suddenly in a few hours with a high temperature. Slight adenitis often precedes nephritis, and vomiting is a danger-signal. The majority of cases of nephritis recover if treatment is early and prompt, and chronic nephritis is rare. A. Osman and H. Carter have recently suggested the administration of alkalis as a prophylactic against this complication.

The Dick Test and the Schultz-Charlton Reaction in Scarlet Fever

The majority of patients suffering from scarlet fever give a positive Dick test if the test is performed during the height of the rash. This is replaced by a negative reaction during convalescence, the antitoxin produced during the disease being apparently specific for the toxins of the *Streptococcus hæmolyticus*. The serum of a convalescent or scarlet antitoxin, if injected intracutaneously at the height of the rash, is capable of neutralising the toxin in the skin, and blanching occurs, giving a positive Schultz-Charlton reaction. If, on the other hand, an individual with a rash shows a negative Dick test and a negative Schultz-Charlton reaction, then the rash is not likely to be one of scarlet fever, neither will it be due to scarlet fever if with a negative Schultz-Charlton reaction a positive Dick test is shown right from the beginning of the illness to the end of convalescence. The serum of such an individual, too, will not blanch a definite scarlet rash.

The Dick test shows that about 60 per cent. of children between 1 and 5 years, and 35 per cent. between 5 and 10 years are susceptible to scarlet fever. Nurses in fever hospitals who are Dick-positive reactors should be actively immunised against scarlet fever, and the time will undoubtedly come when large numbers of children, too, will have to be protected. Scarlet fever antitoxin can confer a passive immunity lasting only a few weeks, but an active immunity, lasting for 18 months to three years at least, may result from injections of increasing amounts of the toxin of the streptococcus of scarlet fever. A total injection of 20,000 skin test doses is recommended, beginning with one of 250 such doses. Children under 5 years of age should be immunised against both scarlet fever and diphtheria without any preliminary Dick and Schick tests, but after 5 years such tests are necessary to pick out the positive reactors.

The Schick Test and Diphtheria in Scarlet Fever

If a patient during the time of the rash in scarlet fever has a faucial lesion suggestively diphtheritic and shows a positive Schick test, then it is wise to administer diphtheria antitoxin. If, on the other hand, a negative Schick reaction occurs, the faucial lesion is almost certainly septic in nature, even though it involves the uvula. Even if diphtheria antitoxin is administered at the same time as the Schick test is performed, a negative reaction may be taken as showing that the patient is not suffering from concurrent diphtheria, and is really immune to that disease. If during the convalescence of scarlet fever a patient develops speckling or patching on the tonsils, and that individual is a Schick positive reactor, then it is wise to administer a small dose of diphtheria antitoxin which can be repeated if necessary. A negative reactor with speckling or patching on the tonsils may safely be left alone. If tonsils and adenoids have to be removed for any reason during the convalescence of scarlet fever, 1500 units of antitoxin should always be injected to confer a passive immunity if the individual is a positive reactor to the Schick test. On the other hand, if the patient is known to give a negative Schick reaction, no diphtheria antitoxin is necessary, and anything developing later on the fauces may be regarded as merely septic.

XIII

THE TREATMENT OF URTICARIA

By Rupert Hallam, M.D., Ch.B.Edin.,
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When confronted with an urticarial rash it is essential to realise that urticaria is not a disease sui generis, but is merely a symptom ; that it may be produced by a variety of causes, and, furthermore, that there is no specific remedy. Therefore, if successful treatment is to be anticipated, a detailed history must be elicited and a thorough physical examination of the patient undertaken. It is often too readily assumed that urticaria is the outward manifestation of a food poisoning, and that some rather unusual article of diet taken within a short interval of the attack is responsible for the condition. Certainly no one will deny that food proteins do in a large number of cases cause the rash, but experience has taught us that in many incidences this is not so, and that the ætiology is more complex.

The Acute Attack

As is well known, this is often accompanied by more or less severe constitutional symptoms such as vomiting, diarrhœa, and a general feeling of malaise. The rash is usually profuse and sometimes even bullous. It may involve the mucous membrane of the lips, tongue, or glottis. Fortunately the latter complication is extremely rare, but cases have been recorded in which tracheotomy has been necessary. Such attacks undoubtedly do frequently follow the ingestion of some article of diet to which the patient is sensitised. It is only necessary to mention some of the more common of these—i.e. shell-fish, tinned meat, or fish in which putrefactive changes have occurred. Should the patient be seen during the early stages and the severity of the symptoms warrant it, an emetic should be administered. In all cases it is advisable to give a dose of calomel, followed by a saline aperient. Prompt relief from the irritation and burning of the distressing rash may be obtained by the subcutaneous injection of 5–10 minims of 1 in 1000 adrenalin chloride. During the first 24 hours it is desirable that water only should be given by the mouth. Recovery ensues in a day or two and the

patient may eventually be able to resume the ingestion of the offending article of diet; in other cases the unfortunate individual may have a recurrence, not only when the particular protein is taken, but he may have become sensitised to other proteins and pass into

The Chronic Stage

This is by no means always preceded by an acute attack. The onset may be insidious, the wheals recurring at regular or irregular intervals. It is this chronic stage of urticaria which exercises the skill and patience of the physician, for the duration may be measured in terms of weeks, months, or even years, and may be due to an embarrassing number of causes. Irrespective of the cause, the lesions may be small and circular, closely resembling the wheal produced by the nettle sting, or large and irregular. Some may be bullous, resembling those of pemphigus, or the œdema of a limb or other part may be so pronounced as to earn the distinctive name of angioneurotic œdema. Whatsoever be the form or duration of the lesion, its cause is only likely to be ascertained if the examination be conducted in a systematic manner.

External Causes.—It is hardly necessary to state that the bites of certain insects may cause urticarial wheals, but it may not be generally known that an infection with scabies is sometimes responsible. I can recall a case in which wheals had recurred obstinately for many weeks before the presence of this parasite was revealed. It is interesting to note that few excoriations are as a rule found on a patient suffering from urticaria. Sudden changes of temperature in a susceptible person will bring about the quick onset of the rash; both hot and cold baths have been known to produce it. Certain articles of clothing may be the exciting cause, as may be also contact with various plants and chemical irritants. When the offending agent has been detected and removed no further treatment is needed.

Internal Causes.—Such varied examples as blood diseases, diseases of the female generative organs, boils, rupture of a hydatid cyst, have been quoted as occurring concomitantly with an urticarial rash. Infrequent as such causes may be, they serve to emphasise the fact that urticaria should be regarded as a symptom and not as a disease.

Recently many apparently authentic cases have been published in which there has been cessation of the rash subsequent to removal of some septic focus. The presence of intestinal parasites may account for recurring attacks, and some subjects have such a predisposition to this reaction of the skin that emotion and other psychical disturbance may be followed by wheals. An example of this was recently described in a continental journal;[1] a woman complained that contact with silk, but with no other

[1] Dufke, F., *Dermatologische Wochenschrift*, No. 21, 1926.

material, caused the rash to appear at the site of contact. A test apparently verified her statement; yet when cotton material was substituted for silk, without her knowledge, the rash still appeared.

Food Proteins

There remains for discussion what is probably the principal rôle in the production of urticaria—namely, absorption from the digestive tract. To enumerate the various food proteins which have been known to cause urticaria is outside the scope of this article; the best plan is to suspect all. The protein sensitisation tests introduced during the last few years have not given the assistance that was anticipated from them. Patients will often be found who give a positive reaction to one or more of these protein extracts; yet when the particular food is omitted the rash continues. The tests appear to show that the patient is hypersensitised but do not necessarily indicate which particular food he should avoid. A more serviceable method is one for which I believe we are indebted to Sir Norman Walker. This is as follows: The patient is instructed to keep a daily ledger. On the left hand page a detailed account of the meals and events of the day is written, whilst on the opposite page the time and the appearance of the rash is noted. First one common article of diet is omitted for several days and then another until all in turn have been excluded. If this plan is conscientiously carried out valuable information is obtained, and the noxious substance may possibly be ascertained. It is advisable to impress upon the patient that if, for instance, he is to omit eggs, he must avoid cake or pudding which contains egg albumin or yolk, however small the quantity. A more rapid method of excluding food protein as a possible cause is to confine the patient to bed for three days and allow milk diet only. If the rash, in spite of the restriction, continues, rice water should be substituted for milk. The method is rigorous, but a patient suffering from a severe recurrent urticaria can well afford to put up with discomfort if the ordeal gives promise of relief.

In the fortunate event of the noxious substance being detected, the remedy is obvious; however, it may be very inconvenient to omit from the dietary common articles, such as milk or eggs. In such instances desensitisation may be attempted.

Desensitisation may be accomplished in one or two ways. Commencing with a minute dose, in the case of milk a few drops, the amount is increased daily if tolerance is maintained; the second method is to bring about anti-anaphylaxis by giving a small quantity of the particular food one hour before the meal containing it is taken. Should attempts to ascertain the ætiology fail, as unfortunately is too frequently the case, and the rash persist, then more or less empirical remedies have to be relied upon.

Empirical Remedies

Calcium salts have had a long innings, but in my experience the results have been singularly disappointing, so have also the somewhat older remedies ichthyol and quinine. Aspirin will sometimes give temporary relief. On the assumption that urticaria is a manifestation of the anaphylactic state, peptone has been recently advocated by French dermatologists. The dose recommended is 0·5 g. taken one hour before each meal. Since urticaria has been noted in cases of hypothyroidism, thyroid extract has been lately prescribed as a remedy; one author, indeed, goes so far as to proclaim it a specific. In two recent cases, a young girl and a middle-aged woman, in which I have tried it, there has certainly been a gradual and lasting improvement. Auto-hæmotherapy is worthy of a trial should other methods fail; 10 c.cm. of blood is withdrawn from a vein and rapidly injected intramuscularly with the usual precautions into the buttock. This is repeated twice weekly.

Of *local applications* for the relief of the itching, lotions are preferable. Of these the usual lotio calaminæ with the addition of a small quantity of liq. plumbi subacet. or carbolic acid is useful, but many patients find the domestic remedies of vinegar or lemon juice the most efficacious. At night the chosen remedy should be placed in a shallow dish by the bedside so that it may easily be applied if necessary.

Lichen Urticatus

Urticaria in the true sense of the word is not frequently encountered in children. There is, however, a relatively common disease known as papular urticaria or lichen urticatus, which is probably closely related to urticaria. It is distinguished by the appearance of a minute papule which appears in the centre of a small wheal of varying shape and size. The complaint causes very great distress to both the child and its unfortunate parents, for it is intensely irritating and may be accompanied by a secondary impetiginous infection. It is more prevalent during the summer months than during the colder months. The ætiology is obscure and the treatment unsatisfactory. I have noted the curious phenomenon that the sufferers recover immediately they are admitted to hospital even although no treatment of any kind be given; the rash returns after their discharge. Based on this experience numerous experiments on the influence of various diets have been made, but the cause of the disease remains a mystery. The experiments referred to pointed to heat being the most active exciting cause. The parents should therefore be warned against allowing the child to be over-clothed, particularly at night. For the same reason the child should neither be undressed in front of a fire nor placed in a hot room. It is customary

to restrain children suffering from some skin diseases by splints or bands. In this disease this would seem to be unnecessary cruelty, for scratching appears to afford relief to the sufferer and does not prolong the course of the disease.

Removal to another house may be tried if feasible, for prompt recovery often follows. A Nottingham patient, seen by the writer, only had the complaint when staying with his grandparents in Sheffield, whilst another boy was quite free when away at school at Worksop, yet always had the rash on returning to his home in Sheffield. In my experience no internal remedy is of any real value. The following have their adherents: calcium lactate, vinum antimoniale and, recently, peptone. one hour before meals. The child should be carefully examined for foci of infection and particularly for the presence of threadworms. Locally the following application will be found serviceable:

Liq. carbonis deterg.	.	30
Pulv. amyli | Talci ∫	āā	40
Glycerini	.	20
Liq. plumbi subacet	.	4
Aquæ	.	200

XIV

THE TREATMENT OF MALIGNANT DISEASE OF THE UTERUS

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I.—General Considerations

Women suffering from cancer of the uterus can be permanently cured if the growth is discovered sufficiently soon. Early diagnosis, therefore, is the first and most important step in the treatment of the disease, and of latter years considerable efforts have been made to secure this by disseminating amongst the laity knowledge of the symptoms that are its first outward sign. The result of these efforts is, I think, a definite tendency amongst women to go to the doctor earlier than they did, but one still sees many cases in which the growth has attained to an advanced stage before the sufferer seeks medical advice, and others in which the early signs of the growth have been overlooked or misinterpreted by the medical man, occasionally from lack of care, but more often because the early symptoms did not conform to text-book teaching.

Danger of Inverted Symptoms

The constant symptoms of cancer of the uterus are bleeding, discharge, and pain, and this is the order of incidence in most cases. Intermenstrual bleeding at any age, but particularly in women over 35 years, demands prompt attention and investigation, and still more does bleeding coming on after the menopause. This is now generally understood. It is not so generally appreciated, however, that the order of incidence of the main symptoms may be altered, so that discharge may precede bleeding, or pain both bleeding and discharge. These atypical cases make up the bulk of those in which the seriousness of the condition remains unsuspected until it is too late to cure the patient.

The idea that carcinoma of the uterus is invariably accompanied by bleeding is by no means correct. Such absence of bleeding is most often met with when the cancer is corporeal, and especially when the uterus is senile, for then the cervical

canal may be very narrow or even obliterated. The growth silently eats its way through the uterine wall, and the first patent intimation of its presence is sudden ascitic enlargement of the abdomen, secondary to metastatic growths in the peritoneum. If, however, the history of these unfortunate patients be investigated, it will be found that they have long been conscious of vague pain low down in the abdomen. Cancer of the cervix, though less commonly, may also run an entirely or almost bloodless course. Such growths may spread far into the paracervical and paravaginal tissue before anyone is aware of their presence. The process of infiltration is, however, accompanied by pain, the origin of which is mistakenly attributed to colitis, or if complained of down the leg to neuritis, the latter diagnosis having a certain amount of truth in it, as the pain is due to the obturator nerves becoming involved with the infiltrated glands. Even when bleeding is the primary sign of uterine cancer, it may only occur at long intervals, and then very scantily. This particularly applies to corporeal disease.

Difficult Physical Signs

It is evident from the foregoing how important it is to examine vaginally a patient presenting vague lower abdominal or pelvic symptoms. But even after the vaginal examination is made the diagnosis may not be clear. This is particularly true of carcinoma of the corpus, in which vaginal examination may reveal nothing, not even bleeding. With carcinoma of the cervix, too, the physical signs may be equivocal. Thus endocervical growths, until they have broken through the vagina, present no ulcerating or fungating surface, whilst some ectocervical growths are very difficult to distinguish from an erosion, especially when the growth starts at some point on a pre-existent erosion, as it very frequently does. In all such difficulties the proper course is to examine the woman under an anæsthetic and remove a portion of the suspected tissue, dilating the cervix, if necessary, to do this. It cannot be too frequently emphasised that " the change " is not normally accompanied by continuous or irregularly repeated bleeding. True, such bleeding often occurs at " the change," but this is because uterine disease or degeneration is so common at that epoch. In spite of much propaganda, women as a whole cling to the dangerous delusion that irregular bleeding is normal at the menopause, for compared with the deep ingraining of old wives' tales modern hygienic education is a mere veneer.

Cure of Cancer of the Cervix

Turning now to the curative treatment of cancer of the cervix, it is certain that the disease if discovered sufficiently early can be permanently cured by suitable operative measures. This leads us to a consideration of what is meant by " sufficiently

early." The question is easily answered from the strictly histological aspect—namely, that the operative cure of carcinoma implies the excision of the primary growth, together with an area of tissue that comprises every lymphatic channel and gland infected by cells derived from the primary growth, and that if the extent of the growth permits such an excision, the patient is cured. From the clinical standpoint, however, an answer cannot be given with such definiteness, for we have no means of exactly ascertaining the extent to which detached carcinoma cells have permeated the surrounding tissues, though we can often be fairly certain which structures the primary growth has or has not infiltrated.

When is a Growth Removable?

The task set the clinician is to decide whether or not the growth is removable, or at least whether the chances of its being removable are worth embarking on an operation to remove it, and this decision must be based both on the results of his physical examination and on a consideration of the symptoms complained of by the patient, both being equally important.

It is necessary to remember the directions in which the growth may spread—namely, downwards, backwards, forwards, and sideways.

Extension rarely takes place by *upward spread*. Even in patients dead of the disease, the corpus is usually pretty intact. The result is that enlargement of the body of the uterus is usually conspicuously absent, and when it does occur, it is usually due to a pre-existent fibroid or to distension of the uterus with pent-up pus (pyometra). The first cause gives rise to no pain, but the second to both pain and fever. Enlargement of the uterus from either of these causes is, however, no bar to an operation.

Downward spread carries the growth into the vaginal walls, and this in itself does not prohibit an operation which removes most of the vagina, so long as the growth has not passed from the vaginal wall to the structures underneath it. In general, the further down the vaginal wall the growth has spread the greater the chance that the structures deep to it are involved. For instance, a growth half-way down the anterior wall has nearly always involved the bladder base, though on the posterior wall more extension is allowable before it is probable that the rectum is involved, for the upper inch of this wall is separated from the bowel by Douglas's pouch. Mistakes in estimating the extent of the downward spread of the growth are frequently made owing to the fact that its advancing edge often forms a projecting ridge like a ring round the vagina, and this is taken to be the lower border of an excavated cervix, whereas it is nothing

of the sort. It is important in examining these cases to measure the distance of this edge from the vaginal outlet, for if the distance is less than that of the normal vaginal wall the growth has involved the vagina.

Extension down the lateral walls is accompanied by an increasing risk of involvement of the ureters. Actual cancerous infiltration of the ureters occurs late. At first they are merely pushed outwards ; later on the growth may surround them either entirely or partially, so that they run in a deep groove. Sooner or later they become obstructed, not, as might be thought, by the actual growth of cancer taking place in their substance, but from contraction of the cancerous growth outside them, so that they become constricted about an inch above their junction with the bladder. Following such constriction, the ureter dilates above the obstruction, and so does the pelvis of the kidney. That this dilatation is not due to growth in the ureteral wall is proved by the fact that if the ureter be dissected out of the growth the dilatation immediately subsides.

Gross extension directly outwards from the cervix, besides involving the ureters, sooner or later reaches the pelvic side wall, forming a buttress-like mass which more or less fixes the cervix ; this massive infiltration of the paracervical tissues gives rise to pain of an aching character felt deep down in the abdomen and in the groin. But besides this method of extension, there is going on in this direction another, far more insidious—namely, lymphatic permeation —by which cancer cells may reach the same goal without the formation of any mass that can be felt, and without any pain. The principal route of lymphatic permeation in cancer of the cervix is, in fact, directly outwards into the glands in the obturator fossa, which may be extensively involved, causing pain, felt down the front and inner side of the thigh, without any tangible paracervical thickening.

Extension of the growth forwards involves the bladder at the junction of its posterior wall and base. The first symptom of this is increased frequency of micturition, coupled with pain in the act. Later on changes appear in the urine, which contains pus or blood, or both.

Extension directly backwards presently reaches the peritoneum on the anterior wall of Douglas's pouch. When this happens, the rectum or a coil of the pelvic colon becomes adherent at the point where the growth is threatening to break into the peritoneal cavity, and this prevents general peritoneal dissemination. Instead a mass is formed, largely in the wall of the infiltrated gut, and intestinal symptoms appear. Thus there is pain in the back and rectum, made worse by defæcation, and later on diarrhœa with, perhaps, blood in the stool. A degree of flatulent distension of the abdomen will be noticed in its lower part.

The reason of this detailed description of the directions in which cervical cancer spreads, and the symptoms associated with the spread, is that the decision whether a growth is probably removable depends upon an understanding of these things.

Important Questions

In examining any individual case, not only should the size and degree of fixity of the growth, and the length of the vagina under the growth, be ascertained, but two important questions should be asked.

The first is: "Have you any pain?" An answer in the affirmative indicates that in all probability the growth has passed beyond the confines of the cervix into the paracervical tissues or regional glands, for if still limited to the cervix it is not, as a rule, painful, the exception being massive endocervical carcinoma, in which the tissue tension is very excessive.

The second question is: "Have you any trouble with the bladder—difficulty, frequency, or pain?" If the woman replies "None," the probability is that the growth is removable, because by far the commonest absolute bar to the completion of the operation is deep involvement of the bladder. If, in addition, the urine is normal, it is quite certain that the bladder is either not involved or only very superficially so. If, on the contrary, the patient replies that she *has* trouble with the bladder, its duration should be inquired about. For instance, she may say that she has great frequency, but on questioning it may be disclosed that she has had frequency for years. The urinary symptoms due to a carcinoma of the cervix are of short duration. Frequency is less grave than pain, and pain than difficulty, for frequency does not necessarily indicate deep infiltration of the bladder, whereas difficulty almost invariably does. The urine should then be examined. Normal urine implies that the mucosa at least is uninvolved, whereas pus and blood indicate the contrary. When in spite of interrogation and ordinary examination doubt still exists as to the degree to which the bladder is infiltrated, the cystoscope should be employed.

XV

THE TREATMENT OF MALIGNANT DISEASE OF THE UTERUS

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II.—Operative Methods and Irradiation

Wertheim's Operation

The operation and, with a few negligible exceptions, the *only* operation worth performing for carcinoma of the cervix, is that introduced by the Viennese gynæcologist, Wertheim, in the early years of this century. Its inventor claimed that by its means about half of the patients who survived it remained well and free of recurrence five years afterwards. Wertheim's claims were fiercely criticised, firstly, on the grounds that his operation had an excessive operative mortality, and, secondly, that his surprising after-results were too good to be true, and even to the present day the operation is looked askance upon in many quarters, and in some countries, notably the United States, it has never fairly been put on trial.

The reason for this is that the operation, if carried out properly, is a very difficult one, and a surgeon taking it up must either learn from one already expert or educate himself, the latter alternative, of course, taking a long time. In the earlier days there was no such choice; surgeons had to educate themselves, with much pain and heavy anxiety, and it is not surprising that many of them, after a few disheartening failures, abandoned the procedure. Those, however, who by one route or the other will take the trouble to acquire the necessary experience and expertness, will find that the claims of the inventor were by no means exaggerated, but just the plain truth, and dependent neither on remarkable good luck nor extraordinary operative gifts. I took up the operation in 1907, and have continued to perform it ever since, and the results I have obtained absolutely substantiate Wertheim's claims. Whilst following the main lines laid down by its inventor, I have made it rather more extensive; thus, I remove the regional glands in every case, not merely when they are obviously

enlarged, and I excise practically the whole vagina instead of merely the upper half. Like Wertheim, my earlier cases show a much higher operative mortality than my later ones, 20 per cent. against 12 per cent., but, as I have repeatedly pointed out, the figure of the operative death-rate chiefly depends upon whether or no the operator chooses to undertake very advanced cases, for amongst such the operative mortality is necessarily high. In my series are included a number of "last chance" cases; in fact, I have operated on over 60 per cent. of all the patients submitted to me. Last year I investigated the outcome of 214 radical abdominal operations performed by me between April, 1907, and October, 1921, and to show what can be done for those suffering from this cruel disease I cannot do better than summarise my results here:

> Of 340 unselected patients, 214 had the radical abdominal operation performed on them, and 180 survived the operation (operation mortality, 15·8 per cent.).
>
> Five years afterwards, of the 180 recovered patients, 85 were alive and well, 82 had died of recurrence, and 13 had been lost sight of or died of other disease.

Five years' freedom from recurrence was considered by Wertheim as an "absolute cure," but it is an unfortunate fact that 10 per cent. of all recurrences take place between the fifth and tenth years, after which a patient may be regarded as free of any further risk. Taking this into consideration, surgery's achievement in the operative cure of carcinoma of the cervix may be thus expressed: that were it possible for a surgeon to perform a series of Wertheim's operations in one day instead of spreading them over a number of years, and keep in touch with all the survivors, nor lose any of them by other disease, he would find at the end of ten years that slightly more than one-half of those who had survived the operation had died of recurrence, whilst slightly less than one-half were permanently cured.

Radium and X-rays

The results that I have obtained by operative treatment are so far superior to anything that in this country up to the present has been attained by irradiation, that I most strongly believe that whenever a growth is removable it should be removed. My experience of radium in the treatment of carcinoma of the cervix is now of long duration, as it has been used in quantity at the Middlesex Hospital for the last 17 years. The results obtained up to the last few years were most disappointing. In some cases a remarkable local disappearance of the growth occurred, and the patient became free of bleeding and discharge for many months or even a year or more; at the end of that time, however, the symptoms recurred, and the patient steadily went downhill and died. In other cases, the spread of the

growth was very definitely checked, and the bleeding and discharge much lessened, though the growth remained grossly apparent to the examining finger. Such patients had radium applied at intervals over long periods, but, in spite of it, steadily lost ground, and, what was perhaps the more distressing feature, lost hope. Their lives were undoubtedly prolonged by the treatment, but the months or years gained could scarcely be called happy ones, beset as they were with alternating hope and fear, of which fear eventually predominated. In a few exceptional cases, a cure comparable to an operative cure—namely, freedom from any sign of the growth for over five years—was attained. Against these few complete successes and many partial successes had to be set an equally large number of patients in whom the radium stimulated the growth to increased activity, and materially shortened the lives of the patients by increasing their pain, bringing on foul discharge where none existed before, or producing fistulæ in the rectum or bladder. It must, however, be pointed out that all the patients of whom I am speaking were those in whom the growth was too advanced for operative removal; except in a few instances, radium has not been used in operable cases. Equally disappointing results have been recorded by many other writers.

Of recent years, however, much better results have been published by certain workers, chiefly on the continent and in America, and claims have been made to a percentage of cures nearly equal to the best of those claimed for surgery. The better results obtained are stated to be due to an improved technique in the using of radium, and this improved technique is now being used in England at various places, Middlesex Hospital included. It is too early to speak with confidence yet of the results which have been obtained by these new methods, but judging from cases that have come under my cognisance, I think that the results are better than they used to be. The point that concerns us at present, however, is whether radium should be used in preference to or as an alternative to operation in cases in which the growth is removable, and up to the present no figures published in this country justify such a change in policy. For cases too advanced for surgery, on the other hand, radium is the treatment of election, and superior in my opinion to deep X-ray therapy. Even to-day with the improved technique the results obtained in these advanced cases are very unequal. In some great improvement is manifested, whilst in others the patients are made undoubtedly worse and their lives shortened. My experience of deep X-ray therapy has been an unfortunate one, for I know of no case in which the growth permanently disappeared, and only a few in which material improvement was obtained. The drawback to X-rays is that each application makes the patient so ill. X-rays and radium may be used in combination.

Speaking generally of the results likely to be obtained by

irradiation, I think it may be said that whilst they are better than they used to be, too much can easily be hoped from them at the present time. A perusal of the literature bearing on the subject shows a discordance of claims as marked in the case of individual workers as are the results in individual patients, and leaves an unbiased observer in a puzzled frame of mind.

Treatment of Carcinoma of the Body of the Uterus

In the case of carcinoma of the body of the uterus, the only hope of cure lies in a radical operation. It is not necessary in this disease to subject the patient to an operation as severe as Wertheim's operation, because the route of spread of corporeal cancer is different from that of cervical disease, and occurs along tracts more easily compassed by the surgeon's knife. The common path of lymphatic permeation is along the lymphatics accompanying the ovarian vessels up to the glands along the upper half of the abdominal aorta. There is no tendency until very late for the growth to invade the lymphatics accompanying the uterine arteries to the side wall of the pelvis, and therefore there is no need for that wide excision of the paravaginal and paracervical tissue which is necessary in cervical cancer. Most patients with corporeal cancer actually die of metastatic deposits due to the growth penetrating the uterine wall, and entering into the peritoneal cavity, and this often occurs long before the cancer cells have reached the aortic glands. The operation indicated is a total hysterectomy, taking with the uterus the ovaries, tubes, and upper part of the broad ligaments as far outwards along the ovario-pelvic ligaments as possible. This is not a severe procedure in most cases, and the operative mortality is not a high one (about 5 per cent.), and would be lower still if it were not that many of the patients are elderly women, enfeebled by long-continued bleeding and foul discharge. As regards the chances of permanent cure, these are at least as good as those yielded by Wertheim's operation—that is to say, that about half the patients recovering from the operation are permanently cured.

Radium and X-ray Treatment in Corporeal Cancer

Radium is practically useless in corporeal cancer. No doubt there are certain cases where the growth is quite superficial on the endometrium, in which radium introduced into the uterus would destroy permanently all the malignant cells, but we have no means of ascertaining the depth to which the growth has spread in the uterine wall, short of removing the uterus and examining it afterwards, and hence to use radium in preference to an operation, even where the growth is apparently a very recent development, would be wholly unjustifiable. Moreover, it is in these early growths that surgery can be certainly relied upon to give a permanent cure. Deep X-ray therapy I have

employed and seen employed in many cases, but I have not seen one in which the patient was cured, and very few in which duration of the patient's life appeared to be lengthened by its use. Whether it should be used as a means of comforting the patient and the patient's friends with the idea that something can be done is a moot point, for the treatment makes the patient feel very ill, and unless carried out in hospital is expensive.

XVI

THE TREATMENT OF CORNEAL ULCERATION

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Ulceration of the cornea is probably, in the majority of cases, the result of trauma. But, in most cases, the trauma is of very slight degree, and the resulting ulceration is due to the fact that the condition of the cornea, conjunctival sac, and general state of the individual are favourable to the advance of septic processes. There is, however, a comparatively large minority of cases of ulceration of the cornea where the ætiology is different. In these cases bullæ form around the nerve-endings in the corneal epithelium, and these bullæ soon break down, forming small ulcers, usually multiple and often grouped in a branching pattern in the central zones of the cornea. This is the type of corneal ulceration often seen in association with febrile states, and is a peripheral expression of a poisoning or irritation of the nerve or nerve ganglion, and is not primarily the result of trauma. Mention should also be made of the ulceration of cornea associated with phlyctenular disease. The treatment of all types of ulceration is, generally speaking, the same.

Corneal ulceration, except in certain indolent cases in elderly people, causes extreme discomfort and pain—in bad cases very severe pain. Photophobia is characteristic of all corneal lesions, and often a marked blepharospasm, leading to a spasmodic entropion of the lower lid, is present. The pain is located to the site of the lesion, but in the more severe cases, in which there is an associated iritic engorgement, there will be in addition much circumorbital and temporal pain, often neuralgic in character. In the early stages the eye, on examination, will be found injected. The injection will be most marked in the region of the limbus, immediately around the cornea, and it will be both superficial and deep—the superficial conjunctival vessels being engorged, and the deeper vessels in the sclera also, these latter giving a deeper homogeneous bluish-red coloration to this region. If the corneal lesion be small, it may be hard to see ; it may be rendered more easily visible by instilling into the conjunctival sac a drop of 1 per cent. fluorescein, followed

by a few drops of saline, after which the ulcerated area will be stained a greenish-yellow colour. An early corneal ulcer will appear as a small, usually roundish, grey area, its margins fading off gradually into the surrounding clear cornea. Later, or in more severe cases, an increasingly large area of the cornea will be involved, and, in extreme cases, the whole cornea may be affected. The ulceration may take a crescentic shape, the convexity of the ulcer pointing mesially, extending in this direction and burrowing deeper as it grows into the corneal tissue. In some cases cellular exudation makes its appearance in the anterior chamber and is seen as a yellowish layer lying at the bottom of the anterior chamber, having a flat upper border. This layer, known as hypopyon, indicates that the condition is a severe one. In elderly people a rather indolent form of ulceration is sometimes seen ; here the situation of the ulceration is marginal, just inside the corneo-scleral junction, and the ulcerative area may be fairly extensive in a radial direction, but does not usually extend centrally.

General Measures

Certain general considerations should be kept in mind. The fact that a septic process has established itself and is in progress suggests that the patient's resisting powers to infection may be reduced. It is necessary, therefore, not to neglect his state of health, the condition of his bowels, the presence of other foci of sepsis, and so forth.

Local Measures

The Lacrymal Sac.—As to the eye itself, it is of paramount importance to investigate the lacrymal excretory apparatus. Pressure should be made over the lacrymal sac and the two punctal openings watched carefully for the presence of regurgitation ; it may even be well to syringe fluid through into the nose in order to ensure that these passages are patent. If regurgitation from the lacrymal sac is found it is necessary to deal with this at once, as here will be almost certainly the cause of the corneal infection. The best procedure is to excise the sac forthwith. If for some reason this cannot be done, it is possible to seal up the two canaliculi by passing the cautery into them or by tying a suture around them, but this is by no means so satisfactory as the excision of the sac.

Ointments.—Having made sure of the condition of the lacrymal sac, the next thing is to treat the eye itself. The routine basic treatment of a corneal ulcer is the instillation of atropine ointment into the conjunctival sac, and the application of a firm pad and bandage. 1 per cent. atropine ointment should be used, and it is quite a useful practice to incorporate 1 per cent. yellow mercuric oxide ointment with the atropine ointment, the yellow

mercuric oxide ointment having a stimulating and antiseptic effect. The ointment should be applied to the eye two or three times in the 24 hours, and just before the ointment is put in the eye should be bathed with warm boric lotion. The best way to do this is with an undine, or if this is not obtainable, to drip the lotion into the conjunctival sac with a sponge. All the intervening time a firm pad and bandage should be kept applied; an eye-shade is useless and its use in these cases is to be deprecated. The bathing of the eye should not be overdone, and in fact excessive irrigation is harmful. In slight cases of corneal ulceration it is perhaps not necessary to confine the patient to bed, but it is well to do so if the case is a severe one or shows signs of progressing.

Heat.—The firm pad and bandage generally tends to relieve the pain to a great extent, but where the pain persists, and especially where the circumorbital pain indicating an associated iritis is present, the use of dry heat over the pad by a hot box or electric apparatus, and the application of leeches to the temple of the affected eye will afford much relief. The usual analgesic drugs, such as aspirin, are in no way contra-indicated.

If the conjunctival sac appears in a septic condition, it may be well to use protargol drops, 5 per cent., twice a day, in addition to the above procedure. In some cases magnesium sulphate, 5 per cent., used as drops, or as a lotion twice a day, appears to give very good results, particularly in the bad ulcer cases associated with a hypopyon.

Intractable Cases

The majority of corneal ulcer cases will respond to treatment carried out on the above lines. If, however, the ulcer appears to be progressing, it will be well to attack the ulcer itself. This is most easily done by applying pure carbolic acid to the ulcer. The procedure is as follows.

Carbolisation.—A drop of 4 per cent. cocaine is instilled into the eye and the lids are held apart, preferably by a lid speculum. The surface of the ulcer is dried by laying a clean piece of blotting-paper upon it. A small pointed piece of wood—a sharpened match will serve the purpose very well—is dipped into the pure carbolic and is then applied to the ulcer. (The match should be well soaked, but no drop should hang from it.) It is well gently to curette the ulcer before applying the carbolic; usually there is a small amount of débris lying in the centre of the ulcer, and this should be removed first. Carbolisation of a corneal ulcer has the advantage that it is comparatively easy to do and can be repeated at frequent intervals. In bad cases the actual cautery at dull red heat may be applied to the ulcer with advantage.

Paracentesis of the Anterior Chamber.—If the ulcer extends in spite of the cauterisation, and especially if there is a large hypopyon present, as is usual in such cases, the question will

arise as to whether paracentesis of the anterior chamber should be performed. This procedure anticipates the actual perforation of the ulcer itself, and by relieving the tension on the corneal tissue favours resolution. If, in spite of all these measures the ulceration still progresses, all hope of saving good vision in the eye will have gone, and it will become a question of attempting to keep the eye in the head with some sort of vision. In such a state of affairs section of the cornea (Guthrie's or Saemisch's section) should be performed. A fine cataract knife is entered at one side of the cornea and pushed through the anterior chamber and out at the other side of the cornea, and then made to cut out vertically through the whole breadth of the cornea. In a remarkably high percentage of such cases, after this has been done the progress is stayed and the eye slowly quietens down. Should this not happen it will probably be necessary to eviscerate the globe.

Prognosis as to Vision

If the process of ulceration has only involved the corneal epithelium complete resolution with absolute transparency will result; in the majority of cases of septic ulcer, however, the process will have involved the substantia propria of the cornea. The corneal tissue proper does not regenerate completely and an opaque scar will be the result. It is possible, after the actual ulceration has healed, to modify the opacity of the resulting scar to some extent by the use of such measures as insufflations of powdered calomel, the instillation of dilute yellow oxide of mercury ointment, or dionin drops 5 per cent. Too much, however, must not be expected from these measures. If the corneal scar occupies the centre of the cornea and obstructs the pupil, it may be possible to improve vision by performing an optical iridectomy, which will enlarge the pupil so as to extend under a clear, or relatively clear, portion of the cornea. Tattooing of the corneal scar with Indian ink will improve the appearance considerably and, in slight scars, will actually improve vision by making them more opaque and so preventing them from refracting light irregularly.

XVII

THE TREATMENT OF CHRONIC PANCREATITIS

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During the last few years the place taken by chronic pancreatitis as one of the common diseases of digestion has become more and more apparent, and its treatment has become a question of considerable importance. Chronic diseases of the pancreas may result in interference with the functions of the islands of Langerhans or with the alveoli. In the former case one of the types of diabetes may result, and in the latter the disturbance is mainly concerned with the external secretions of the organ. It is with this type of disease that the present article deals. Glycosuria is sometimes a transient sign in these cases, but it is seldom severe and only very rarely persists. There are two main types of chronic pancreatitis, catarrhal and chronic interstitial.

(1) *Catarrhal pancreatitis* is characterised by periodic attacks of nausea, vomiting, and diarrhœa, with bulky stools laden with undigested fat. The attack is nearly always heralded by a bout of shivering and a feeling of vague abdominal discomfort which may amount to definite epigastric pain, which is then generally associated with pain referred to the back between the scapulæ. Catarrhal pancreatitis is due to infection which may enter the main pancreatic duct from the common bile-duct or duodenum, or may be carried into the organ from the liver by lymphatic vessels.

(2) *Chronic interstitial pancreatitis* may be of three types, interlobular, interacinar, and a degenerate lipomatosis. The interlobular is the common variety, and the one principally associated with interference with the external secretion. The symptoms are less acute than with catarrhal pancreatitis. There is diminution rather than suppression of the external secretion ; thus, diarrhœa and nausea are rare. On the other hand, there is marked interference with the digestion, particularly of fat and protein, and intestinal intoxication is pronounced. Flatulence is the prevailing symptom, but most of these patients suffer a good deal of pain in the form of an

aching back. This form of pancreatitis is due to infection from the liver or gall-bladder, which is carried to the pancreas by the lymphatics.

Chronic pancreatitis always appears to be secondary to some other chronic inflammatory process in the abdomen. In the majority of cases this is a disease of the gall-bladder ; sometimes the pylorus or duodenum are at fault, and occasionally the cause appears to be in the appendix. Wherever the primary focus, it must be remembered that the treatment of the pancreatitis can only be a part of the general treatment of the causative disease.

To remove the primary focus is an axiom of surgical treatment ; here is a possible exception. No case of chronic pancreatitis is cured by cholecystectomy alone. Even after removal of the primary infecting focus, the diseased pancreas must be coaxed back to health by strict attention to diet, drainage, and drugs.

Diet

This should be chosen with two main objects in view : (1) relieving the strain on pancreatic digestion ; (2) limiting the amount of intestinal decomposition.

Carbohydrates.—The burden of carbohydrate digestion must, as far as possible, be thrown upon the saliva. Prolonged mastication of carbohydrate food is essential. Bread should be cut thin, toasted, and eaten cold. Potatoes and " milk puddings " should be avoided. Crisp carbohydrate breakfast foods having a maize basis are particularly to be recommended. They should be eaten in conjunction with, but not soaked in, fruit juice and a little cream. The cream inhibits the flow of gastric juice, and so prolongs the period of active ptyalin digestion within the stomach.

Fats.—Fat digestion is accomplished almost entirely through the medium of the lipolytic ferment contained in the pancreatic juice, assisted by the action of bile. The amount of fat in the diet must, therefore, be reduced to a minimum. Unsaponified fat clothes small particles of protein, and so renders them inaccessible to the action of digestive juices, and encourages putrefaction. Fat must be rigidly excluded from the protein meals. Pork, bacon, and all forms of fat meat are to be avoided. Duck, goose, and all water fowl are rich in fat, and must also be proscribed. Of the more common fish, salmon, eels, herrings (fresh or cured), red mullet, mackerel, and halibut contain too much fat to allow of their being included in the diet. No fat must be used in cooking, so that fried food and all sorts of pastries are excluded. The only forms in which fat may be given are cream and butter. They must be used very sparingly, and given only with pure

carbohydrate meals. Where there is jaundice or diarrhœa from catarrhal pancreatitis, fats are forbidden altogether.

Proteins.—The digestion of proteins is shared by pepsin, trypsin, and erepsin. The bulk of the work, however, is borne by the pancreatic secretion. Proteins should be given in a form, therefore, that will most easily be dealt with by the stomach and succus entericus. Meat may be taken sparingly once a day, and must be lightly cooked and preferably minced, so that the maximum amount of pepsin digestion may be obtained. Fish, except those mentioned under the paragraph on fats, may be substituted for meat in the single protein meal that is allowed each day. Eggs should not be taken. Raw eggs are not digested at all by the stomach, and little by the succus entericus, so that, with the failure of pancreatic juice, they leave a large residue for bacterial decomposition, and, according to Dr. Langdon Brown, the relatively large amount of sulphur contained in them makes them more prone to putrefactive changes.

Fruits, green vegetables, and salads, except radishes, may be taken in moderation, but salad dressings containing fat and egg should be omitted, and cooked vegetables, particularly spinach, must be innocent of butter.

Beverages.—Milk, tea, beers and stout, and sparkling wines are to be avoided. Nothing should be drunk during meals except at dinner, when one glass of good, dry, white wine or a small whisky, which should not be "drowned," will aid the gastric digestion. No alcohol should be taken between meals.

Drainage

Drainage in chronic pancreatitis is employed, first, to relieve congestion of the organ by evacuation of its mucus-clogged ducts, and, secondly, in order to remove infected material from the neighbouring bile passages, and so to minimise the amount of reinfection of the pancreas. Drainage is obtained in two ways: by the use of the duodenal tube and by operation.

Drainage of the pancreatic ducts through the *duodenal tube* involves practice in the handling of the tube by the doctor, and considerable patience on the part of the subject. The method I use is that advocated by Lyon, with a rubber tube of about 2 mm. in diameter, with a wall sufficiently thick to resist atmospheric pressure, and having a perforated silver acorn, 1 cm. by 0·3 cm., at the distal extremity. I do not have markings on the tube, as I find that only by experience in the use of the method, or by the use of the X-rays, can the exact position of the tube in the stomach or duodenum be determined.

After a fast of about 15 hours the patient is propped up in the sitting position, and the tube, lubricated with

glycerine, is swallowed until the acorn is lying well within the gastric cavity. This is determined by the cessation of retching. The patient is allowed to remain in the sitting position for two or three minutes, and then is placed on the right side, with the foot of the bed slightly raised and the head resting on one pillow. By this manœuvre the weighted extremity of the tube is allowed to hang down in the stomach over the pylorus. A 20 c.cm. syringe is attached to the tube, and some of the stomach contents aspirated. They will be found to be copious in quantity and opalescent in appearance. The patient is told to swallow the tube about half inch at a time, with an interval of about a minute between each swallow. A little water in a feeding cup may be given to the patient to assist in swallowing ; in the majority of cases this is unnecessary. With the progress of the tube through the stomach, repeated aspiration should be practised in order to determine the relative amount of gastric juice present. It is found that when the tube enters the pyloric vestibule the amount of gastric secretion obtained by aspiration is only 4 to 5 c.cm. at a time. Swallowing the tube must then proceed very slowly, or it is apt to become curled up in the stomach. When the acorn end of the tube first touches the pylorus there is always a reflex attack of retching. This may be very short, only one descent of the diaphragm being noted. A careful watch should be kept, or this will probably be missed. No further attempt should be made to swallow the tube until a final and much more emphatic heave demonstrates the passage through the pylorus ; now gentle traction on the tube will indicate the fact that the distal part is gripped by the pylorus. Further traction on the tube will start retching by pressure of the acorn on the distal side of the pylorus. Aspiration generally is unsuccessful in producing any fluid, but occasionally a little thick glairy mucus can be extracted from the duodenum. The tube is now slowly swallowed for about three inches, until its extremity becomes approximately over the ampulla of Vater.

The patient may now turn over and lie on the back in a more comfortable position ; the head may be raised if desired. A solution of 25 per cent. magnesium sulphate is used in the majority of cases to stimulate the flow of bile and pancreatic juice. A solution of peptone is often more active than magnesium sulphate in stimulating a flow of pancreatic juice, but the latter has the advantage of being cheap and readily obtainable. After the injection of about 40 c.cm. of the solution into the duodenum, repeated aspirations with the 20 c.cm. syringe are made, the plunger is withdrawn and pushed back, so that no fluid is actually removed from the duodenum. From five to ten minutes elapse before a change is noted, and then the solution becomes tinged with yellow. The colour of the fluid will get gradually deeper as

the proportion of bile to magnesium sulphate solution increases. During the next three-quarters of an hour the duodenal contents must be slowly removed by aspiration, and it may be found necessary to repeat the injection of magnesium sulphate into the duodenum two or three times. It is no part of the present article to describe the collection of specimens of pancreatic fluid for diagnostic purposes.

Drainage by operation should be done at the time of the primary operation for dealing with the infecting focus from which the chronic pancreatitis arises. In the great majority of cases the operation is for cholecystitis complicated by gall-stones. If chronic pancreatitis be present, as indeed it is in a very large percentage of old-standing cases, drainage of the biliary passages is imperative. The failure to relieve digestive symptoms by the operation of cholecystectomy for treatment of gall-stones is generally due—this is the essential point—to the overlooking of pancreatitis and the failure to provide and maintain adequate drainage.

Much may be said of the relative merits of drainage of the biliary system through the gall-bladder or through the common bile-duct. Where there is any possibility of the ampulla of Vater or the terminal part of the common bile-duct becoming occluded by pressure of a sclerosing pancreatitis or other cause, the gall-bladder must be preserved, as it may be necessary ultimately to resort to cholecysto-duodenostomy; but where there is advanced inflammatory disease of the gall-bladder it is better to remove the viscus and drain the common bile-duct. Draining must be maintained for several weeks. Where pain is a prominent feature of chronic pancreatitis, relief may be obtained by incising the peritoneum on the antero-superior surface of the pancreas.

Drugs

Drugs serve two purposes. They may disinfect the pancreatic ducts after being secreted by that organ, or they may be used to control intestinal putrefaction. Sodium salicylate and aspirin are the only pancreatic disinfectants that appear to be of much value. I am indebted to Dr. Victor Schektor, of Boulogne, for the following prescription. Take the juice of four lemons in a large jug. Add sodium salicylate 20 gr., and sodium bicarbonate 30 gr. When the effervescence has subsided, add one bottle of Vichy water. Stir well, and drink a glassful at a time, consuming the whole quantity in 24 hours.

For the control of intestinal putrefaction two drugs of particular merit are oil of cloves, which should be prescribed in a pill, and calomel taken in small doses.

For those whose means allow, a prolonged course of treatment at a spa is generally beneficial. Little benefit is derived in these cases from treatment by dried pancreas or pancreatic extract.

In extreme cases food may be prepared partially digested with pancreatic extract, but it is very unpleasant to take.

The Outlook

The treatment of chronic pancreatitis calls for a considerable exercise of patience both on the part of the doctor and the patient. But no case should be despaired of, and although in the more advanced stages of the disease cure seems to be unobtainable, yet very great relief of symptoms may be confidently expected.

XVIII

THE TREATMENT OF ERYTHEMA MULTIFORME AND ALLIED ERUPTIONS

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This large and relatively common group of toxic erythematous eruptions will for our purposes include erythema multiforme (e.g. iris or target forms), erythema nodosum or contusiforme, and purpura.

A simultaneous consideration of these clinical types is justified by what has been termed their rheumatoid characters. The lesions are always evanescent or fleeting, tending to recur, sometimes with seasonal variations, and not infrequently accompanied by fever, constitutional disturbances, and vague rheumatic pains around the joints and in fibrous planes. Scarring is never produced in uncomplicated cases. A certain similarity in the pathological histology further justifies this grouping. Exudation of serum or blood through a damaged capillary endothelium is the keynote. In all three conditions there is some evidence to support the view that a hæmolytic streptococcus may play a part in the causation. It has actually been recovered and grown in pure culture from some of the lesions, especially those of a purpuric type. In a large percentage of the cases there is a history of tonsillar trouble, and it is likely that the organisms or their toxins may enter the circulation at this point. In others, again, there is pronounced dental sepsis, which may be obvious or revealed only by X-rays. The possibility of these two sources of blood infection should always receive due consideration, but it has to be admitted that eradication of such foci does not invariably lead to a cure or prevent relapses.

If we are satisfied that the surgical work has been thorough, and that the macroscopic and accessible foci have been completely eradicated, we are then faced with the more difficult and problematical search for subsidiary foci, a task which may baffle even the most experienced. In this connexion it is well to remember that the causative toxin may be medicinal or metabolic, as well as bacterial, and that cases are recorded which appear to have followed the ingestion of tinned foods; this brings the clinical picture

into line with those (like urticaria) for which an anaphylactic explanation is put forward. In urticaria there is considerable experimental and clinical evidence that histamine, or a chemical substance resembling it, is the actual causative agent. By analogy there is much to be said for the theory that the introduction of certain drugs—e.g. iodine or quinine—in predisposed persons, the existence of septic and occluded foci, or the ingestion of stale foods, may lead to the formation or splitting off from tissue molecules of a definite type of albuminoid poison which specifically produces the eruptions we call erythema multiforme, erythema nodosum, or purpura. Such a hypothesis is attractive, and whether ultimately proven or not, at any rate provides a basis for treatment.

There are special therapeutic indications in each of the three members of the group.

Erythema Multiforme

In the acute case the treatment should at first be symptomatic only, for it is never wise to attack even obvious foci surgically when the whole circulation is presumably flooded with the causative virus. This caution would seem especially advisable in cases with oral or pharyngeal lesions. These patients are best treated in bed, with the usual attention to diet, purgation, etc. If gastro-intestinal symptoms occur, calomel, salol, or high rectal washouts with saline or weak permanganate of potash (1 in 5000 or weaker) may be administered. If there is much oral sepsis or eruption of bullæ, with rapid formation of eroded or ulcerated areas in the mouth, only the bland and soothing antiseptics will be tolerated. These include weak solutions of glycothymolin (℥i to Oi), peroxide (5 vols. per cent.), and bicarbonate of soda (gr. x. ad ℥i). Pains in the joints should be treated with salicylate of soda, but do not respond so well as the true rheumatic cases. While the patient is under immediate medical supervision every effort should be made to discover the source of infection. Swabs may be taken from the tonsils or gums ; a bacterial investigation of sterile samples of the urine may prove useful for the purposes of diagnosis, or for the preparation of a vaccine at a later stage.

Local treatment of the cutaneous manifestations is a simple matter, for the patient, as a rule, does not complain of much more than burning or slight itching. Lead and calamine lotion in equal parts usually suffices to give relief. Strong antiseptics should never be used, and lotions and powders are better than ointments.

Vaccine treatment is best deferred until the surgical procedures are completed. In one case, in which a virulent hæmolytic streptococcus had been recovered from the urine, the fæces, and the apical abscesses at the roots of many teeth, every injection of the autogenous vaccine was followed on the next day by a fresh eruption of vesicular erythema multiforme over the

whole trunk. The phenomenon showed how sensitive some patients are to the virus, and suggests the need for caution in the matter of dosage and dose intervals. There is good reason to suppose that in the case quoted the vaccine helped to promote the recovery of the patient.

Erythema Nodosum

In this disease the inflammatory process and the exudation of serum are at a deeper plane, and occur in tissues, such as the shins, in which pressure effects give rise to pain. Pain is indeed usually the symptom that most urgently requires treatment. Bed is essential, and salicylate of soda or aspirin gives considerable relief. The affected members may be wrapped in cotton-wool over a 10 per cent. ichthyol ointment, or lead compresses may be applied. While most authorities are convinced of the presence of circulating toxins in such cases, there is some doubt as to their nature. The safest position is to regard erythema nodosum as a symptom which may occur as a manifestation of various poisons, and that in its ætiology rheumatism, tuberculosis, streptococcal infections, certain acute specific fevers, and gastro-intestinal toxæmia may play a part. During the attack the same general measures are applicable as for erythema multiforme ; when the attack is over there should be instituted a similar process of investigation, which must include an examination of the patient's personal and family history, especially as regards tuberculosis.

Purpuric Eruptions

Purpuric eruptions may be classified broadly into primary or idiopathic, and secondary. The ætiology of the former group is entirely unknown, and its incidence increasingly rare. There is ground for the belief that in the future a bacterial or bio-chemical cause will be found for all cases. A blood count and a Wassermann test should precede all other investigations, for purpuric eruptions may occur in many blood diseases of both known and unknown causation. They may also occur in diabetes and advanced renal disease, and are of grave significance when associated with intermittent fever and signs of organic disease of the heart. Beyond attention to the points already laid down above, little can be suggested on general lines. The treatment must in the main be symptomatic and governed by the severity of the case. When hæmorrhage from mucous membranes, from the kidney, or from the stomach is a feature, the outlook is serious, and it has been computed that 14 per cent. of such cases proceed to a fatal termination. Three varieties of idiopathic purpura are described.

(1) *P. simplex*, usually seen in young children as small petechial spots on the legs chiefly. There may also be joint pains and slight fever. Rest in bed and a light diet is usually

all that is required, and recovery is the rule in from two to three weeks.

(2) *P. rheumatica.*—In this type the joint symptoms predominate, but occasionally there is an associated eruption of bluish red macules.

(3) *P. hæmorrhagica.*—As its name implies, the hæmorrhages, which may be either cutaneous, subcutaneous, or general from any mucous surface, are the main feature of the clinical picture. Joint symptoms may also occur, and treatment by salicylates may afford some relief.

The number of recommendations available for the treatment of severe cases of purpura is in inverse ratio to the degree of their reliability. Adrenalin chloride by the mouth or by subcutaneous injection of 5 to 10 minims of a 1 in 1000 solution three to four times daily is probably the most valuable symptomatic agent we possess. In desperate cases blood transfusions from a relative in the corresponding blood group may be tried, while in those less dangerously situated the blood may be given intramuscularly in 20 c.cm. doses in the buttocks. Horse serum (20 c.cm.) at intervals of three or four days has other advocates, but if used must be given with due care to the avoidance of the most troublesome and ever-present possibility of subsequent serum disease.

Calcium salts are generally prescribed for all cases of pupura, and in the severe types with serious hæmorrhages intramuscular injections of whole blood are said to have been beneficial. In cases of a chronic relapsing type, X-ray irradiation of the spleen, which is sometimes felt to be enlarged, may do good, and recovery has been reported after splenectomy.

In the secondary group of purpura every effort must be made to trace out and eradicate a septic focus, for, just as in erythema multiforme and erythema nodosum, the best results can only be expected by discovery and abolition of the cause.

XIX

THE TREATMENT OF DIPHTHERIA

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Even after our 30 years' experience in the treatment of diphtheria by antitoxin it still seems essential to insist on the necessity for immediate treatment. The chances of recovery diminish steadily with the lapse of time between the onset of the disease and the administration of serum, and valuable hours may be lost in waiting for a bacteriologist's report. Generally speaking if a case is suspicious enough to be swabbed it is suspicious enough to be given a dose of antitoxin, and it is even sound practice to give antitoxin in the face of a negative culture where the clinical appearance suggests diphtheria. The only objection to antitoxin is the occasional occurrence of serum sickness, and if a concentrated serum is used this risk is greatly reduced. The belief that diphtheria antitoxin plays a part in the production of the paralytic sequelæ of the disease is without foundation, whilst the occurrence of " antitoxin " abscesses merely indicates faulty technique in the injection.

Isolation.—A patient treated at home should be isolated in a well-ventilated room, and the services of a trained fever nurse engaged. Small pieces of clean rag should be provided for wiping up discharges and these should be promptly burnt after use. The patient's crockery and spoons should be specially marked and boiled after each meal. Isolation may be terminated when two or three consecutive negative cultures obtained at a few days' interval have been reported. Before returning the room to its normal use it should be very thoroughly " spring " cleaned and the patient's personal linen and bedding disinfected by steam. Toys and books should be burnt.

Serum Dosage

On this point there are two principal schools of thought, one believing in the exhibition of massive doses up to 150,000 or more units of antitoxin, whilst others who find wide support in this country and the United States hold that amounts up to 50,000 units are sufficient to bring about all the benefits to be expected

from serum. The following system of dosage is based on the practice of the latter school.

In estimating the dose the factors to be taken into account are the day of disease, the extent and severity of the local lesion, and the amount of toxæmia as indicated by pallor, prostration, cervical adenopathy, and albuminuria. Age or body-weight need not be specially considered since any modification that one would be inclined to make for a small child is counter-balanced by the greater susceptibility at that age. Mild cases seen early with slight patching on one or both tonsils should be given from 2000 to 6000 units of antitoxin. Cases presenting a moderate amount of toxæmia and patching on both tonsils will require from 8000 to 16,000 units of antitoxin. Severe cases with extensive membrane involving the fauces, uvula, soft palate, and posterior pharyngeal wall, accompanied by profuse nasal discharge, fœtor and profound toxæmia should be given 30,000 or 40,000 units at once. These doses apply to cases coming under treatment on the second or third day ; cases presenting corresponding lesions after this period require an additional 2000 to 10,000 units according to their severity. In the mild and moderate types an increase of dosage is indicated if a nasal discharge is present, or if the faucial pillars, posterior pharyngeal wall, or uvula are involved.

The ideal method is to give an adequate single dose at the outset of the treatment, but even the most experienced do not always find this possible, and the throat and general condition should be carefully re-examined at the end of 12 or 24 hours ; a spread of the membrane or the failure of a nasal discharge to clear up indicates repetition of the dose.

The serum may be injected subcutaneously, intramuscularly, or intravenously, the route now most extensively employed being the intramuscular, and the site the middle of the outer aspect of the thigh. In severe or late cases intravenous injection of at least part of the dose is preferable, but in children this is frequently difficult, and it may be wise to adhere to the easier intramuscular method. Before intravenous injection the serum should be warmed by standing the phials in a vessel of warm water.

Serum Sickness.—Anaphylaxis

After the administration of serum from 10 to 50 per cent. of patients, according to whether concentrated or unconcentrated serum is used, show one or other of the manifestations of serum sickness. The commonest, and frequently the only one of these is the appearance of a rash which comes on from about the fifth to the twelfth days after injection. It may be urticarial, erythe-

matous, morbilliform, or scarlatiniform in appearance, the first being the most usual and is generally intensely itchy, a soothing application of calamine lotion being frequently required. Arthritis is less common and may be present with the rash or alone ; pain is the outstanding feature, little or no swelling being visible. Localised œdema of the eyelids, upper lip, genitalia, or hands and feet may occur, also some degree of pyrexia.

Anaphylaxis happens so rarely that it should never be considered a contra-indication to serum administration. However, persons who have been previously sensitised by injections of horse serum, or are subject to asthma, should be desensitised by injecting subcutaneously 0·5 c.cm. of serum and following that up in not less than four hours with the therapeutic dose. If a patient has to receive antitoxin more than ten days after a previous injection the same procedure should be followed.

General Management

Until all danger from circulatory failure is past, the patient should be rigorously prohibited from sitting up in bed, only one soft pillow being allowed at first, and every possible strain being avoided. The bowels should be kept open by enemata. The diet should be fluid at first, but liberal when the febrile period is over. In moderate cases after two or three weeks a second pillow may usually be given, then a third, then sitting up may be permitted, until finally the patient is allowed up. In severe cases, however, or in those whose pulse is unsatisfactory, these advances require to be made with more caution, the patient being confined to bed for six to eight weeks. After further medical supervision is unnecessary a month's holiday is desirable. Patients who have suffered from circulatory disturbances should avoid hard exercise for a year or more.

Local treatment of the membranous deposit is superfluous except in severe cases or where there is superadded secondary infection, when gentle douching with warm water may be carried out.

Heart Failure

The patient should be placed in a completely recumbent position on the appearance of pulse irregularities in rhythm or rate. If there is pallor or faintness the foot of the bed should be raised on blocks, and fluid nourishment given frequently in small amounts ; hypodermic injections of strychnine or camphor in oil may be called for. Adrenalin has gained some reputation in this condition ; its value or indeed that of any drug, is problematical, but they should always be tried. In sudden collapse, or when vomiting comes on, all feeding by the mouth should be stopped and rectal salines given, as well as hypodermic stimulation every two or three hours. If pain is present, hot fomentations should be applied to chest and abdomen. In extreme cases, when

restlessness is a feature, a carefully estimated injection of morphine may give the patient a spell of quietness, and postpone the almost inevitably fatal issue. Thirst, often a distressing feature when fluids by the mouth are cut off, may be partly alleviated by rectal salines when these are retained; the lips and mouth should be moistened frequently with iced or acidulated water.

Post-diphtheritic Pareses

These tend to spontaneous recovery. The patient must be kept at complete rest and strychnine given by the mouth. The tendency to nasal regurgitation in palatal paresis can usually be overcome by careful feeding with semi-solids. In pharyngeal paresis the patient requires to be fed by the nasal tube and the foot of the bed raised so that saliva may drain from the mouth. The recovering patient should be carefully fed at first with thickened fluids.

Laryngeal Diphtheria

Laryngeal diphtheria should be treated by an immediate dose of antitoxin of 12,000 to 20,000 units; if severe faucial or naso-pharyngeal lesions are present in addition 30,000 to 40,000 units should be given. A croup kettle and a half-tent should be arranged so that the air in the neighbourhood of the head is kept moist and warm by a current of steam. Hot fomentations should be applied to the neck frequently. In hospital it is usual to postpone interference as long as possible, but in general practice this may be dangerous. Rapidly recurring spasms of dyspnœa, great restlessness, cyanosis, and a fast flickering pulse are obvious indications, but there are many lesser gradations of the obstructive syndrome whose gravity has to be estimated. It is better to operate early than too late, and when the doctor cannot be within easy call it is sound practice to operate.

Tracheotomy.—Intubation is essentially a hospital procedure, and the operation to be recommended for the practitioner is high tracheotomy. A detailed account of this is not possible here, but some of the important points may be stressed.

An anæsthetic is not necessary, but the patient must be firmly held, especially the head, which must not be allowed to move from the vertical. The anatomical landmarks must be carefully selected, the midpoint of the lower border of the cricoid never being lost sight of. The incision should be *absolutely* in the midline. Bleeding need not cause alarm, and steady swabbing must be carried on to prevent the field of operation from being obscured. When the trachea is opened there is no urgency about inserting the tube until the first spasm of coughing has cleared away mucus, blood, and fragments of membrane. In the after-treatment the main consideration is to get the tube out, and attempts to

this end should be made about the third day after operation. As a rule the patient can be fed quite well by means of a feeder or a spoon and very rarely is the nasal tube required.

Diphtheria in other Situations

Nasal diphtheria with membrane formation requires from 6000 to 8000 units of antitoxin, and cases in which there is a watery or blood-stained nasal discharge containing *B. diphtheriæ* will usually yield to a small dose of 2000 units. Conjunctival diphtheria should be treated with 6000 or 8000 units, and in diphtheria complicating operation wounds or occurring as a secondary infection of skin eruptions it may be necessary to give large initial doses up to 20,000 or 30,000 units.

Prophylaxis

Passive immunisation can be conferred by the subcutaneous injection of 500 units of antitoxin. The protection lasts about three weeks and is immediate.

Active immunisation can generally be secured by three doses each of 1 c.cm. of toxin-antitoxin mixture subcutaneously. The procedure should be delayed till after the ninth month of life ; in children under school age no preliminary Schick test is necessary. Up to puberty a preliminary Schick test without a control should be performed, but after that age, and in retesting after immunisation, all tests should be controlled by the heated inactivated toxin. Protection takes some months to develop ; the lapse of six or twelve months will be found a convenient interval before retesting. Those still susceptible as revealed by the Schick test should receive a further course of toxin-antitoxin injections.

Carriers

Local applications have little effect, and the best prospect of terminating the carrier state is held out by investigating the nasopharynx and correcting any deformity or pathological condition. Tonsillectomy and removal of adenoids are often useful.

XX

THE TREATMENT OF SINUSES

By G. Grey Turner, M.S.Durh., F.R.C.S.Eng.,

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I.—General Considerations

"A sinus is not a disease but a symptom." Successful treatment therefore depends on the diagnosis and removal of the cause, and is not merely a question of the use of some special irrigation, or vaccine, or artificial sunlight, or ionisation, or the injection of Beck's paste, or in fact any of the very numerous plans that are often more or less indiscriminately employed. All these methods have their place in treatment, but they must only be used with relation to the cause in any particular case. To treat a residual sinus with artificial sunlight may often be most appropriate, but it is a gross violation of surgical principles to use a vaccine for the cure of a sinus over the jaw instead of removing the buried fragment of tooth which is so often the causative factor.

Most sinuses can be classified under one or other of the following heads :

1. Foreign bodies derived from the outside.
2. Foreign bodies derived from the tissues themselves, such as dead bone, or teeth, or calculi.
3. Defective drainage of abscess cavities.
4. Communications with a secreting epithelium.
5. The persistence of some vestigial structure.
6. Tubercle or actinomycosis.
7. Malignant disease.

Sinuses are said to be *active* when the cause remains, and are spoken of as *residual* when the track persists, in spite of the fact that the original causative factor has been effectively dealt with.

Sinuses due to Foreign Bodies

We must now consider some of the varieties of sinus in detail, and first *those due to foreign bodies which have entered the tissues from without.* The commonest examples are associated with missiles, with which everyone became so familiar during and after

the war. Even at this late stage it is necessary to insist on the routine X-ray examination of every case in which there is the remotest possibility that a metallic foreign body may be the cause of a sinus. The discovery of such a foreign body is usually easy, but it may be found at some considerable distance from the orifice of the sinus which it is causing, and the X-ray may have to include a large field. The removal of such a foreign body will cure a sinus due to this cause. Removal may be carried out via the dilated sinus, but it is often very much easier and better to cut directly down on to the foreign body by a shorter and more direct route. There are some cases in which the sinus persists even after the removal of a foreign body. This is not uncommonly due to some portion of clothing which has been carried into the tissues at the same time as the metallic fragment, and which has escaped removal. There are also many foreign bodies from without which do not show on X-ray examination, and yet may be large and troublesome, such as thorns or pieces of glass. The history must be closely scrutinised, and exploration may have to be carried out for their detection and removal.

Another class of external bodies are those introduced in the carrying out of some surgical operation. In the days when silk was more commonly used for ligatures and sutures, it was often the cause of troublesome sinuses which persisted until some offending portion was either extruded naturally or removed. In a case of persistent abdominal sinus I removed a thick silk ligature used to secure the pedicle of an ovarian cyst seven years previously. Silver wire and silkworm-gut, and even heavily chromicised catgut, may likewise be offenders. Drainage-tubes are every now and again lost in the tissues, and have been known to be the cause of persistent sinuses resulting from empyema, appendix abscess, necrosis of the long bones, etc. Sometimes a rubber tube retained for too long in a wound may itself be the cause of an indolent sinus. Fragments of gauze or cotton-wool may also be overlooked, and in one striking case a troublesome sinus of three years' standing in connexion with the upper jaw proved to be due to a small piece of sponge which had been packed into a tooth socket and had been forgotten.

Foreign bodies derived from the tissues themselves are sufficiently numerous and important, and among these fragments of bone in the form of sequestra, and teeth or portions of teeth, supply the commonest examples. There is no end to the sinuses about the jaws which turn out to be due to diseased teeth or fragments of teeth left behind after extraction, roots driven into the substance of the jaw as the result of unskilful attempts at extraction, or roots which have been left behind, have healed over, and have given rise to sinuses even years afterwards. Sequestra are such well-known causes of sinuses that they are not likely to be overlooked, but it must be remembered that even a very small sequestrum will sometimes be the cause of a persistent sinus, and that the orifice of the latter may be at some considerable

distance from the focus of diseased bone. Other foreign bodies, such as calculi, may be the cause of sinuses, and I have removed gall-stones which have been the offenders. In one notable case an enterolith from the appendix kept up a sinus for 40 years, the causation being proved by the cure which immediately followed its removal.

Defective Drainage of an Abscess Cavity

Sinus may be due to the defective drainage of an abscess cavity, such as an empyema in the chest, or the similar condition in the antrum of Highmore. In the chest, the situation of the opening is only one of the factors that has to do with the persistent opening, but it may be the main one, as in those cases of empyema which have burst spontaneously somewhere in the neighbourhood of the nipple or have been deliberately opened too high up. The immediate requirements of the case are met, and the patient's condition improves, but the sinus persists because only the top of the collection of fluid has been tapped, and it requires an incision in a more dependent place to bring about proper drainage of the cavity and to hold out prospect of cure of the sinus.

Communications with a Secreting Epithelium.—Persistent Vestigial Structures

Sinuses due to communications with a secreting epithelium include those most commonly found about the anus, which we speak of as "fistula." These persist because of their communication with the bowel. Sinuses due to vestigial structures are most frequently found in the middle line of the neck, where the thyroglossal fistula is a classical example, or in the side of the neck in the situation of the branchial clefts. They may also occur between the anus and the coccyx, where postanal dermoids are found. The clue to the exact nature of the latter type may be furnished by the appearance of hairs or even a tuft of hair which may project through the opening.

Sinuses due to Tubercle

Then there are the sinuses in which tubercle is the cause. The opening on the surface may communicate with a deep-seated focus either in connexion with a tuberculous gland, as in the neck, with bones and joints, or occasionally with the peritoneal cavity, as in those troublesome sinuses about the umbilicus or the right iliac region where the primary disease is in the bowel. Sometimes the track itself is not actually tuberculous but is merely a communicating channel of granulation tissue between the tuberculous focus and the surface, but more usually the track is actually engrafted with tubercle, and it is these sinuses which furnish the majority of the residual sinuses which have been mentioned.

In the same situations actinomycosis may be the causative factor.

Malignant Disease

Malignant disease is one of the rarest causes of sinus, but it must be borne in mind. In this connexion it is as well to mention that sinuses of long duration, perhaps usually associated with very deep-seated and chronic bone disease, may eventually themselves become engrafted with epithelioma, although this is a very rare event.

The Indications for Treatment

A sinus should never be allowed to persist without an attempt at its diagnosis and cure. It is not only an annoyance, but a potential source of danger, because it may be a focus for continuous septic absorption and it is liable to outbursts of acute infection. Chronic absorption may lead to a whole train of evil symptoms, sometimes even culminating in lardaceous disease. Tetanus has been known to arise and malignant disease may certainly follow. For these reasons every sinus requires careful investigation :

1. By ascertaining the history accurately and by critical consideration of all the circumstances.
2. By ordinary examination with the object of ascertaining its relation to surrounding parts.
3. By X-ray examination, in some cases with the aid of opaque injections.
4. By cautious use of the probe.
5. By noting the effect of treatment.
6. By reconsideration from time to time.

From what has been said it is clear that the most important indication is to discover and remove the cause, and if this is done the great majority will soon heal.

XXI

THE TREATMENT OF SINUSES

By G. Grey Turner, M.S.Durh., F.R.C.S., Eng.,

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II.—Sinuses in Special Situations

The Frontal Region

Head sinuses in the frontal region are often associated with infection of the air sinuses, when the treatment of the latter is the primary consideration ; this also applies to sinuses over the mastoid. Sinuses elsewhere on the skull, especially those over the frontal region which are higher up than the situation of the air sinus, may result from a specific infection in the form of a gummatous inflammation with necrosis, and in these days this possibility is apt to be overlooked. When specific disease is the cause the sinuses readily yield to the appropriate treatment for that condition, and do not require local intervention. If the discharge from a sinus on the cranium is noticed to pulsate, it will probably be an example of extradural abscess which has found its way to the surface spontaneously but has not sufficiently drained.

The Jaws

Sinuses about the jaws are nearly always caused by pathological conditions of the teeth. Even when these appear normal they ought to be suspected, and should be carefully examined and finally X-rayed. More than once a tooth has been sacrificed and a sinus cured when the dental condition was reported to be above suspicion. A tooth which becomes loose from time to time or has been previously injured is often a dead one, and keeps up an infection around the root which in turn may be the cause of a sinus. Even if the mouth is edentulous the jaws should be carefully X-rayed, since fragments of teeth buried and long forgotten may yet be the cause of so much infection as to give rise to a sinus. Unerupted wisdom teeth may also be associated with inflammatory trouble followed by the development of an external sinus.

When a tooth is the cause of a sinus, the latter almost always heals as soon as the offender has been removed, irrespective of the duration of the sinus, which may have existed for years. If the correct tooth has been extracted and the sinus persists for longer than a week or two it may be wise to explore the socket with a sharp spoon, for occasionally bone débris may be keeping up the infection. If a tooth is not the cause, a sequestrum is almost sure to be so, and will probably be easily detected on examination of the infected socket, or will be seen by the X-ray. Tubercle and actinomycosis both occur in the jaws and may be the cause of sinuses, but neither is common in this situation.

The Neck

In the neck sinuses are most often associated with broken-down tuberculous glands, and are commonest when the gland is deeply situated beneath the sternomastoid muscle. Such cases illustrate the general problem of sinuses due to tubercle. The ideal treatment is to remove the focus, and if the group of glands is localised, and presumably infected from the tonsil or naso-pharynx, their removal by a well-planned dissection is the method of choice. Long-standing sinuses are apt to be secondarily infected, and an operation which will open up fresh cellular tissue must not be undertaken until an attempt has been made to diminish such secondary infection by careful and repeated dressing with a reliable antiseptic ; for this purpose the 1 in 1000 perchloride of mercury is the best. When it is not deemed expedient to excise the focus with the sinus, the judicious use of the sharp spoon will be most helpful, but the object in view should be to scoop out the tuberculous débris at the bottom of the sinus, and not merely to scrape the track itself. When local interference is not contemplated, the general principles in the treatment of surgical tuberculosis must be conscientiously carried out—namely, rest, abundant food, fresh air, and sleep. Multiple tuberculous sinuses in the neck furnish the most promising field for light therapy.

Sinuses resulting from vestigial remnants such as the thyro-glossal duct and the branchial clefts are often very small, but are in characteristic situations, and at some stage clear mucus escapes even though at other times the discharge is purulent. For their cure operative interference is essential.

Sinuses connected with the Joints

In the neighbourhood of joints tuberculous sinuses are common. Here the treatment merges into that of tuberculous joints in general ; but I must insist on the importance of prolonged rest, for it is the continuity of the treatment rather than the method which is likely to lead to success. For tuberculous sinuses in general the best local application is pure carbolic acid, which can be

applied on a probe, after which the orifice of the sinus is plastered with a paste made of iodoform mixed with 1/1000 perchloride of mercury in watery solution. The application requires to be made every week or ten days, and the treatment by rest is to be continued indefinitely. Very few tuberculous sinuses will refuse to heal if the treatment is sufficiently prolonged. It is in these cases, however, that adjuncts such as artificial sunlight, the injection of Beck's paste, and so forth are most useful. Personally, I have always been rather chary about using vaccines, but if sinuses like those under discussion have resisted treatment for long, then a judicious use of a vaccine may just happen to start curative processes which might otherwise be indefinitely delayed.

Sinuses in the course of the long bones are usually the result of sequestra, and these must be localised, identified, and removed. Very small sequestra may not always be clearly seen on X-ray photographs; but usually those that do not show will be safely extruded by natural processes. When such tiny sequestra are suspected it is a good plan to explore the sinus occasionally with a probe, for this opens up the track and is often followed by the extrusion of the reluctant piece of dead bone.

Sinuses about the chest are most commonly due to unhealed empyemata, but they may be from tuberculous foci in connexion with the ribs, or pyogenic infection with sequestra; or may result from disease in the spine, from which the pus may travel forward to find its exit on the lateral aspect or even the front of the thorax. Sinuses over the sternum are often of specific origin.

Abdominal sinuses near the umbilicus may be due to a vestigial remnant connected with the omphalo-mesenteric duct. The discharge in these cases is characteristically mucoid. Tubercle not infrequently gives rise to a sinus at the umbilicus. Sinuses in the iliac region or over the gall-bladder area are often associated with appendicitis, or gall-stones, or incompletely successful interference for these conditions, so that either overlooked enteroliths or left-over gall-stones are the commonest causes, and this possibility must first be eliminated. Occasionally a new growth in the bowel not otherwise suspected gives rise to a sinus, but in this instance the latter is in the midst of a characteristically hard area, or this induration soon makes its appearance. So-called left-sided appendicitis, the result of infected sacculi in the sigmoid, may also cause and keep up sinuses in the left iliac fossa.

Sinuses on the posterior aspect of the abdomen are probably associated with retroperitoneal infections or perirenal phlegmons.

In the *perineum* the urethra and the anal canal or rectum are always to be looked upon as the most likely situations for causative factors. Any sinus within an inch of the rectum probably owes its origin to a communication with the bowel, and a diagnosis can be made by feeling for the small indurated area, which, in these circumstances, can always be detected between the mouth of the sinus and the anus, just as if a wire had been buried in the tissues. A sinus immediately behind the anus may be of congenital

origin, the result of a post-anal dermoid or some remnant of the neurenteric canal.

About the coccyx sinuses are often of obscure origin, and it may be most difficult to find the cause and to bring about their cure. The prognosis should not be too optimistic.

A sinus on the sole of the foot is highly suggestive of a perforating ulcer, and it may be one of the earlier signs of a central nervous lesion, and is certainly often present when the latter is suspected, but the ordinary signs are not sufficiently clear.

Actinomycosis is characteristically associated with multiple sinuses. For this condition iodine administered in fresh milk has proved wonderfully successful. The treatment begins with 7 minims of the fresh tincture in 2 ounces of milk, thrice daily, after food, but the dose may be increased to 20 minims thrice daily without fear of evil consequences.

Residual sinuses—that is to say, cases in which the cause has been found and removed and the sinus still persists, or sinuses in which all efforts have failed to disclose the causative factor may have to be dealt with. In these circumstances a whole variety of methods have been tried, and all have been more or less successful at times. I would place first the treatment by attention to the general health under the best possible conditions. Locally, the injection of Beck's paste has sometimes proved successful, and now one would be disposed to try artificial sunlight. But of the greatest importance is probably rest for the part with firm bandaging, so that the walls of the track may be kept in apposition.

If these measures are not applicable or fail, then certain sinuses which are not too long and which do not pass between structures of great importance may be laid open in their entirety, so as to convert them into open wounds. In other cases, scraping with a sharp spoon may set up a reparative process; or, better than either of these methods when applicable, is the excision of the whole sinus track.

XXII

THE TREATMENT OF DISORDERS ASSOCIATED WITH EXAMINATIONS

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It is the aim of every student faced with an examination to have all mental processes working at their maximum efficiency. There are several disorders of mind and body which may impair such efficiency and these can to a certain extent be prevented or avoided by judicious forethought. The processes concerned with the association of ideas are probably the most important in relation to examinations, and every candidate relies largely upon this form of mental activity to pull him through. Among a group of candidates there are always some whose difficulty is to get the association process set going, and others who are handicapped by a disability to sort out and set down in some form of order the multiple and complex ideas which flood their minds after reading their questions. Students seem to appeal for advice mostly to those among their seniors whose ordeals by examination are not too remote to be remembered in detail; but often a family practitioner could better help a student whom he has observed under various conditions of stress from childhood upwards. It is not usually difficult to separate those whose association-processes are inhibited by the very sight of an examination paper from those who are over-stimulated at the outset and need steadying. To either group drug therapy may be beneficial, but it must be carefully selected. For the first-named group a drug such as caffeine, which in small doses certainly stimulates the higher centres, is often beneficial, taken half an hour or so before a written paper, in the form of the effervescing preparation of caffeine citrate (gr. 60) or as a cup of good black coffee. For those whose higher centres tend to work at a feverish activity as soon as they begin to answer questions, alcohol taken immediately beforehand has been suggested. But those who make these suggestions require to have a singular familiarity with the subject's make-up, and those who act on them should know their own physiology with remarkable exactness.

The majority of candidates do not fall into either of these groups, and to them any form of drug-taking will only do harm.

The practice of taking small doses of cocaine, prevalent in certain continental centres, is emphatically to be condemned.

Examination Phobia

Most of the mental distress suffered by examination candidates comes into the category of phobia. The fears connected with written work are not so prevalent as those associated with viva voce examinations and can to a large extent be eliminated by working through questions without the help of books and keeping strictly to the time-limits usually allowed. This has the additional advantage that if sufficient old papers be worked through most of the questions met in the actual examination will have been answered before. For the fears associated with viva voce examinations preparation by a stern and preferably rude tutor with "ragging" propensities offers the best chance of a cure, but certainly such a tutor should be a private acquisition—as a class teacher he may benefit one student, but he will damage a dozen. In this connexion it should be remembered that the examiner with the rough manner does not necessarily mark lower than his gentler colleague, though there is little foundation for the common belief that the harsh in manner are the soft in action. Examiners make ample allowance for stage fright and usually give border-line candidates the benefit of the doubt. A trial trip, by which is meant taking the examination before the chances of passing are really hopeful, often gives valuable experience to the student, but the practice is to be condemned. It wastes time and vitiates the statistics by which the severity or laxity of the educational tests are estimated.

Revision of Work

The peculiar muddled condition in which certain candidates find themselves at an examination is best dealt with by a thorough revision of the methods of preparation. For certain individuals cramming during the last week is almost always bad, while for others it is invaluable. This depends to a certain extent on what may be termed the reaction time of memory. Those who find that they can remember facts and figures best a few hours or days after committing them to memory do well to work almost up to the day of the test, glancing quickly through note-books or synopses covering the whole field of the subject of examination. Others, on the contrary, remember best a week or so after revising their work, and these persons will be well advised to slack off in the last week or to take a holiday. Even for the former class a whole day off immediately beforehand spent in quiet recreation will often be of great help, though it is difficult to convince them that this is so. Home worries should be reduced to a minimum before and during an examination. Over-anxious parents do not always realise what harm can be done by letting it be seen

that they are worrying over the chances of success. The influence of love affairs appears to vary. Certainly any storms which seem to be inevitable had better either be postponed as far as possible or brought to a climax several weeks before the crucial days.

Diet

Some candidates take little or no breakfast before an examination and have only starvation rations for lunch. While the eating of heavy meat meals is probably harmful, the free intake of carbohydrates is definitely beneficial and does much to prevent at least the form of headache due to acidosis. The midday meal between two three-hour papers should be the same as that taken on ordinary days with the addition of excess sugar in some form or other—e.g. chocolate. If alcohol is usually taken at lunch it should not be omitted.

Physical Disorders

On the physical side many of the disorders occurring at examination times are physiological in origin, connected with overstimulation of the adrenal-sympathetic mechanism. Tachycardia, diarrhœa and vomiting, fainting, frequency of micturition, dryness of the mouth, shaking of the limbs, and the "cold sweat" are the principal manifestations. Unless these are very marked they can scarcely be regarded as pathological, and only in severe cases can any form of treatment be expected to give relief. Theoretically drugs or endocrine preparations which stimulate the opposing autonomic nervous system might be expected to do good, but there is not yet sufficient known about such therapeutic measures. Tincture of belladonna (℥5) added to a mixture containing full doses of bromide may do good in very severe cases. Troublesome vomiting is best relieved by a sedative such as chloretone (gr. 5 to 10). For diarrhœa one of the opium astringent preparations such as pulv. kino. co. (gr. 5 to 10) should be used, or codeine in pill form (gr. $\frac{1}{4}$ to $\frac{1}{2}$) may be taken the day before the onset if nervous diarrhœa is expected. It will be seen that the use of medicines like that of alcohol is dictated largely by the subject's own experiences—and even these may be misleading.

Examination headache and examination sleeplessness are often difficult maladies to treat. For headache on the morning of an examination a combination such as the well-known one of phenacetin, gr. 10, and caffeine citrate, gr. 5, will often give relief without leaving any depressant after-effects. For sleeplessness a hot drink last thing at night with or without the addition of a little alcohol—very useful for the worrying type—and a dose of aspirin is often sufficient. In severe cases of insomnia bromural, gr. 5, and adalin, gr. 5, are useful as hypnotics which do not usually produce drowsiness on the following day.

Certain common affections may be present at the time of an examination and their routine treatment may have to be modified to suit the situation. An attack of migraine may completely overcome a candidate, who had better retire from the examination if such attacks are usually severe ; the recurrence of attacks may often be effectively stopped, at any rate for a time, by the well-known Gowers's mixture. In milder cases 20 gr. of phenacetin or aspirin or 15 gr. each of sodium bromide and sodium salicylate may stave off an attack. In a bad attack of nasal catarrh local treatment in the form of a medicated inhalation or menthol ointment will often give temporary relief, while an irritating cough can be suppressed by the use of a heroin linctus or such a lozenge as one containing 3 gr. each of extract of liquorice and ammonium chloride. A mild attack of influenza may be kept to a certain extent under control during an examination by repeated doses of a mixture containing quinine, aspirin, and tinct. camph. co., but in severe cases the examination should be abandoned and no risk taken. The question of the infectivity of this and other complaints should be borne in mind by the candidate who proposes to sit at all costs.

XXIII

THE TREATMENT OF G.P.I. (PARESIS; DEMENTIA PARALYTICA)

By G. W. B. James, *M.C.*, M.D.Lond.,

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I.—The Recent Case

Paresis has for long been regarded as a hopeless condition in which treatment was of no avail. This is not now an accurate view. Life can be prolonged and remissions encouraged by prompt treatment and proper care.

Early Diagnosis

Early cases offer the most favourable prognosis. Character changes in early middle life, or later, should provoke a minute search for the well-known physical signs of general paralysis on the part of the practitioner. If there is any doubt specimens of the blood and cerebro-spinal fluid should be obtained forthwith, so that any uncertainty can be quickly resolved. The refinement and accuracy of modern methods of diagnosis should ensure the recognition of paresis at a very early stage. Advanced cases may improve under treatment, but psychical defect nearly always remains.

Malaria Therapy

The malarial treatment offers new hope in the treatment of paresis. It is the natural result of the almost despairing use of substances which have had some unknown stimulating effect on tissue resistance, indicated by a sharp leucocytosis and accompanied by pyrexia. Injections of such substances as nucleinic acid, sodium nucleinate, phlogetan, and lecithin have been followed by improvements. Sera have also been used, and vaccines prepared from a variety of organisms have been tried.

The treatment of paresis by inducing an attack of benign tertian malaria gives results which hitherto have never been attained. Not every case of paresis is fit for treatment by malaria, and several considerations must be weighed carefully before it is decided upon, but the method can be advised for every suitable case. An important factor is the age of the patient.

The older he is the less satisfactory the result, and the greater the risk of a fatal issue. For a patient older than 45 the treatment entails increasing risks, and results may be poor. The response seems to be best in the classical elated or manic patient. The depressed paretic, the tabo-paretic, and the slowly dementing forms of the disease give less satisfactory results, though exceptions do occur. Renal disease, the presence of jaundice, cardio-vascular disease, and marked anæmia increase the risk of malarial therapy and may even contra-indicate its use. A careful examination and frank discussion with the family should precede treatment when patients are suffering from conditions which will add to the dangers of the pyrexial period.

Technique

The treatment consists in infecting the patient with benign tertian malaria, and allowing the malaria to continue unchecked until 10 to 14 rigors have occurred, when the fever is controlled by the administration of quinine. The best means of producing infection is to take 3 c.cm. of blood from a patient already under treatment, preferably during a febrile attack, and injecting it subcutaneously in the subscapular region of the recipient. After an interval, which varies from 6 to 21 days, the rigors commence and should be allowed to continue as long as the patient can safely tolerate them. Another method is the use of suitable infected mosquitoes, which are procurable with the generous assistance of the Ministry of Health. The mosquitoes are brought to the patient in glass containers which are applied to the skin, and are allowed to bite freely. In my opinion, the malaria produced by mosquito bite is less easy to control by quinine than that produced by infected blood, and relapses of the fever more frequent. During the pyrexia confusion, delirium, and hallucinations are common, and wild excitement may occur. On the whole the patients are fairly tractable. The treatment will necessarily confine the patient to bed, though he may be allowed up between the first two or three rigors. The pyrexia varies, but temperatures of 104° to 106° F. are common. The fever may be tertian, with rigors on alternate days, but is often double tertian, the paroxysms taking place daily.

Regular examinations of the urine should be made. Albumin is sure to appear, but need not cause alarm unless it becomes large in amount. Pronounced albuminuria, the appearance of jaundice or marked collapse are indications for arresting the course of the malaria, but it must be remembered that the best results follow 10 to 14 rigors. No treatment must be allowed during the rigors save sponging when the temperature rises to 105° or more.

The administration of quinine by the mouth arrests the malaria in a most effective manner. Quinine sulphate, or hydrochloride, gr. x. t.d.s. for three days, produces a rapid subsidence

of the fever, and the parasites disappear from the blood. The quinine is even more effective if given intramuscularly, and when there is an urgent need to control the pyrexia it may be given intravenously. The patient will have lost weight, may be weak and anæmic, but as convalescence becomes established the mental condition should improve, and may continue to improve for three or four months after the cessation of the treatment. During this period novarsenobillon or sulfarsenol should be administered intravenously. It is well not to begin with too large a dose, and to increase the doses gradually. The malarial treatment may be carried out at home, in a nursing home, or hospital. The room of the patient is best rendered mosquito-proof by framing the windows and door with fine net. A frame may be made also for the bed, which can with advantage be protected.

The patient should be instructed to return for a course of treatment by arsenical compounds every six months during the remission of his symptoms. Lumbar puncture is useful in giving laboratory information as to the result of the treatment. The Wassermann reaction remains positive, but there should be a pronounced fall in the lymphocyte count and a diminution in the globulin content.

Other Methods

Trial is being made of a method for inserting salvarsanised serum into close contact with the surface of the brain by performing cisternal puncture. When convalescence after the malaria is established a dose of N.A.B. is given, and after 30 minutes some ounces of blood are withdrawn, from which the serum is extracted. The following day, under a general anæsthetic, a needle is inserted into the cisterna magna, and the serum introduced, first withdrawing a similar quantity of cerebro-spinal fluid. Six injections are given at weekly intervals and very marked improvement has been recorded. Tryparsamide, a sodium salt of N-phenylglycineamide-p-arsonic acid, is also being used for the treatment of paresis. It is one of the substances which apparently passes the choroid plexus, and though there are definite risks associated with its use, it may be advised where other methods have failed. It is best given intravenously in doses of from 1 to 3 g. dissolved in 10 c.cm. of sterile distilled water. Not less than eight days should intervene between the injections, and eight injections complete the average course. Ocular disturbances are the chief risk. They may be temporary, but complete and permanent blindness has resulted in some cases from the use of tryparsamide. The remedy is still in the stage of trial, and patients must be carefully selected.

Social and Medico-legal Considerations

The paretic is a difficult patient, especially in the early stages of the disease. He is often a danger to himself, his family, his

fellows, and his fortune. Judgment is so defective that delusions flourish. The practitioner should warn the friends of the probability of disordered conduct, even where no signs of it have yet appeared. In addition to the excesses and extravagances of the elated patient, the depressed paretic may commit suicide, and the suspicious type may assault the innocent victim of his suspicions. Insight is quickly lost in the early paretic, and it is hopeless to argue with him. His promise to behave is quite valueless, and in his own interests certification should not be delayed too long.

Some of the slowly dementing patients and the tabo-paretics can be managed at home. Caution must be exercised in telling the relatives and friends the nature of the disease. In any case it is inadvisable to give a diagnosis until it is firmly established by careful laboratory examinations of the blood and cerebro-spinal fluid. No delay to vene-puncture and lumbar puncture should be sanctioned by the physician. In suitable cases energetic treatment should be urged, and in view of the impressive results of modern treatment a hopeless prognosis should not be given.

Not infrequently the wife of a paretic is fully aware of the nature of the disease and its course. She fears for herself and her children. Happily, the practitioner may safely reassure her. There is no danger to be feared from close contact with the patient, and no reason even to forbid sexual intercourse. The unfortunate patient has often been passed as medically fit for marriage, and unless there were active specific signs at marriage, and a history of miscarriages, the wife and children will invariably be found to be healthy. If the wife continues to be apprehensive, a family blood Wassermann may be taken, and a negative result is the rule.

If treatment is successful, the future life of a general paralytic should be carefully regulated. The diet should be simple, he should take gentle exercise in the open air, and the bowels must be kept active. He can, and often does, carry on his work after treatment and may continue to support himself and his family.

Careful notes of the mental condition should be made from time to time, and kept. Questions of business and testamentary capacity frequently arise, when some record of the mental state is useful, and it is often lacking when most wanted.

Lastly, the laboratory reports on the blood and cerebro-spinal fluid should always be filed, and refusal of treatment, a not infrequent occurrence, should be noted in the records made concerning the patient.

XXIV

THE TREATMENT OF G.P.I. (PARESIS; DEMENTIA PARALYTICA)

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II.—The Chronic Case

Some cases of paresis which are not responsive to treatment, in spite of early diagnosis and the prompt application of the methods, were outlined last week. Some patients continue to deteriorate slowly; others improve, but psychical defect remains, and they are not able to look after themselves or resume their work. There has also to be considered the patient who, by reason of some physical defect or age, is not suitable for the use of malarial therapy. Some of the slowly dementing forms of paresis present great difficulties to the practitioner. The patient has no insight into his condition, may show profound loss of memory, may have attacks of mild confusion, may be erratic and even dirty in his habits, and yet does not become so disordered in his conduct or speech as to justify a certificate of unsoundness of mind under the Lunacy Act. Yet for the majority of chronic cases certification and treatment as an in-patient in a mental hospital becomes necessary sooner or later. Nursing a chronic case at home or in a suitable nursing home involves considerable expense, since adequate assistance must be available. It can be done, and sometimes there is no alternative.

Treatment should ensure as much fresh air as is possible. The patient must always be accompanied when walking or driving. An effort should be made to provide some simple outdoor amusement to interest him, for he will often pass many hours playing at some easy game. Bowls, clock golf, skittles, are among the games which are easily set out on the smallest patch of grass. In the later stages of enfeeblement care must be taken to see that the patient is not unduly exposed to the weather, especially when the wind is easterly. Patients become very liable to attacks of broncho-pneumonia as the disease progresses, and a fatal illness not infrequently follows a walk or drive in a cold east wind.

Diet

The diet should be liberal, though care must be exercised to see that any tendency to gross overfeeding is checked. Practically all solid food must be minced ; paretics choke themselves easily with meat, or with potatoes, which they often swallow whole. The supply of meat should be sparing, and it should be arranged that the chief meal be taken at midday. Bones must be removed from fish ; eggs and milk should be given freely, and will form the greater part of the dietary in the later stages. The absolute avoidance of alcohol is a fetish. Indeed, many patients are better for 1½ to 2 ounces of whisky or brandy taken with the principal meal. All wines should be forbidden. Tobacco in moderation may be allowed.

Sleep

Insomnia is rarely a feature of the chronic case of paresis. In practice it will be found that somnolence is much more usual. For this reason patients should be put to bed early ; 8 or 9 p.m. is not too soon, and the patients often sleep the night through. The bedroom should contain very little furniture ; linoleum is the best covering for the floor. A patient who is confused is safer on a box or spring mattress placed on the floor of the room. He may be even safer on a single mattress on the floor. The discomfort of this couch may be mitigated by placing under it a cork mattress, such as is sold in camp outfits.

Insomnia and restlessness at night may be relieved by a dose of castor oil. If this measure is not successful sleep can generally be secured by ordering 5 gr. each of the three bromides, 6 gr. of medinal, or 1 or 2 drachms of paraldehyde or amylene hydrate taken on retiring. The bowels must be kept functioning rather freely. Patients require larger doses of laxatives than the normal person. Castor oil should be given when there are attacks of irritability, restlessness, mild confusion, or excitement. An inspection and palpation of the abdomen should be made frequently by the physician in charge, with a view to detecting a distended bladder. A paretic in the advanced stages, or even before, will walk about without complaint with a very distended bladder. Retention, or distension without actual retention, is relieved by the use of a catheter, seldom necessary for more than one or two days.

Seizures

If the management of a paretic be successful, fits will be rare or unknown. If they occur, they may be epileptiform or apoplectiform in type, or resemble a Jacksonian attack in which there is no loss of consciousness. The epileptiform attacks are best treated with an injection of a morphine salt. If the fits continue

lumbar puncture sometimes relieves them instantly. Chloroform anæsthesia may be necessary in a severe case. A sedative mixture containing 10 gr. of potassium bromide and 5 gr. of chloral hydrate may be given for a few days after a seizure. A mixture which is useful in preventing seizures contains 15 gr. of hexamine and a similar quantity of acid sodium phosphate. Whatever its action, the regular use of hexamine will produce satisfactory results in limiting the " fits " of paresis. The paralyses following the fits clear up rapidly, often within a few hours. It is probable that antisyphilitic treatment also minimises the risk of fits. Novarsenobillon, and mercury and iodides have some influence, though there are some patients who do not tolerate either very well, and in this case the drugs should then be discontinued.

During the confusion and paralysis following a seizure it may be necessary to feed the patient artificially. Swallowing becomes difficult or temporarily impossible, and attempts at spoon-feeding are dangerous. It is better to use a nasal tube once or twice a day so that food and necessary medicines can be given with safety and certainty. The bowels may prove difficult to move after a fit; an enema should be used, a simple soap solution being all that is required.

Sudden attacks of vomiting of the cerebral type may herald a seizure, or may be a troublesome feature of the disease. The diet should be cut down to liquids, hexamine prescribed, and a brisk purge ordered.

Late Stages

As the disease progresses wasting becomes pronounced, and there will be increasing feebleness and inability to walk or stand. At this period there will also be a rarefying osteitis of the long bones and ribs, and a fall or other slight injury is very liable to produce a fracture. Friends should be warned of this serious possibility. Pronounced ataxy and feebleness are best dealt with by putting the patient to bed, preferably on a water- or air-bed. Improvement often follows, and in a week or two the patient can be got up again. Wasting becomes pronounced, and great efforts will be needed to prevent bed-sores. Measures must be taken to keep the patient clean and dry. Constant inspections are necessary to see if changing is required. While the patient is still up a large sanitary towel is useful to prevent the soiling of clothes. It may be used when the patient becomes bed-ridden, but care must be exercised to see that the towel is changed at once when wet or dirty. Wet sheets and garments must be removed at once, and when in bed the patient's position should be altered hourly, both by day and night. A night nurse is a necessity in the later stages. A careful toilet of the skin must be carried out twice daily, and prominent points rubbed with spirit and dusted with an antiseptic powder. Should bed-sores appear they may be treated with any mild antiseptic dressing, which must be renewed frequently. A sluggish bed-sore will often heal after

it has been fomented for a few days. In the final scenes artificial feeding may be required, and is easily performed through a nasal tube.

Antisyphilitic Treatment

Many patients seem to derive benefit from regular courses of N.A.B. or sulfarsenol, the latter drug being given intramuscularly. A course may be given at intervals of 4–6 months. The dosage should be small to commence with and increase gradually. Commencing with 0·45 g. of N.A.B. or 0·18 g. of sulfarsenol, the dose is increased to 0·9 g. and 0·60 g. respectively at a slow rate, the intervals between the injections being a week, and six or eight injections complete the course. Improvement in general health may result, but the use of these preparations is inadvisable when the patient does not tolerate them well, or if there is no definite physical improvement.

The same remarks apply to mercurial preparations. A mixture containing 5 gr. of potass. iodid. and a drachm of liq. hydrarg. perchlor. t.d.s. may be helpful, and relieves headache, if present. A pill containing $\frac{1}{4}$ gr. of hydrargyri iodid. virid. is another good prescription, and is given twice daily, with regular rests. Should mercury in some form produce improvement, and be well tolerated, it can be safely continued. If there is no physical benefit, or any sign of intolerance, continued use of the preparations of either arsenic or mercury are not justified.

Conclusion

The practitioner should not fail to warn the family of a paretic of the risks attached to nursing at home. There may be attacks of excitement, or sudden impulsive actions on the part of the patient which almost invariably indicate legal care to be a necessity. In a small establishment home care is a grave problem, and if the mental condition permits of certification, the patient is just as contented in a mental hospital. The care of property is a question which need present little difficulty. This can be dealt with by procedure under Section 116, Subsection (*d*) of the Lunacy Act, by which the property of the patient can be cared for, providing he be shown to be incapable of managing his own affairs by reason of mental infirmity arising from the disease.

XXV

THE TREATMENT OF MYXŒDEMA

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The treatment of myxœdema resolves itself largely into the administration in some form of thyroid extract or thyroxin, the active principle of the thyroid gland. Myxœdema is a true deficiency disease, and thyroid treatment is specific. Stress has also been laid on the necessity of removing any possible cause of thyroid depression which may exist at the time of observation, but in practice it is often found that when the disease has developed to the stage at which it can be diagnosed the causal factors are no longer playing an active part in its production. There may be an antecedent history of hyperthyroidism, the result of emotional stress or some septic process which has caused an exhaustion of the gland, or part of the gland may have been removed. Myxœdema may develop as the end-result of repeated pregnancies, or may appear with the termination of ovarian activity at the climacteric. Generally, however, there is little which can be done from the ætiological aspect of treatment, though it is always advisable to bear in mind the important part played by focal sepsis, intestinal toxæmia, and errors of diet, and to correct these as far as possible. Chief reliance must be placed on the administration of thyroid extract. It is to Prof. George Murray that we are indebted for the observation, in 1891, that the symptoms of myxœdema in human beings could be made to disappear by the subcutaneous administration of sheep's thyroid gland. Victor Horsley, previously to Murray's work, practised transplantation of sheep's gland into the tissues of a myxœdematous patient, but the results of this operation were unsatisfactory then, as they have been since, chiefly owing to the rapidity with which the graft is absorbed. The effects are only temporary and not lasting. Somewhat later it was shown by H. MacKenzie that extracts of thyroid gland taken by the mouth would also control the symptoms of the disease, and this has remained the standard method of treatment to the present day. With the advent of synthetic thyroxin (Harington, 1926), it seems probable that the use of gland extracts will gradually be discontinued, for the synthetic substance should be more dependable than the various preparations of thyroid extract now in use.

The chief difficulties in the past in obtaining satisfactory results in the treatment of myxœdema have been (1) the absence of any reliable method of gauging the dose required. Estimations of the basal metabolic rate are proving of considerable value. (2) The large number of different preparations of thyroid extract on the market and their tendency to vary in strength from time to time.

The Basal Metabolic Rate

The basal metabolic rate is the rate of energy exchange in the body under basal conditions (after elimination of food, muscular exercise, and so forth). It can be found by measuring the amount of heat given out by the body in a given time, or indirectly by estimating the oxygen consumed per unit of surface area. This is the method employed clinically. A sample of expired air is collected by a specially designed apparatus while the patient is at rest and has fasted for 12 hours overnight. The metabolism under these conditions is fairly constant for different individuals, and only varies within limits of plus or minus 10 per cent. In hyperthyroidism it may be as much as 75 or 100 per cent. above normal, whilst in myxœdema it may fall to 40 per cent. below normal. This test affords a means of accurately controlling the dosage of thyroid extract in myxœdema. It is scarcely necessary to point out that it must only be used as a supplement to clinical observation.

Thyroid Extract and Thyroxin

The preparations of thyroid extract usually employed in the treatment of myxœdematous patients are fresh thyroid gland, desiccated thyroid gland (thyroideum siccum), liquor thyroidei (thyroid solution, B.P.1898).

In practice it is not perhaps sufficiently well recognised that these preparations are of different potency; unsatisfactory results often follow from the indiscriminate use of different preparations in any given case. The strength depends mainly on the iodine content of the substance employed. Of the preparations mentioned, desiccated thyroid is five times the strength of the fresh gland, 1 gr. of thyroideum siccum corresponding to 5 gr. of fresh or whole gland; 5 gr. of fresh gland has the same potency as 10 ℥ of liquor thyroidei. The following comparative table may be of use:

Thyroid (desicc.) . .	¼	½	1	2	3	4	5 gr.
„ (fresh) . .	1¼	2½	5	10	15	20	25 gr.
„ (liquor) . .	2½	5	10	20	30	40	50 ℥

Since reliable preparations of desiccated thyroid are readily obtainable from most firms, it would seem advantageous to use this extract as far as possible in all cases.

Reference has already been made to the introduction of synthetic thyroxin by C. R. Harington. Clinical reports of its effects in myxœdema are still scanty.

D. M. Lyon and F. A. Redhead [1] report results obtained in two myxœdematous subjects. The metabolic activity of both patients increased immediately and rapidly, one by 26 per cent. and the other by 48 per cent. Corresponding rises in temperature and pulse-rate and decrease in weight accompanied the rise in basal metabolism. W. A. Plummer and W. M. Boothby have also made numerous clinical observations in cases of myxœdema with thyroxin, using the active principle isolated by C. C. Kendall from the gland in 1915. The results are apparently clear cut and almost quantitative when this substance is given intravenously. The myxœdematous symptoms are relieved, and it is calculated that 1 mg. of thyroxin causes an average increase of 2·8 per cent. in the basal metabolic rate, a 10 mg. dose raising the metabolism from minus 40 per cent. to minus 12 per cent. In a large series of cases this figure was remarkably constant. Intravenous administration is not essential; the same effect was obtained when thyroxin was given by the mouth. Thyroxin is now supplied commercially in doses of 0·2 mg., 0·4 mg., 0·8 mg., and 2 mg. to be taken by the mouth. Based on the percentage iodine content of the two preparations, 0·2 mg. of thyroxin (Harington) corresponds approximately in potency to two-thirds of a grain of the desiccated gland.

Management of a Case

The therapeutic indications are, therefore, clear. The basal metabolism of a patient with myxœdema must be brought to the normal level and there maintained by an appropriate daily dose of thyroid extract or thyroxin in some form. In practice it is not possible to have estimations of the basal metabolic rate made often, and in the ordinary straightforward case it is certainly not necessary to submit the patient to the inconvenience of several estimations. An initial examination, however, may be of considerable value, and will give a good idea of the amount of thyroid extract which is likely to be required to raise the patient's metabolism to normal. To a large extent the basal metabolism runs parallel with the pulse-rate, so that for ordinary purposes the latter will usually be a sufficient guide, especially if it is used in conjunction with other clinical data, notably variations in the patient's weight. It is important to make routine observations when giving thyroid preparations by the mouth, and, owing to the variability in the extracts and in their absorption from the gastro-intestinal tract, to standardise clinically, or by means of the basal metabolic rate, not only the preparation but also the individual patient. After the initial

[1] *Edinburgh Medical Journal*, April, 1927.

tests it is usually sufficient to note the clinical effects when thyroid is given by the mouth. Most cases of myxœdema are extremely sensitive to this extract, so that it is best to commence with a small daily dose and gradually to increase it at intervals of a week or so until an appropriate maintenance dose has been found. A satisfactory result can usually be obtained by starting with gr. ¼ of the desiccated gland once a day, increasing to gr. ¼ twice a day at the end of a week, to gr. ½ twice a day at the end of another week, and later to gr. 1 twice a day. This is an adequate maintenance dose for the average case of myxœdema, and a larger one is seldom required. It is necessary, however, to judge entirely by results, and no rules can be laid down. The patients themselves often rapidly acquire a knowledge of what is the optimum dose for them and can give considerable help to the physician. They should be warned at the start that treatment will have to be continuous throughout their lives, and that successful results depend to a large extent on the systematic supply of thyroid extract in the correct dosage. Since the effects of the remedy are so obviously beneficial, there is seldom any difficulty in obtaining complete coöperation from the patient.

A warning is also necessary as to the symptoms of overdosage. It is often a good plan to stop the routine administration for a day or two each week, or for a few days each month, to avoid any accumulative effects. For the same reason attention to the bowels is advisable. If overdosage does occur, all thyroid should be stopped for a week or two and started again at half the previous dose. The extract should be discontinued during the course of any acute illness, or if any septic process is present, such as tonsillitis or pyorrhœa; under these conditions symptoms of hyperthyroidism are liable to appear if thyroid treatment is persisted with. The symptoms of an overdose are headache, nervousness, palpitations on exertion, diarrhœa, insomnia and mental irritability, and general malaise. There is also excessive loss of weight, tremor, and tachycardia. It is not difficult to detect signs of overdosage at an early stage, for when the myxœdematous symptoms have once cleared up the weight should remain more or less constant at approximately the average normal level of the patient before his illness.

Diet.—The value of any food as far as the thyroid is concerned is to a large extent dependent on its iodine content, and it has been shown experimentally that with an exclusive meat diet, in which the iodine content is low, the gland tends to atrophy. The same result is brought about by inanition. It is advisable, therefore, to see that the diet is adequate in quantity and quality. A mixed diet containing an abundance of fish, fruit, and vegetable is appropriate. Where myxœdema is associated with obesity a very much better result can often be obtained by a moderately severe restriction of carbohydrates. Less thyroid extract is generally required in these circumstances, and this is advan-

tageous inasmuch as these patients often show a tendency to cardiovascular instability.

Cardiovascular Considerations. — Patients with myxœdema frequently have symptoms and physical signs of cardiovascular insufficiency. This may be coincidental or the result of the thyroid condition. The heart usually shares in the process of myxœdematous infiltration, or may be fatty. Arterio-sclerosis is not an uncommon complication. In such patients, when thyroid extract is given in quantities sufficient to cure the myxœdematous symptoms, increased work is thrown upon the heart, and it may take time to adjust itself. It is usually advisable, therefore, for this type of patient to remain in bed during the first part of the treatment and to take no unusual exertion. In severe cases a course of digitalis or other cardiac therapy may be given before treatment with thyroid extract is started.

Conclusion

The most essential features in the treatment of myxœdema are the removal of all sources of thyroid depression and the regular supply to the patient of some form of thyroid extract or thyroxin in the correct dosage. The results are generally satisfactory. The original patient treated by Murray was 46 years old and lived in good health for over 28 years after developing the disease.

XXVI

THE TREATMENT OF OPEN FRACTURES OF THE LIMBS

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The main treatment of any open fracture must be (1) to render the wound clean, which entails a thorough excision of all lacerated tissues ; (2) to convert it as soon as is possible—i.e. immediately or by secondary suture—into a closed fracture, and (3) to rectify the fracture itself.

Excision

It may be urged that a complete excision is unnecessary when the wound is caused from within by a sharp fragment which has perhaps momentarily penetrated the skin, creating a small puncture wound, and when the damage to the skin and muscle are slight. The necessity for excision in these cases must depend on individual judgment based on the condition seen ; in some cases interference is unnecessary. When there is doubt prejudice should be in favour of excision, since otherwise a definite risk of sepsis is involved. Not only is the virulence of an infective agent an unknown quantity, but the whole point of excision as a routine is to cleanse the wound and so gain the one chance of its successful primary closure. With a few exceptions it is safer to apply the rule of complete excision to all open fractures.

When a large fragment has penetrated the skin from within, or the external injury from without has caused an extensive wound with much laceration of the skin and soft tissues, it may not be possible to close the wound after excision. This is more especially true in wounds on the inner aspect of the leg and the region of the ankle-joint, common sites for such injuries. In such circumstances it is useless to bring the skin together under tension, since sloughing almost invariably follows ; in my experience, too, it is a dangerous procedure to undermine the skin in order to close the wound, since in this way an infective agent is given a wider area over which to act. In such cases, therefore, it must be recognised that the severity of the injury to the soft tissues has excluded the possibility of obtaining a

completely closed fracture immediately ; and though such wounds are usually allowed to heal by granulation, if the chance arises for closure by secondary suture it should be taken. When in the first instance the wound is left open it is necessary only to cover it. Drainage-tubes, gauze packs, and so forth serve no useful purpose ; they are, as a rule, sure paths of infection and should not be introduced.

It may be reasonably urged that if open fractures do not come into a surgeon's hands until a day or two after the accident, when infection has already occurred, it is either not necessary or not justifiable to deal with the wound radically. Again, every case must be judged separately. It may be unnecessary to excise a small wound which has been inflicted 24 or 48 hours previously and is not septic. On the other hand, if infection is present but localised a complete excision is often practicable, and may be extremely useful ; but it is problematical whether free excision at this stage will render sterile an already infected wound, and complete closure at any rate should not be attempted. In the civil open fracture it is rare to encounter an acutely spreading infection which demands wide incisions, or even removal of the limb. The essential point is that all open fractures must be treated within the first few hours, and in the majority of cases infection is prevented by excision of the wound within six or up to twelve hours of its causation. As a general rule, the presence of shock need not be a contra-indication to excision and splinting. How far such a course may be negatived by severe shock must be a matter of judgment, and it should be borne in mind that immobilisation of the injured limb in itself tends to reduce shock.

To fulfil the demand of a complete excision it would appear logical that the fractured surfaces or fragments of bone which have been exposed to infection should be removed. In the completely shattered bones caused by gunshot, some surgeons advocated the removal of all completely loose fragments, while others retained all fragments of any size as useful for the eventual repair of the bone, though by doing so sepsis might be prolonged. It has been recommended, too, in civil open fractures that the protruding fragments should be excised. In my practice this procedure has not been adopted, as apart altogether from the inevitable shortening, or risk of non-union, fragments of any size are necessary for the restoration of alignment, and in the lower limb especially are essential for the restoration of the full strength of the bone for purposes of weight bearing. In all cases the very small completely detached fragments of bone are removed together with the shreds of periosteum, and the exposed surfaces of the larger fragments cleansed ; in the exceptional case the nature of the accident or intense soiling of the fragments may demand a more extensive removal of bone ; in the majority, however, it is justifiable, in my opinion, to preserve all bone fragments.

Restoration of Alignment

The alignment of the bone should be restored after the excision has been completed. Often it is extremely tempting to fix the fragments in position straightway by a plate or other means, especially as it is a common experience afterwards to find that slipping has occurred from the reduction obtained at the operation. In all probability fixation may be done many times without untoward results, but as a general rule, in my opinion, it should never be done. The main concern at this stage must be to obtain a clean and, if possible, a closed wound, and the alignment, though it should be attended to, for the moment must be a secondary consideration. There is no knowledge of the type of organism that has gained entrance and no guarantee that the excision has been sufficiently complete to prevent sepsis; the risks of infection in every case are too great to permit of the introduction of any foreign body for the purpose of fixation, and the results seen from this are often lamentable.

If it is not possible to maintain alignment by suitable splinting and traction then at a later date (10–14 days), if there is no evidence of sepsis in a closed wound, an open operation may be performed and reduction and fixation effected. This should be done in the full realisation of the fact that sepsis may be lit up immediately, or that a mild infection may occur at a later date; under no circumstance should such an operation be undertaken in the presence of a still open wound. In favour of operation it must be realised that gross displacement, obvious within a week or two of the accident, tends rather to increase than diminish; that in the leg, where this question is most likely to arise, errors of alignment give rise to greater disability than in any other part of the body; that the margin of time in which a perfect result can be obtained is a small one, for if the question is shelved and an operation is decided upon when malunion has occurred, far greater mechanical difficulties present themselves, and the chance of the perfect result is much diminished. With a better understanding, however, of the necessity and requirements of the initial operation and of the more effective methods of splinting, the secondary operations should become increasingly unnecessary.

The Value of Complete Immobilisation

The maintenance of absolute rest of the part wounded must be achieved by the splinting. The value of a complete immobilisation of a limb in these cases cannot be over-estimated; if it is essential to assist in the healing of a wound that has been closed by operation, it is even more essential for the wound that has become infected. Immobilisation is best obtained in both the upper and lower limbs by means of a Thomas splint with traction, which must be suited to the position of the wound; it should be

continued until the wound has healed or sepsis has quietened, when, if the alignment is satisfactory, provision may be made to permit of voluntary movements of the joints. Occasionally, in the lower limb more especially, the mobility of joints may have to be sacrificed temporarily, at any rate, in order to obtain stability of the bone.

In my own experience union is delayed more frequently after an open fracture than in any other type, not including the cases in which there has been an obvious infection. Even in the best circumstances, when the wound has been excised and closed, alignment restored, the limb appropriately splinted, and any obvious signs of inflammation are absent, union may be delayed for a considerable time. It is my impression, founded on the condition found at secondary operation, that it is the presence of a septic infection which prevents union, though it is of so mild a degree that there has been no obvious evidence of it in the wound or in general systemic disturbance. In the large majority of such cases union does eventually become firm, though to achieve this immobilisation at the site of fracture may have to be considerably prolonged. If, therefore, the alignment of the fragments is satisfactory, a secondary operation should not be undertaken for delayed union in these cases ; operative measures will tend to maintain or exaggerate the sepsis, however mild, and thus defeat their own object.

XXVII

THE TREATMENT OF INSOMNIA

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I.—General Considerations

Insomnia, or the inability to secure a sufficiency of normal physiological sleep under favourable external conditions, is often one of the most exacting problems which confronts the physician. A sufficiency of physiological sleep denotes an amount which is normal and usual for a particular individual, although the actual duration and depth of sleep may vary with age and personal constitution. Insomnia implies not only inadequate sleep, but also failure to obtain sound and restful sleep. Three types of insomnia may be distinguished: (1) sleep delayed in onset; (2) sleep interrupted by disturbing dreams or "starts"; and (3) sleep normal in onset, but the sleeper awakens in the early hours of the morning and is unable to sleep again (internocturnal insomnia). Two of these types may be combined in the same patient.

In dealing with any case of insomnia, it is essential to regard the sleeplessness merely as a symptom and to use every endeavour to ascertain the exact nature of the underlying disturbance responsible for its production. Cases of insomnia have been differentiated into two groups: (1) secondary insomnia, in which the loss of sleep results from some form of bodily discomfort—e.g. pain, cough, dyspnœa, etc.; and (2) primary insomnia, in which no definite physical cause for the symptom can be found. In the latter, however, the sleeplessness almost invariably results from some psychical cause, often an alteration in the affective or emotional stage of the patient (anxiety, fear, depression) which acts as a persistent mental irritant preventing the onset or interrupting the tranquillity of sleep. It is probable, indeed, that no true primary insomnia ever occurs.

Ætiology

From the ætiological standpoint the main factors responsible for insomnia may be classified as follows:

(A) *Physiogenic causes.*—Insomnia resulting from physical discomfort or organic disease.

(1) *Pain.*—Neuralgia, neuritis, arthritis.
(2) *Dyspnœa.*—Cardiac disease, asthma, nasal obstruction.
(3) *Cough.*—Bronchitis, phthisis.
(4) *Frequency of micturition.*—Cystitis, prostatic enlargement, disseminated sclerosis.
(5) *Pruritus.*—Skin diseases.
(6) *Pyrexia.*—Acute specific fevers.
(7) *Gastro-intestinal disturbances.*—Flatulence, palpitation, colitis.
(8) *Circulatory disturbances.*—High blood pressure, cold feet (peripheral stasis).
(9) *Toxic states.*—Chronic sepsis, alcoholic delirium.
(10) *Organic cerebral disease.*—Encephalitis lethargica, meningitis, dementia paralytica.

In some diseases insomnia may result from a combination of several of the above factors—e.g. in pneumonia from cough, dyspnœa, and toxæmia, or in typhoid fever from gastro-intestinal disturbance, toxæmia, and pyrexia.

(B) *Psychogenic causes.*—Insomnia in which no definite physical basis is found.

(1) *Anxiety states* (anxiety neuroses and anxiety hysteria).—Mental conflicts, apprehensions, disturbing dreams.
(2) *Neurasthenia.*—States of fatigue.
(3) *Hysteria.*—Auto-suggestion, somnambulism.
(4) *Compulsion neuroses.*—Obsessions.
(5) *The psychoses.*—Manic-depressive states, paraphrenia.
(6) *Dementia præcox.*
(7) *Confusional states.*

Clinical Aspects of Insomnia

In dealing with any patient complaining of sleeplessness, a full physical examination is imperative at the outset. Apart from cases in which the symptoms point to an obvious cause—e.g. pain, dyspnœa, pruritus, frequency of micturition, etc.—the digestive, circulatory, respiratory, and excretory systems must be examined, the blood pressure taken, and, lastly, careful attention devoted to the investigation of the nervous system in order to exclude the presence of organic disease. Insomnia is often an early symptom of organic nervous conditions; for instance, in spite of what the name implies—encephalitis lethargica frequently begins with sleeplessness on several successive nights or, preceding the lethargy, insomnia may be associated with mild nocturnal delirium. Inability to sleep may also persist long into convalescence, especially in the Parkinsonian type of the disease, while it is quite common to meet with alterations in the sleep rhythm (the so-called "sleep-reversal") in which the patient is

able to sleep quite well during the day, but insomnia occurs at night. The writer has met with several cases in which, the patient apparently having recovered from the encephalitis, a reversal of sleep rhythm was the only remaining symptom. Again, in general paralysis of the insane (dementia paralytica), insomnia frequently occurs in the early stage of the disease, and may or may not be accompanied by excitement or exaltation. Later, in many cases, sleep tends to become excessive, and even narcoleptic attacks may occur. Of the diseases of the nervous system associated ætiologically with alcohol, delirium tremens is accompanied by absolute sleeplessness in the early stages, while in alcoholic pseudoparesis insomnia is early and pronounced.

Anxiety

When all physical factors have been definitely excluded and the conclusion reached that the insomnia is one of psychogenic origin, the physician's duty is to investigate all possible causes of mental anxiety. Consequently a full exploration of the patient's domestic, business, social, and sexual life is essential. A mental conflict is the basis of all cases of anxiety hysteria, in which insomnia is one of the most frequent symptoms. In such cases sleep is often disturbed by harassing dreams, usually associated with or symbolical of the factors giving rise to anxiety—e.g. the battle dreams of war neuroses, etc. Later, sleep is also delayed, the patient frequently anticipating the recurrence of disturbing dreams and fearing to fall asleep. The explanation of these phenomena advanced by analytical psychology is that painful or terrifying experiences are repressed; during sleep, however, control over the repressed memories is relaxed and the patient dreams of them either in actual or in symbolical form. Sleep may also be delayed in onset by the conflicts of apprehension, grief, or of business and domestic worries. Anxieties which have been partially obscured by the ordinary occupations of the day, or by attempts at a process of conscious repression, will emerge with excessive insistence and will have full play while the patient lies waiting for sleep to come. Under such circumstances all doubts are exaggerated and all worries intensified; sleep may eventually supervene only to be interrupted by a startling dream in which the anxiety is reproduced with added intensity and the awakening accompanied by distressing emotional manifestations, such as palpitation and sweating. During the stage of semi-consciousness that actually precedes sleep, the patient is sometimes rudely aroused by an apparent vision of startling intensity (hypnagogic hallucinations), and usually connected with his mental conflict, although often in distorted symbolical form; sleep is thus further delayed, if not actually abolished for that night.

Neurasthenia

Neurasthenia is a term that should be confined to the clinical entity characterised chiefly by rapid and undue fatigue on slight exertion, physical or mental, and should not be confused with anxiety neurosis nor anxiety hysteria. In neurasthenia sleep is often good, although it is occasionally delayed in onset. Almost invariably, however, the patient awakes unrefreshed, and is often difficult to arouse in the morning. Sleep may be disturbed by nocturnal emissions. Overwork, in the absence of coexisting worry, is a rare and doubtful cause of insomnia. Most cases in which the symptom is attributed to this factor are examples of anxiety states, mild manic-depressive psychoses, or early dementia præcox. Complete insomnia—total sleeplessness on a succession of nights—is very rare, but may occur in association with neurasthenia. In women it sometimes follows the prolonged nursing of invalids, during which period the absence of regular rest has lowered the general health of the patient and destroyed the normal sleep-habit. As this form may endanger mentality, prevention is better than cure.

Hysteria

Sleeplessness is occasionally a purely hysterical manifestation (conversion hysteria); in such cases the degree of insomnia is often much exaggerated, the patient taking a delight in telling people how little he or she sleeps. Apart from the fundamental psychoneurotic disturbance, hysterical insomnia develops as the result of auto-suggestion, and may disappear quite suddenly, only to reappear in another form—e.g. as hysterical aphonia, headache, astasia-abasia, etc. In some cases the actual origin of the sleeplessness has been physical—for example, pain, etc.—but the cause having disappeared, the insomnia persists as a hysterical symptom. This occurrence is analogous to the paresis that sometimes persists in hysterical form following an organic paralysis due to nerve injury, the actual lesion, as shown by normal electrical reactions, having recovered. Somnambulism — though not strictly a form of insomnia—may also interrupt the otherwise normal sleep in hysterical subjects. As a rule, the patient has no recollection of somnambulistic acts when awake.

Hypochondriasis

In hypochondriacal subjects insomnia may become a veritable obsession and constitute a definite "compulsion neurosis," the patient believing that under any circumstances it is quite impossible for him to sleep. Apart from hypnotics such cases may require prolonged psycho-analysis to elucidate the cause, and even then relief may not be attained. Similar cases, however,

will eventually sleep quite an adequate number of hours, but will continue to assert that they do not sleep.

The Psychoses

Insomnia is frequently an early symptom in the psychoses, occurring in association with the depressed or excited mental condition of manic-depressive states, in confusional psychosis, dementia præcox, presenile depression, etc. Many examples of persistent insomnia associated with depression are in reality cases of manic-depressive psychosis. To the same class belong the instances of suicide attributed to sleeplessness, some of which if recognised earlier might have yielded to treatment. In such depressed states sleep is considerably delayed, the patient lying awake tormented by melancholy and painful ideas; sleep may also be disturbed by confused dreams, and the patient awake early, fatigued and depressed. In mania, excitement interferes considerably with sleep, and some acute cases are almost completely sleepless. Milder cases suffer from delayed sleep and usually awake too early, although when actually asleep their slumber is often profound. Apart from depression, some cases of senile insomnia are due to flatulence and some to high blood pressure. Many of the aged, however, although sleeping only four or five hours at night, will take naps during the daytime, and so average an adequate amount of sleep in the 24 hours.

XXVIII

THE TREATMENT OF INSOMNIA

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II.—Therapeutic Measures

1. Physiogenic Insomnia

The treatment of insomnia dependent upon definite physical disorder is, in general, that of the associated disease, and most of the conditions are outside the scope of this communication. Continued pain, however, due to neuritis or neuralgia and resulting in protracted insomnia in unstable individuals may, if unrelieved, lead to a psychoneurosis or even a psychosis. Cases are not uncommon where the organic disorder having ceased to exist, both the pain and insomnia persist as hysterical manifestations. In the sleeplessness caused by definite pain analgesic drugs are indicated, such as acetyl-salicylic acid (5–15 gr.), pyramidon (4–8 gr.), veramon (2–3 tablets), novalgin (7½–15 gr.), or dialacetin (½–2 tablets); the latter is a most useful drug for pain combined with insomnia. If the pain is of a severe and temporary character morphine or the total alkaloid preparations, opoidine (⅓ gr.) or omnopon (up to ¼ gr.), may be indicated.

In all patients who complain only of sleeplessness, in whom no obvious physical cause can be found, it is as well for the practitioner to make quite sure at the outset that the symptom is not one of physiogenic origin. Dyspepsia and constipation as causes of insomnia may easily be overlooked; flatulence especially is liable to lead to delayed sleep. It is often worth while to try the effect of a carminative draught taken at bedtime. Minor circulatory disturbances—e.g. cold feet—may also be missed. In cases of high blood pressure the treatment is largely that of arterio-sclerosis—dietetic measures, moderate exercise, saline purgatives, and iodides. A dose of nitroglycerine at night is often helpful.

2. Psychogenic Insomnia

Where the cause of the sleeplessness is of psychical origin the practitioner's first step, as already stated, is to ascertain all

possible causes of mental discomfort—anxieties, etc. Elucidation of the mental factors, however, may take a considerable time, and prolonged psychological investigation and even psychoanalysis may be necessary ; in the meantime the patient needs sleep. Much help can be given by trying to persuade him to adopt the right mental attitude to his symptom. Those who suffer from insomnia almost always exaggerate in their own minds the severe consequences of not sleeping adequately, a fact which adds considerably to their anxiety. The physician should point out to the patient that there is no fear of his losing his reason or dying as a result of his sleeplessness, that a smaller amount of sleep than most people take is quite compatible with health, and that rest in bed with muscular relaxation is to a certain extent a substitute for sleep. A correct mental attitude will assist greatly in relieving an anxiety state and combating insomnia ; delayed sleep is often kept up by worry concerning it, the patient going to bed anticipating and dreading that he will not fall asleep. On the other hand, it is useless for him to try to make desperate efforts to go to sleep ; as far as possible he should retire to bed in a tranquil state of mind, believing that sleep will come. Failing this, if he can be persuaded to show indifference to sleep, the insomnia will sometimes disappear.

In the subject of insomnia every effort must be made to raise the level of the general health by suitable feeding, warmth, and judicious exercise ; the tendency to undue fatigue must be counteracted by a reduction of the daytime activities and the taking of short periods of rest, especially after meals. Cerebral excitants, such as coffee and tea, are best avoided in the latter part of the day. As sleep in many individuals is largely a question of habit, the patient should retire to bed at a regular hour each night and should avoid close mental work during the evening, or if this is impossible, he should take a short walk before bedtime. A warm bath promotes sleep in some cases, but has the reverse effect in others ; it is, however, worthy of trial. In those who suffer from cold feet, a hot mustard foot-bath at bedtime is often helpful. It is unwise to go to bed on an entirely empty stomach, since it is generally accepted by physiologists that cerebral anæmia plays some part in the mechanism of sleep. A meal tends to produce drowsiness, blood being required in the splanchnic area for purposes of digestion, and this leads to a corresponding diminution in cerebral vascularity (compare the desire of most animals to sleep following a meal.) For this purpose it is advisable to take warm soup, bovril, or cocoa with dry biscuits half an hour before bedtime.

The patient should have a bedroom to himself, which must be dark, quiet, and well ventilated. All clocks must be removed and the light turned off ; if, however, the latter is impossible owing to the patient's apprehension, the light must be subdued by shading. A spring mattress is usually best, but much depends on that to which the patient has been accustomed. The bed-

clothes should not exceed the minimum quantity required for comfortable warmth, and in those sensitive to cold the bed must be warmed with hot-water bottles after a thorough airing in the daytime. As regards posture, it is generally preferable to try to sleep on the right side ; in this position pressure by the liver on the stomach is avoided and it is easier for the latter organ to empty. The height of the pillow will depend largely upon the patient's habit, but in cases of increased blood pressure a high pillow is desirable.

Reading in bed sometimes promotes sleep, and some individuals habitually read until drowsiness compels them to extinguish the light. Unless the patient is accustomed to " read himself to sleep," it is best not to introduce the suggestion in case a habit of wakefulness be established.

Education in complete muscular relaxation is sometimes valuable. The faculty of muscular relaxation can be so developed that the patient is able to relax all muscles upon getting into bed, a habit that greatly favours the onset of sleep. General massage, with special attention to the spinal muscles, carried out shortly before the usual hour of sleep, is of great assistance, especially in cases of neurasthenia.

As regards alcohol, much again depends upon the patient's habits and how he reacts to alcohol. Stout or a glass of hot whisky and water at night will induce sleep in many individuals when everything else has failed ; in others, however, it has but a temporary effect and may even cause wakefulness.

As suggestion—the hour of day, undressing, and the accustomed bedroom—probably plays a considerable part in the production of sleep in adults, it is generally best to try to treat insomnia in the patient's own home. In cases of long standing, however, a change of environment is usually desirable. The bedroom and surroundings may have lost their suggestive effect, and far from inviting sleep, actually repel it by the association of continuous nights of wakefulness. In the extremely rare cases of insomnia due to overwork in the absence of associated worry, or in which the anxiety is of a superficial character, a holiday may speedily effect a cure.

Hypnosis has often been advocated in the treatment of insomnia. In the writer's experience neither simple suggestion without hypnosis nor post-hypnotic suggestion is very satisfactory. In suggestible subjects a temporarily good result may sometimes be obtained, but even such cases quickly relapse in the absence of more radical treatment. In other cases no effect is observed.

Cases in which the sleeplessness is of long standing and has resisted the simpler methods of treatment described, as well as those in which the symptom amounts almost to an obsession, will usually require deeper and more prolonged psychological investigation—psycho-analysis or one of its modifications—to obtain a satisfactory result. In such cases the younger the

subject the better the prognosis, while after middle age psychoanalytical methods are unlikely to benefit.

It is almost needless to state that it is far better to treat the cause of insomnia rather than the symptom of insomnia itself. In psychogenic cases, however, this may occupy a considerable period, and in the meantime, pending the result of psychotherapeutic and other measures, the patient must have sleep. Although the routine use of hypnotics is indicated only in exceptional cases, it is unjustifiable to withhold such sedatives owing to the often groundless fear of habit-formation on the part of the patient; the insomnia, indeed, is far more likely to become a fixed habit and the patient is usually only too glad to discard the hypnotic. Also, in many cases, if sleep be induced even by artificial means, a definite psychosis may be averted.

Hypnotics

In prescribing a hypnotic one cannot afford to fail, since the patient may be left in a worse condition than before; consequently, it is wise to begin with a substance and a dose a little stronger than is really necessary. In mild cases simple bromides or "sedobrol" may be used, but the bromide-urea compounds—bromural (5–10 gr.) and adalin (10–15 gr.)—or dial (1½–3 gr.) are often more efficacious; the latter is very safe and sure and has no unpleasant after-effects. Of more potent sedatives, the veronal group—especially medinal (sodium-veronal) in 7–10 gr. doses—are very satisfactory; it has been shown that these drugs in *therapeutic* doses have no toxic effect upon metabolism and no cumulative action. Paraldehyde is too unpleasant for general use, but is helpful in alcoholic cases and in pneumonia, while chloralamide is too uncertain in its time of action. On account of its delayed effect, trional (10–20 gr.) is indicated in internocturnal insomnia, in which the patient is awake only in the latter part of the night. Sulphonal (10–30 gr.) suits some individuals, but is generally inferior to veronal and medinal, while luminal in hypnotic doses is undesirable. Morphine should not be used in insomnia of psychogenic origin outside a mental hospital. In practice it is usually best not to continue a hypnotic longer than two or three weeks without an attempt at a gradual reduction in the dose employed. In the later stages, with the patient improving, the sedative may be varied from time to time, with a slight reduction in dosage on each occasion a hypnotic previously used is again prescribed. A hypnotic by the bedside of the patient to take if necessary is often successful and he may sleep night after night without needing it.

In the acute psychoses of which sleeplessness is so common a symptom, the use of powerful sedatives (the so-called "chemical restraint") is becoming regarded with increasing disfavour. Endeavours are being more and more directed towards assisting nature to bring about relief by careful nursing and general

treatment—attention to the digestive and excretory functions, frequent baths, and the administration of alkalis. Attempts to promote sleep are also made by warm sponging, hot packs, and continuous baths. Hypnotics, nevertheless, are often necessary, but should be used judiciously and as sparingly as possible.

XXIX

THE TREATMENT OF LOBAR PNEUMONIA, BRONCHO-PNEUMONIA, AND BRONCHITIS IN CHILDREN

By Leslie B. Cole, M.D.Camb., M.R.C.P.Lond.,

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I.—General Considerations

Although classical examples of these three conditions are distinguishable, there are many borderline cases in which diagnosis cannot be made. Since exact differentiation, though desirable, does not affect treatment, which is mainly symptomatic, they are here considered together with certain reservations.

Briefiy the three conditions may be outlined as follows :

In *lobar pneumonia* the infecting organism in nearly every case is the pneumococcus and the distribution of the inflammation in the lung is lobar. If there are no complications the temperature usually reaches normal by lysis or crisis within a week of onset. Although not generally recognised as such, this is probably the commoner pneumonia of childhood. The disease becomes increasingly severe with increased age and weight. In children under two years old without complications, the degree of illness is slight and the signs of consolidation often transient. When this is so diagnosis is often a matter of opinion.

In *broncho-pneumonia* the infecting organisms are streptococci, staphylococci, pneumococci, *B. influenzæ*, and others. The distribution of the inflammation is lobular, but this is often not shown by physical signs, because a lobular consolidation often makes a whole lobe solid. In children it occurs most frequently in connexion with influenza, whooping-cough, and measles, and in these bronchitis often precedes it. Broncho-pneumonia is a very severe disease ; the temperature remains high for several weeks, cyanosis is a marked feature, and death the usual termination. Should recovery occur some degree of fibrosis of lung will probably remain.

Bronchitis.—The severity of an attack of bronchitis depends on the extent to which the bronchial tubes are involved. If only the large tubes are affected it is a mild disease. If, however, the inflammation has extended into the smallest bronchioles the clinical picture merges closely into that of broncho-pneumonia

and the physical signs of the two are often identical. To what extent an acute bronchitis may develop into broncho-pneumonia is not at present quite clear. Possibly the type of organism determines this, and accounts for the fact that the bronchitis of measles, whooping-cough, or influenza appears to develop into broncho-pneumonia while ordinary bronchitis does not do so to the same extent.

Prevention

Bottle-fed babies and debilitated children, especially those with a tendency to rickets, are particularly liable to develop bronchitis and pneumonia. There is no specific mode of prevention, but avoidance of cold and damp probably lowers the incidence considerably. The development of bronchitis during an attack of whooping-cough or measles or in an influenza epidemic is a signal for special care.

Differences between Pneumonia in Adults and Children

Pneumonia, like other acute diseases in children, is often ushered in by convulsions. This is especially so in apical pneumonia, which is commoner in children. The possibility of meningitis should not be forgotten, but too hasty lumbar puncture to exclude this diagnosis is wrong. The rapidity and type of respiration are the best guide to early diagnosis. Abdominal pain is specially frequent in children at the outset of lobar pneumonia and may make the diagnosis from acute appendicitis very difficult. Again, the rapidity and type of respiration are the best guide. If in true doubt it is better to open the abdomen unnecessarily in lobar pneumonia than to fail to operate in acute appendicitis on the assumption that the child is probably suffering from pneumonia. Many cases of lobar pneumonia in children operated on by mistake do well. The younger the child the less is the danger of cardiac failure. In mild attacks the strain upon the heart is very slight and convalescence is correspondingly rapid.

When first called to see a child with broncho-pneumonia it is important to remember how often this is a complication of whooping-cough or measles. If the history is indefinite the child should be isolated until the possibility of infection has been excluded.

General Management

Successful treatment depends as much on the nurse as the physician. In severe cases the value of a good trained nurse cannot be over-estimated. The child should be put to bed in an airy room at even temperature. Contact with other children should not be allowed.

Diet.—While there is pyrexia a fluid diet is best. Milk, whole or diluted, is suitable for most children, but mutton or chicken broth, beef-tea, barley-water, and lemonade are also valuable. Fluids should be given freely. Feeds should be small in quantity and given every two or three hours. In severe cases with digestive disturbances, whey or albumin water are valuable, and in mild ones custard, junket, milk pudding, and Benger's food may be allowed.

In some children there is a tendency to acidosis. When this is suggested by drowsiness and apathy, associated with acetone bodies in the urine, the amount of fat in the diet should be limited and carbohydrates given freely. Milk is then not a good article of diet on account of the high percentage of fat it contains, but sugar should be given freely dissolved in lemonade.

Care of the Nose and Mouth.—It is important to keep the mouth as clean as possible. A septic throat, suppurating middle ear, or purulent nasal discharge is often traceable to neglect of this precaution. A weak antiseptic mouth-wash of carbolic or potassium permanganate should be used for this purpose. Obstruction of the nasal passages by catarrh is sometimes a cause of increased dyspnœa. They should be kept as clear as possible by encouraging the child to blow the nose. When this is not effective and nasal obstruction seems to be the cause of respiratory distress, the anterior nares may be cleared with pledgets of cotton-wool and gently irrigated by warm boric and bicarbonate solution (āā ʒi ad Oi) with a small syringe. This should not be done unless the obstruction is definitely distressing the child. To do it as a routine is, in all but a few cases, only meddling with a sick child unnecessarily.

Purgation.—At the outset it is well to give a purgative ; gray powder is suitable for children under 3 and calomel followed by salts for older ones. Subsequently syrup of senna, senna pods, or cascara are appropriate laxatives. Symptoms should be dealt with as they arise and are discussed below under separate headings. No routine treatment is indicated. Rapidity of convalescence depends on the type and severity of the attack. After an attack of acute bronchitis of the larger tubes or mild lobar pneumonia, a child of 3 may be allowed to walk about the cot two or three days after the temperature is normal. A child of 12 should stay in bed ten days after mild lobar pneumonia. The severity of the attack being equal, the length of time spent in bed after the temperature is normal should vary directly with the size and age. After broncho-pneumonia convalescence is much slower and depends on the amount of permanent damage to the lung.

XXX

THE TREATMENT OF LOBAR PNEUMONIA, BRONCHO-PNEUMONIA, AND BRONCHITIS IN CHILDREN

By Leslie B. Cole, M.D.Camb., M.R.C.P.Lond.,

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II.—The Treatment of Special Symptoms

Sleeplessness

Sleeplessness should be prevented from the start. Nothing so exhausts a child as a succession of sleepless nights, and in a severe case the promotion of sound sleep from the outset may turn the scales. When drugs are given the dosage must be effectual; the hypnotic which fails may do more harm than good. In the early stages, and in many cases throughout the attack, potassium bromide and chloral hydrate, or syrup of chloral, are the best. Children take both well. Tepid sponging often helps to send a child to sleep in conjunction with these. If these milder remedies fail the problem of the use of opium and morphia arises. In an adult this question becomes more delicate as the crisis is approached; in the child an even nicer judgment is required on account of the intense and varying susceptibility of children to opium and its derivatives. There is, however, no doubt as to its value, and in some cases life may depend on correct and timely dosage.

To a child of 3, 1 minim of tincture of opium or 1 gr. of Dover's powder may be given. The dosage in each case must be judged with especial reference to the amount of respiratory distress. It is well to err on the side of under dosage at first and repeat if sleep is not obtained. Morphia is best given hypodermically combined with atropine, which tends to diminish respiratory distress; with the same caution morphine hydrochloride gr. 1/20 may be given to a child of 3. Heroin is said to have a less depressant effect on the respiratory centre, but I prefer to give morphine itself rather than be lulled into a false sense of security by giving heroin.

Pain.—Pyrexia

Pain in the chest may cause restlessness and lack of sleep and can be relieved by local applications. Since the soft bony frame-

work of a child's chest is easily compressed, any heavy application likely to impede respiration should be avoided. Antiphlogistine or thermogene wool applied to the affected side, or methyl salicylate ointment, are the best local applications. In older children pain from a localised patch of pleurisy may be relieved by immobilising the affected side with strips of adhesive plaster. A mustard leaf will sometimes give relief.

Pyrexia.—Antipyretic drugs should not be given. For a prolonged temperature of over 104° F. tepid sponging is effective and comforting. Start with water at a temperature of about 90° F. and cool while sponging by the addition of cold water. The temperature of the child should be watched and sponging should not be continued after this has fallen to 101° F. by the rectum.

Cardiac Failure

Much may be done to lessen the strain upon the heart by preventing respiratory distress. When any tendency to cyanosis shows itself, or the secretion in the tubes appears to be interfering with easy respiration, atropine should be given. By drying up excess of secretion and causing the bronchial tubes to dilate, this allows air to pass freely into the alveoli and oxygenation is facilitated. Children stand atropine well; gr. 1/100 may be given hypodermically three times a day to a child of 3, and in severe cases four-hourly. The value of stimulants is problematical. In weakly children, or those in whom there is any abnormal rapidity or feebleness of the pulse, it is well to give a stimulant from the start.

The following is a useful mixture, given three times a day for a child of 3:

℞ spiritus ætheris ℥v.
spiritus ammon. arom. ℥v.
aquam ad ℥i.

There is considerable difference of opinion as to the value of brandy in treatment. Some authorities maintain that it is unnecessary and may even be harmful. Personally, I find it a most valuable stimulant in severe cases and have never observed any ill-effects from its use. Thirty minims may be given four-hourly to a child of 3 directly any tendency to cardiac weakness appears; the dose may be increased to one teaspoonful or more if necessary. Brandy should never be given until there is definite need of a stimulant. Adrenalin appears to be of value in some cases; ℥v (1 : 1000) may be combined with injections of atropine. Strychnine should be given cautiously to children who are very sensitive to it. In cases of sudden cardiac failure a small and isolated dose is of value; it should only be repeated at long intervals. The value of camphor as a cardiac stimulant is indefinite. For a single dose gr. ½ dissolved in olive oil may be given intramuscularly to a child of 3, or gr. ¼ if the dose is to

be repeated at six-hourly intervals. Digitalis is often given to children, but I have never observed any benefit from its use. For collapsed children under 2 years old a mustard bath is the most valuable stimulant. One heaped tablespoonful of mustard is added for each gallon of water in the bath, which should be as hot as can be safely borne, the body being completely immersed for from two to five minutes. The child should then be dried quickly in a warm towel and put straight into bed.

Expectorants

In mild lobar pneumonia these are not indicated during the first few days. When there is bronchitis, or the cough becomes dry and irritating, small doses of ipecacuanha, squill, and ammonium carbonate are useful. A linctus containing a teaspoonful of equal parts of glycerine and syrup of Virginian prune, or of equal parts of compound tincture of camphor, oxymel of squill, and syrup of balsam of tolu is good. The bronchitis kettle will often relieve a dry and irritating cough, especially if there is some laryngitis. When there is obvious respiratory irritation from excess of secretion in the bronchial tubes, which an ineffective cough fails to relieve, a single emetic dose of ipecacuanha is of great use.

Fresh-Air Treatment.—Oxygen

Treatment in the fresh air is unnecessary for the simple case of lobar pneumonia. In certain cases of severe lobar pneumonia and broncho-pneumonia with cyanosis and much respiratory distress, removal to the open air causes immediate and marked improvement. If a spot well sheltered from the wind and rain is obtainable in a garden or on a balcony and the child is in the hands of an efficient nurse, the treatment is very valuable. In the absence of these facilities it is better avoided.

Oxygen Administration.—For patients with cyanosis oxygen is useful. It should be given for periods of 15 minutes once every hour, through a catheter introduced into the nose. Administration by means of a funnel held a few inches from the nose and mouth is a bad method and probably of no benefit whatever.

Specific Treatment

The serum treatment of lobar pneumonia has so far only been doubtfully successful, and that only in cases due to Type I. pneumococcus. To get the maximum effect it must be given as early as possible, in large amount, and by the intravenous route. In many children it is impossible to obtain sputum to determine the type of infecting pneumococcus and serological tests are necessary. The giving of serum by the intravenous route to children is very difficult, especially in private practice, and as the

infection is much less dangerous than in adults, the scope for specific treatment is less. It may possibly be of use in older children when means for rapid serological diagnosis are at hand.

Complications

Empyema.—In pneumonia, from the start a close watch must be kept for the development of an empyema. In children the physical signs of this complication are often misleading. In the early stages the most definite sign, displacement of the heart, is absent, while the others are often indefinite. Breath sounds are often not diminished over a thin layer of pus, and high-pitched tubular breathing is often present. Owing to the ease with which sounds are conducted in a child's lungs the sounds may be similar but slightly less on the unaffected side, and it is easy to suspect the empyema on the wrong side. For these reasons the physical signs are less helpful than in an adult, and in cases of doubt it is wiser to make certain by exploration. Should the temperature continue after pus has been found and evacuated, the possibility of a double empyema must not be forgotten. Before resorting to exploration great care must be taken to exclude other causes of continued pyrexia. Examination of the ears, throat, or urine is sometimes forgotten. The treatment of empyema has already been dealt with in this series.

Abdominal distension should be treated in its early stages, for once paralytic ileus has developed very little can be done. A less fluid diet should be given and an abdominal binder worn. Turpentine enemas, rectal wash-outs, or the passage of a high rectal tube may assist in the evacuation of flatus. If distension increases pituitary extract may be given; 0·20 international units intramuscularly is a safe dose for a child of 3. For persistent vomiting the stomach should be washed out.

Convalescence and After-treatment

Fresh air and avoidance of chill, nourishing food, a tonic, and a graduated return to normal life are the chief convalescent requirements. A holiday in the country or by the sea may be needed.

An attack of pneumonia in a child is an important fact in its medical history and should never be forgotten, especially during a future attack of measles, whooping-cough, or influenza. The possibility of a residual fibrosis of the lung must be remembered, particularly in a child who has had the good fortune to recover from an attack of broncho-pneumonia.

XXXI

THE TREATMENT OF PERFORATING INJURIES OF THE EYE

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A perforating injury of the eye must always be looked on as a serious surgical emergency and treated under the best conditions possible, since any temporising or inexpert care involves the risk not only of loss of the injured eye, but also of one of the most tragic of possibilities, the onset of sympathetic ophthalmia causing destruction of its fellow. The treatment of perforating injuries as usually adopted can only be dealt with by considering in the first place the diagnosis and classification of such injuries. The subject is large and only the broad principles which guide the procedure of the ophthalmic surgeon can be indicated, since in actual practice each case is different and must be judged on its merits.

Classification

Cases of perforating injury fall into two groups: 1. Those in which the globe is perforated by a blunt or sharp instrument, but there is no retention of a foreign body within the eye. 2. Those in which a foreign body remains within the eye. Both these groups can be subdivided on an anatomical basis, according to the position of the wound and of the foreign body. The question of diagnosis arises when from the history it seems likely that a foreign body is present. The settling of this question is of the utmost importance in treatment and prognosis.

Diagnosis of Intra-ocular Foreign Body

The presence of an intra-ocular foreign body may be extremely hard to detect. Occasionally it may be directly seen in the anterior chamber or with the ophthalmoscope, but this is rare. There are four further sources of evidence which can be tapped—namely, radiography, examination with the magnet, biomicroscopy with the slit-lamp, and the history of the accident.

Radiography.—If the foreign body is opaque to X-rays it can be photographed, and by the application of Mackenzie Davidson's method can be accurately localised, with a margin of error of less than one millimetre. Fortunately, the majority of intra-ocular foreign bodies are metallic and can therefore be detected. Even lead glass fragments may be localised, but the lighter forms of glass are transparent to the rays.

Examination with the Magnet.—If the foreign body is magnetisable its presence can be detected by means of the Haab or Mellinger magnet. The patient usually feels pain in the eye when the current is switched on, if the foreign body is attracted, and in a number of cases—sometimes only after repeated switching on and off—it can be drawn forward into the anterior chamber and thence extracted.

Examination with the slit-lamp is of assistance in cases where the perforation is very small and there has been no loss of aqueous, or obvious hæmorrhage into the anterior chamber. By its means it is possible to make out with certainty whether a small deep injury to the cornea has actually perforated or not, and whether there has been the slightest trauma to the iris. In some cases the track of a minute foreign body through the lens can be detected before the lens fibres begin to swell up.

The *history* should be very carefully taken, as it will often throw light on the possibility of an intra-ocular foreign body. For example, in the case of an injury received while chipping stone with a hammer there is very likely to be a fragment of steel in the eye, while a blow from a large iron nail or bolt, though perforating, is not often accompanied by retention of any metal.

Treatment of Perforating Injury without Retention of a Foreign Body

(*a*) Wounds involving the *cornea* only are the simplest to treat, since, if sterile, they heal spontaneously. The eye should be well washed out, atropine instilled, a bandage applied, and the patient kept at rest. A watch must be kept for the onset of sepsis, and if this supervenes the treatment of infected ulcer of the cornea must be carried out (see "Corneal Ulceration," by P. G. Doyne, p. 74 of this volume).

(*b*) Wounds involving the *iris and ciliary body* are more dangerous since the risk of sepsis or of sympathetic ophthalmia is much greater. The iris or ciliary body or both may be prolapsed through the wound and operative treatment then becomes imperative. A general anæsthetic is usually necessary, since it allows of more thorough examination and more efficient toilet of the wound. The patient is already in pain, and any manipulation of the irritated iris may be felt even after the instillation of cocaine. The eye is well washed out with a solution of perchloride of mercury, 1 in 12,000. The lids are retracted, taking

care that there is no pressure on the globe, and the wound is examined. Any prolapsed portion of uveal tissue is freed from the edges of the wound and cut off. On no account must any attempt be made to replace such tissue inside the eye since it is most certainly infected. In a certain number of cases there is already pus in the anterior chamber when the patient is first seen. Although the prognosis is then bad an attempt to save the eye may be made by washing out the anterior chamber with peroxide of hydrogen. In some cases this is successful. In cases not obviously infected, if the wound is large and involves the sclera or limbus, it may be sutured with fine silk, but this is seldom necessary. In most cases, however, it is as well to cover the wound in the sclera with a small flap of conjunctiva. Atropine is instilled freely.

In all cases the eye must be carefully watched for the following complications: (1) Sepsis, as evidenced by either an iritis which may yield to treatment or a panophthalmitis which will result in loss of the eye. (2) Formation of anterior synechiæ. These are very common and extremely difficult to avoid after excision of prolapsed iris through a corneal wound. They interfere considerably with the healing of the wound, keep up irritation in the eye, and are a source of danger. They are usually divided as soon as practicable. (3) Appearance of plastic irido-cyclitis with keratic precipitates (k.p.). This is a danger-signal and if it appears the eye must be excised, since the risk of sympathetic ophthalmitis is extremely great. If the lens is injured the risk of loss of the eye becomes greater, especially in children. The lens fibres swell up when brought in contact with the aqueous and press the iris forwards on to the cornea. The tension of the eye then rises and a curette evacuation of the softened lens is called for.

(*c*) When wounds involve the *sclera* and *vitreous* behind the ora serrata there is usually a wound of the lid as well, and the swelling resulting from this may be so great as to make examination of the eye very difficult. If so a general anæsthetic should be administered and a thorough exploration carried out. There will probably be much subconjunctival ecchymosis around the scleral wound, masking it. Vitreous, choroid, and retina may be seen protruding from it, in which case they should be cut off. Suture of the sclera and formation of a conjunctival flap is usually desirable.

Whenever an eye is so grossly injured that restoration of useful vision is improbable it should be excised, as the risk of retaining it outweighs the possible slight advantage.

Treatment of Perforating Injury with Retention of a Foreign Body

Once the diagnosis of intra-ocular foreign body has been made the question of its removal must be considered. If it is

in the anterior chamber or if it is magnetisable and can be drawn forward attempts are made to remove it. The hand magnet is invaluable in these cases, being used to remove the foreign body through the wound of entry or through a corneal incision after it has been drawn into a favourable position by the larger magnet. It is of great importance that attempts at removal should be made as soon as possible after the injury, since the foreign body will very soon become involved in exudate and fibrous tissue from which it may be very difficult to stir it. If it is non-magnetisable or cannot be located its removal may be impossible. The prognosis is, however, much worsened by its retention. Very minute foreign bodies may become encapsuled and cause no trouble, but more often, though sight may be good at first, a slow degeneration of the eye sets in which finally renders it useless. In the case of retained iron the process is accompanied by solution of the iron and deposition of it in the uveal tract and on the lens (siderosis).

It is obvious that, apart from the question of the practicability of the removal of the foreign body, the most important point is the cleanliness or otherwise of the fragment. Pieces of metal are often hot when they fly into the eye and are more likely to be sterile than other substances, such as stone or wood splinters. These latter are very apt to give rise to suppuration, which may destroy the eye even though the foreign body has been removed. The prognosis is also worse if the lens has been injured. In such cases a second operation (curette evacuation) may be necessary to relieve the tension due to the swelling of the lens. Sometimes the foreign body is discharged with the lens matter at this operation.

Prophylaxis of Sympathetic Ophthalmia

It is obvious that if an eye is so grossly injured that no restoration of function can be hoped for it should be immediately excised. When, however, attempts are made to save an injured eye a strict watch should be kept on it for many weeks. In the diagnosis of early sympathetic ophthalmia the slit-lamp is invaluable. It will reveal the earliest traces of k.p. in the exciting eye and will also render visible those fine changes in the anterior vitreous which precede the appearance of cyclitis in the sympathising eye. If regular examinations of both eyes are made the approaching danger may be seen and dealt with relatively earlier than was previously possible. It is also as well to do a differential blood count in suspicious cases, since a rise in the percentage of large mononuclear cells is found in most cases of sympathetic ophthalmia. The grosser signs—persistence of pain, lacrymation, and ciliary flush in the injured eye—are easily detectable, and if the eye has no useful vision it should, of course, be excised without waiting for the appearance of cyclitis.

XXXII

THE TREATMENT OF BRACHIAL NEURITIS

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Closely comparable to sciatica in the lower extremity, neuritis of the trunks forming the brachial plexus may arise from a large variety of causes, of which chronic goutiness, rheumatic fibrositis, injury, and infectious fevers are the commonest.

Chronic infection from pyorrhœa, antral abscess or other sinus suppuration, chronic intestinal or renal infection, may be the source of an infective perineuritis affecting one or more cords of the plexus, more commonly the posterior. Acute brachial neuritis is a most painful affection usually developing gradually during several days from pain around the back of the shoulder and upper arm, soon spreading down to the elbow and wrist and into the back of the hand, and even the finger-tips. When the posterior cord alone is involved then the back of the hand and knuckles is the lowest point for the pain to reach. The intensity of the pain, resembling knives cutting or rats gnawing the flesh, may render sleep impossible without the aid of hypodermic injections of morphia or heroin, and complete rest in bed will be essential with the arm supported on a soft pillow or cushion. Fixation of the limb by strapping or bandaging to the side will not be borne as the patient finds change of posture at intervals an absolute necessity, even though movement for the moment aggravates the pain. Moist heat in the form of antiphlogistine poultices or a paste of kaolin with glycerine and menthol heated and spread on lint, and covered with thick wool, may be kept on for hours at a time; or linseed and mustard poultices, the latter very weak, in the proportion of 1 part to 12 of linseed, may be used and changed every four hours. The linseed poultice should be covered with gauze on the side next the skin, avoiding needless mess. Before applying the actual poultice the skin may be painted with glycerine of belladonna or with warmed lin. A.B.C. made of lin. aconit., lin. bellad., and lin. chlorof. in the proportions of one of aconite to two of belladonna and three of chloroform liniment. Half an ounce of warmed tincture of opium may with advantage be added to the linseed meal in making each poultice.

Ol. gaultheriæ, Bengué's balsam, and similar preparations may be used alternately with the belladonna liniment, though patients are apt to tire of the smell of oil of wintergreen. During the daytime, when the poultices are changed, it is a useful variant to give applications of radiant heat to the neck and shoulder. Sun-ray by the tungsten carbon arc-lamp, or ultra-violet rays from the cooler mercury-vapour lamp, are also a useful form of treatment. Other forms of electrical treatment may also be employed, such as diathermy and salicyl ionisation. The latter is not very easy to apply to the neck and arm, but may best be given through a moist sponge or thick pads of wetted gamgee tissue. Ionisation sometimes aggravates the pain and should then be given up for radiant heat and poultices.

High-frequency currents in the form of violet sparks, or auto-conduction, are quite useless except as a suggestive treatment, but the positive breeze of a large static machine may act beneficially both directly and indirectly. Faradisation should never be employed, and the same applies to massage in the stage of active neuritis. Not until all signs of active inflammation of the nerve-sheaths in the form of tenderness to light pressure and darting neuralgia have passed away may massage be employed. So limited are the movements of the shoulder-joint permitted by a patient in the first two or three weeks of a severe attack, that adhesions in the joint may form, but though the physician is aware of this he must leave the limb as immobile as the patient will allow, at the same time giving warning that eventually such adhesions may require breaking down under an anæsthetic. In rare cases only do periarticular adhesions form in the wrist and interphalangeal joints.

If marked fixation of a wrist has occurred it is almost invariably evidence that the condition is an active infective arthritis and not neuritis at all. I have more than once seen acute arthritis of the shoulder-joint mistaken for neuritis, while it is a commonplace to see chronic adhesions in a shoulder-joint as the result either of subacute rheumatism or of a traumatic synovitis resulting from a slight fall or sudden strain of the joint, diagnosed as "neuritis." The marked fixation of the joint with absence of hyperæsthesia or much local tenderness, and a history of pain limited to the shoulder region, and never extending much below the elbow, will at once distinguish this stage of chronic adhesions in the shoulder-joint from an acute neuritis. This is important to recognise, because the immobilisation necessary in the case of neuritis is the wrong treatment for the former condition, which requires passive movements and massage. In a great many of these cases of fixed shoulder, however, passive movements are useless until the adhesions have been well broken down under an anæsthetic. Gas is sufficient, but the limb must be completely uncovered, and the patient laid flat on a bed, so that the arm can be brought well up over the head. In addition to circumduction movements, it is important not to forget to rotate the joint well

also. A point worth attention is the risk of dislocation of the shoulder in the action of bringing the arm up over the head during the anæsthetic. During this movement and before letting the arm down, the operator should press his fist into the axilla, thus keeping the head of the humerus from slipping below the edge of the glenoid cavity. The masseuse who is afterwards to perform the daily passive movements of the joint should be present at the operation, and should manipulate the joint under the anæsthetic to give her complete confidence as to the movements possible. The amount of pain following this slight operation varies ; it is a good plan to have a fomentation ready to apply as soon as the anæsthetic is over, and a hypodermic injection of gr. $\frac{1}{4}$ of morphia is generally necessary.

More difficult to treat are the adhesions in the finger-joints which are a sequel in some of the more severe cases of brachial neuritis, accompanied by wasting of the finger-pads and glossiness of the skin. Such adhesions must never be forcibly broken down under an anæsthetic, as this always sets up considerable reaction and swelling with re-forming of the adhesions worse than before. Soaking of the hand in hot soda or brine solutions daily, followed by passive movements of the joints to the limit that can be borne without undue pain, may after many weeks gradually restore the movements of the stiff finger-joints, but the process must not be hurried by too forcible treatment or injury will result.

After the pain of an attack of brachial neuritis has passed off, in four to six weeks or longer, there is certain to be some general emaciation of the limb apart from any local muscular atrophy which may result from the stress of the neuritis damaging any particular nerve-trunk. Massage of the limb may now safely be employed and faradisation best given with the slower interruptions of the Bristow coil, or with wave faradism, produced either by rhythmically sliding the secondary to and fro over the primary, or by passing the current through a pointed electrode dipping in and out of a narrow tube containing water, by the action of a motor or metronome.

By these means the recovery of the general wasting will be hastened. When the stress of the inflammation damages certain nerve-trunks to the extent of causing degeneration of the nerve-fibres, local muscular atrophy will be observed corresponding to the nerve-supply—e.g. atrophy of the serratus magnus when the long thoracic nerve is involved, or of the deltoid in the case of the circumflex. When this degree of damage is done, electrical tests will show the presence of reaction of degeneration—that is to say, the muscle will not respond to the faradic current, but will show sluggish contractions to galvanism, with perhaps stronger reactions to the closure of the current at the anode. Faradism will then be of less use in the treatment of the wasted muscle than reversals or interruptions of galvanic current.

A frequent form of neuritic pain about the shoulder-joint that is generally diagnosed as neuritis is really a neuro-fibrositis,

due to a subacute or chronic fibrositis affecting the fascial planes and intermuscular septa at the base of the neck and shoulder. The ætiology of this condition is very similar to that of the more general brachial neuritis affecting the main nerve-trunks, the difference consisting in the situation of the fibrositis, either surrounding or at a distance from the main nerves. The pain in this form of neuro-fibrositis mainly affects the shoulder and base of the neck and does not spread down the arm below the area of the deltoid, except in a few cases which commence as a diffuse fibrositis and spread to the sheaths of the main nerves, when the pains will extend further down the arm, even to the finger-tips.

Local radiant heat, sun-ray lamp or diathermy, ionisation, and poultices will be of service as in the general brachial neuritis, but the pain is less severe and does not cause sleepless nights, requiring the use of morphia or heroin. Careful examination for sources of sepsis of dental or sinus origin must be made and dealt with appropriately. Alcohol in all forms should be forbidden in the acute stages of neuritis, though total abstinence is less necessary in neuro-fibrositis. Diet is of less importance than is often stated, but the meals should be small in persons over the age of 50. Internally, aspirin or salicylates, mild purgation, and sometimes atophan should be tried.

Occasionally these cases become chronic, with persistence of neuralgic pain, especially on certain movements, and a few points may be found especially tender to pressure, particularly around the vertebral border of the scapula or above the supra-scapular fossa. These tender points should be carefully located and marked with a dermatograph pencil, and dramatic cures may occasionally be wrought by injecting them with a fine needle, using first two or three drops of 2 per cent. novocain solution and after waiting three or four minutes injecting 5 minims of 90 per cent. alcohol. Great care must be taken when performing these alcohol piqûres over an intercostal space never to pass the needle through the pleura. To avoid this accident search should always be made with the point of the needle for the rib, this indicating the depth that is safe.

XXXIII

THE TREATMENT OF POST-PARTUM HÆMORRHAGE

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I.—Placental

Serious hæmorrhage after the birth of the child may occur from the placental site as the result of failure of the natural mechanism of control. Traumatic bleeding from laceration of some part of the birth canal, usually the cervix or vestibule, is distinguished clinically by palpation of the abdomen, when the body of the uterus will be felt hard and firmly retracted. In this article only bleeding from the placental site will be discussed, bleeding from lacerations being reserved for later consideration.

Control of bleeding is normally effected by the retraction of the walls of the uterus as it shrinks down and empties. The contractions of the third stage compress the uterine cavity and expel the after-birth; retraction compresses the uterine wall and the vessels passing through it and maintains control in the absence of active contractions. The mechanism can be seen at work most clearly during the classical Cæsarean section operation. There is often profuse bleeding from the uterine incision before the membranes are ruptured and the fœtus removed. After the escape of the waters and removal of the fœtus, the uterus shrinks down to half its previous size and its walls are more than doubled in thickness, and thereby the bleeding from the incision becomes greatly checked. After removal of the after-birth and the establishment of firm retraction there is no bleeding of moment from the placental site.

Causes of Failure to control Hæmorrhage

The causes of interference with the normal mechanism are much the same as those of failure of the uterine powers in the earlier stages of labour, and may be classified as follows:

(1) General maternal states, of which the most important are shock and grave anæmia (as from ante-partum hæmorrhage), toxæmic conditions and nephritis, fatigue, exhaustion

and emotional states, overdosage with anæsthetic and analgesic drugs.

(2) Uterine conditions, such as over-distension by twins or hydramnios, fibroids, and adhesions to surrounding structures; exhaustion of the uterine muscle from severe or protracted labour or uterine sepsis, and possibly inherent muscular weakness from chronic inflammatory changes in the myometrium.

(3) Incomplete emptying of the uterus interfering with retraction, such as retained placenta or portions of it.

Preventive Treatment

Consideration of these causes will indicate lines for prophylaxis. More cases will occur in the practice of the careless and impatient; a thorough antenatal supervision and a proper conduct of the second and third stages of labour will reduce the incidence of bleeding almost to vanishing point.

In all conditions where there is an increased risk of post-partum hæmorrhage the attendant will be particularly on guard and have all preparations made. Antenatal treatment will be given in the toxæmias of pregnancy or other general disease, and precautions taken to avoid fatigue, serious exhaustion, and infection during labour. Rapid delivery when the uterine powers are exhausted and after serious hæmorrhage during labour—e.g. placenta prævia—is always dangerous. Hurry to effect delivery of the after-birth carries with it the risk of incomplete expulsion and its consequences. One special point may be mentioned. A full bladder—well recognised as inhibiting good uterine action in the second stage—may also interfere with the power to control bleeding in the third stage. Distension of the bladder should be watched for in the later part of labour, and the catheter passed on the first sign of the need for it. If labour is conducted with the patient on her left side she should be turned on her back during the third stage. The observation of the uterus through the abdominal wall, the manipulations for expression of the placenta, and for the control of bleeding, should it occur, are all more readily conducted in that position.

Signs and Symptoms

There may be free and rapid loss per vaginam or blood may collect in the flabby and distended uterus and be largely concealed; hence the importance of constant or frequent observation of the state of the uterus by abdominal palpation. Unless there is no skilled assistance at hand or the attendant's attention is distracted by having to restore an asphyxiated infant or other urgent duty, it is wise to concentrate attention on the uterus, since early warning may be obtained by its softening and enlargement. At this stage rubbing and kneading will rarely fail to

restore the hardness of the uterus, but once the large, soft, distended state is established restoration becomes more difficult. Abdominal observation should, therefore, be made frequently in spite of other preoccupations. A watch should also be kept on the patient's face for pallor, on the pulse, and on the general condition for the usual evidence of hæmorrhage.

Local Measures

If bleeding occurs before the placenta is born and massage and kneading do not produce immediate hardening so that the fundus can be compressed in the palm of the hand, the after-birth must be delivered, for firm and permanent retraction will not be secured till the uterus is empty. Unless sufficient contraction can be obtained to allow the fundus and upper part of the body to be grasped between the fingers and thumb, it is inadvisable to attempt expression, since success is unlikely and inversion readily occurs when the placenta is expressed from a relaxed uterus. If conditions are favourable expression should be tried by squeezing the uterus like a sponge from above downwards; if this manœuvre is not immediately successful it should be abandoned. Violent and prolonged efforts may get rid of the placenta by tearing away the detached portion and leaving some part still attached. If expression fails or the uterus remains large and flabby, the after-birth must be removed manually. This operation is recognised as the one among all internal manipulations that carries with it the greatest risk of infection, both because the fingers work in immediate contact with the placental site and because of the lowered general condition of the patient at the time. Nevertheless, the emptying of the uterus should not be postponed till the serious condition of the woman demands desperate measures, but should be done as soon as the failure to secure control of bleeding by obtaining firm uterine retraction becomes obvious. The hand must be gloved and every precaution taken to minimise the chances of infection being carried up to the uterus. The outside hand plays a very important part—it presses down and supports the flabby bag during the separation of the placenta by the inside hand; before removing the hand and placenta, the opportunity is taken to stimulate the uterus to contract by massaging it firmly from the outside, if possible, till it is felt to be gripping the hand within, when, so to speak, hand and placenta may be expressed from above. Keeping up the hold on the uterus through the abdominal wall, a hot intra-uterine douche (118° to 120° F. in the douche-can) is next given, the nozzle being run up to the fundus so that it can be felt there by the external hand. The douche should be copious—at least half a gallon—and the heat is the important matter. An antiseptic (e.g. tinct. iodi ℥i or ℥ii, ad Oi) may be added so long as it is not poisonous or rapidly absorbed. Should the emergency be such that the douche is not ready at once, bimanual

compression of the uterus must be carried out during the period of waiting. The hand is inserted into the vagina, preferably into the anterior fornix, and doubled up with the knuckles against the anterior wall of the uterus and the fingers behind the symphysis, while the external hand behind the posterior wall crushes the uterus down on to the fist and symphysis.

Very rarely does the hot intra-uterine douche fail, but should it not prove effective, bimanual compression must be resumed, as firm pressing together of the uterine walls acts as a substitute for retraction. As soon as the uterus is empty its activity should be stimulated by an intramuscular injection of pituitary extract or a preparation of ergot. As shown by A. Bourne and J. H. Burn, the injection of 2 units of pituitary extract is sufficient and may be repeated in an hour ; the most effective way of giving ergot is to inject 1 mg. (or 1/65 gr.) of its active principle, ergotoxin or ergotamine.

Hæmorrhage after Expulsion of the Placenta

In hæmorrhage after expulsion of the after-birth treatment should follow on the same lines. The failure of retraction may then be due either to exhaustion of the uterine muscle or to retention of a portion of the placenta. Frequent observation of the uterus by a hand on the abdomen will give early warning of relaxation, when massage and kneading of the uterus, together with the injection of pituitary extract or ergotamine, will almost always prevent the condition from becoming serious. If the uterus is too large to be contained between the thumb and fingers, it should be compressed between the two hands, squeezed empty of clot, and a hot intra-uterine douche given at once. Owing to the danger of infection, the passing of the hand into the uterine cavity should be reserved for those cases in which examination of the after-birth shows undoubted evidence of the retention of some portion of placenta ; missing portions of membrane alone do not justify the risk of uterine exploration. In the gravest cases with rapid and profuse hæmorrhage, the urgent necessity of its immediate control is a justification for passing the gloved hand into the uterus, while the other hand compresses the uterine walls from the outside on to the closed fist within till contraction on to the inside hand begins. Very rarely, however, will more be required than bimanual compression on to the fist in the vagina, for though it is difficult to exert compression over the whole of the large soft bag of a relaxed uterus, squeezing of the walls together will control the bleeding from the placental area.

The whole palm may be spread out over the posterior wall and fundus and the uterus squeezed down against the symphysis and fist in the vagina. Fatigue, especially of the external hand and arm, may be lessened by leaning the weight on that hand and, when relief is needed, the nurse

or other assistant can press on the hand and even allow it to be withdrawn for a rest, keeping up the pressure meantime. The elbow supporting the inside hand obtains a purchase by being wedged into the bed, and, acting passively as the fixed object against which pressure is made, that arm does not tire so quickly. Some pressure on the aorta may also be exercised during compression and may help to check bleeding. As uterine retraction returns, compression may be relaxed until it is possible to substitute a graduated compress under an abdominal binder. Plugging of the uterus is a difficult and dangerous operation if performed outside a hospital, since the necessary amount of sterile material will rarely be immediately available, and need only be adopted if the recovery of retractile power in the uterus is long delayed. Strips of turkish towelling or other improvised material may be boiled and wrung out whilst compression is maintained and the uterine cavity tightly filled in desperate cases.

Conclusion

The above measures provide a consecutive plan of campaign which will control bleeding even in the most serious cases provided the exhaustion of the patient has not reached a degree that renders recovery of function in the uterine muscle unlikely. Treatment for shock and collapse from loss of blood should follow the checking of hæmorrhage.

XXXIV

THE TREATMENT OF POST-PARTUM HÆMORRHAGE

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II.—From Laceration

The characteristic feature of this type of post-partum bleeding is that it occurs with a firmly retracted uterus, which is easily felt and grasped in the abdomen. The bleeding is not rapid and severe, but appears rather as a steady trickle that, if not checked, may in time give rise to serious symptoms. Should it be accompanied by immediate and marked collapse, it would suggest rupture of the uterus or an extensive laceration of the cervix extending into the base of the broad ligament. Inversion of the uterus, also associated with symptoms of shock, is excluded by the presence of the firmly contracted uterus in the abdomen. Sometimes blood collects in the distended vagina, especially in the posterior fornix, and escapes slowly, so that the state of affairs may not be immediately obvious. For this reason it is a sound practice when there is a steady trickle of blood to press down the retracted and empty fundus uteri at intervals so as to express any blood or clot that may have collected in the vagina. Should each expression result in the expulsion of blood and a mass of clot, it will be almost certain that the hæmorrhage is from a laceration of the cervix or other part of the genital tract. Bleeding from the vulva or vestibule is readily detected by inspection.

Causation and Preventive Treatment

Trauma of the soft parts is most likely to occur in difficult and instrumental labours, especially those due to malpresentation and misfits. Rapid delivery through incompletely dilated soft passages always carries with it the risk of extensive laceration. One of the reasons why so much emphasis is laid on not attempting delivery by the forceps till the cervix is fully drawn up over the head, and on slow delivery in placenta prævia once compression of the placental site had been secured, is the serious hæmorrhage

that may result from lacerations produced thereby. The soft parts about the vestibule and round the pubic arch may be cut cleanly by pressure of the blades of the forceps or other instruments against the hard bone. The tearing of soft parts, such as the perineum, by overstretching is rarely associated with bleeding of any moment, as the vessels are torn rather than cut. Occasionally similar accidents may arise in a natural labour, particularly if associated with strong pains and rapid expulsion. Early rupture of the membranes followed by rapid completion of the labour by the natural powers may result in cervical and vaginal tears, but here again serious bleeding is very unusual because the tissues are not clean cut.

The *preventive treatment* is obviously to avoid as far as is possible by careful antenatal supervision the complications of labour likely to give rise to laceration, and to refrain from rapid delivery through the insufficiently dilated soft passages.

Treatment

Treatment, when the condition has arisen, must depend on the severity of the hæmorrhage, the site of the laceration, the circumstances in which the labour is conducted, and the facilities available. Bleeding from clean-cut lacerations of the vestibule, or vagina near the outlet, which can be easily seen and reached, may be controlled by underrunning with a catgut stitch, either mattress or double cross-stitch. Similar treatment would clearly be best in all cases of bleeding of more than a minor degree were it not that a thorough investigation of the higher reaches of the genital tract is difficult and requires good exposure, good light, skilled assistance, and often difficult manipulations in circumstances that are a great handicap to success. Hence it is essential that full consideration be given to what is possible and effective as well as to what might be done under hospital conditions.

When the bleeding is not severe, and is represented by a pooling of blood in the vagina, which trickles out at the vulva in a slow stream and is expelled as clot and fluid blood by occasional expression, a vaginal douche as hot as the woman can bear, or if she is anæsthetised, at a temperature of 115–118° F., should be given at once. That will usually suffice unless a large vessel is divided, but before leaving the patient, time should be given to make sure that blood is not collecting again in the vagina.

In the more serious cases, and when the douche is ineffective, the next procedure to be adopted must be determined by what is possible in the circumstances. The best would be to give an anæsthetic and, with the patient in the lithotomy position and a weighted speculum of the Auvard type in the vagina, to examine the cervix and vaginal fornices thoroughly, discover the source of the bleeding, and suture the laceration with catgut. Even under the favourable conditions of a hospital, with an electric headlight and skilled assistants to retract and sponge away the

blood that obscures the bleeding area, this may not always be a simple matter, though generally the cervix can be brought down by volsellum forceps and sutured. The difficulty is greater with lacerations running out into the vaginal vault or up into the lower uterine segment. To advise measures of this kind for ordinary family practice would be a counsel of perfection that could rarely be followed. The hæmorrhage, however, can always be controlled by firm packing and pressure downwards on the retracted uterus. Either with the woman on her left side, or, if there is adequate assistance, in the lithotomy position, the vaginal vault is stuffed tightly with sterile gauze or an improvised and boiled dressing, and with a hand on the abdomen the uterus is pressed firmly down on the plugging, whilst the gloved fist of the other hand presses the dressing up against the cervix and vaginal vault for a time till more material is ready to be inserted ; once it is in place, the compression between the hands is resumed, and this packing goes on till there is a tight vaginal plug against which abdominal pressure can be made, a tight binder over a graduated compress being applied to maintain it. If the bleeding is serious and time is needed for the preparation of the dressings, it may be controlled for the time being by a form of bimanual compression, in which the gloved fist, covered so far as possible with a sterile soft dressing, is pressed up against the vaginal vault and lower part of the uterus, whilst the external hand presses the body down on it, till time is gained for a more permanent method of compression by plugging. In other words, if the bleeding area is high up, the best plan is to exercise pressure manually over a wide area of the vault till it is possible to devise some other means of continuing the compression. If the laceration extends into the lower uterine segment, and even if it is complicated by prolapse of bowel, firm plugging, after return of the prolapsed intestine, is the best emergency measure.

Sometimes it may be possible to carry out an intermediate plan, by getting hold of the torn cervix or vaginal vault with volsellum forceps (or other forms of forceps or clamp) and checking the bleeding by the pressure of the forceps or by applying traction upon it, and leaving it there till arrangements can be made for a more effective control by suture. When the possibilities of infection are considerable, plugging is safer than suture, for it leaves a free exit for discharges. Infected wounds are best left to granulate, and the first thing to be done, should infection occur after stitching a tear, is to remove all sutures to allow the escape of discharge.

Indeed, in all severe lacerations that call for suture, once the hæmorrhage is under control it is best to postpone any further interference till adequate assistance and suitable conditions can be arranged. In such an accident as a perineal laceration involving the rectum, it is better to adopt temporary measures where conditions are unfavourable, and postpone the suturing for 12 hours or so, rather than try to make the best of a bad job

in the middle of the night with a poor light and no skilled assistance. In circumstances such as these, and in procedures where accurate suturing is essential, the risk of failure is lessened by waiting till satisfactory arrangements can be made, and increased by attempting a difficult task under unsuitable conditions.

The treatment of post-partum hæmorrhage from laceration may be summarised by saying that when it does not yield to a hot douche, compression by a plug is better than the theoretically more efficient suture in all save wounds which are low down and easily seen. Suture of tears through the cervix into the base of the broad ligament may fail to achieve its object, because when the cervix is drawn down, the uterus comes down with it, but not the parametrium, and the vaginal walls may be sutured and bleeding continue into the space above. On the other hand, the attempt to close the space by encircling it with a curved needle runs the risk of including the ureter. Some 20 years ago Fritsch stated that, as the result of observations on cases in which secondary operation or post-mortem examination had been done, bleeding was checked by suture only in those cases in which it would have ceased without it. As plugging is not always well done and much blood may be lost during preparations and insertion, he urged that for immediate treatment the best plan was to grasp the labia majora in the left hand and press the relaxed pelvic floor upwards into the pelvis, whilst the right hand pressed the uterus deeply into the pelvis so as to compress the bleeding surface between the two hands. This pressure can be maintained for half to three-quarters of an hour, and has the advantages of immediate applicability, compressing the bleeding surfaces so as to leave no dead spaces in which blood may accumulate, and being entirely extra-vaginal, so that the risks of infection are greatly lessened.

As both plugging and suture, particularly the latter, may be followed by the formation of a hæmatoma, the warning may be given to watch for swellings in the broad ligament that may come up over the pelvic brim and appear as a hard mass on that side of the middle line on which the laceration has occurred. Also if a douche is given it should be under low pressure, with the patient's hips low and the body propped up, and no poisonous chemical should be used. Heat is the agent in checking hæmorrhage. Absorption from extensive raw areas is rapid, and communication with the peritoneal cavity is a possibility to be borne in mind in serious lacerations. If there is prolapse of bowel, or other definite evidence of a rupture into the peritoneum, plugging only should be adopted.

XXXV

THE TREATMENT OF SEA-SICKNESS

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There is a well-marked variation in liability to sea-sickness shown by different age-groups, sex-groups, and individuals. Infants under 1 year of both sexes are practically immune from this complaint, possibly owing to the non-development of their sense of balance. An adult could never experience with impunity the tossings and rockings a baby has to endure. Old people of both sexes are also practically immune. The athletic type in whom powers of oxidation are well developed suffer very little; heavy and even moderate drinkers who have acquired the habit of quickly oxidising carbohydrates also belong to this class. On the other hand, the hypoglycæmic diathesis is a direct predisposing cause. This group includes children liable to *cyclic vomiting*, certain types of *endocrine dysfunction*, sufferers from *migraine*, and those liable to ketosis from slight causes. *Pregnancy*, in which there already exists a disturbance in metabolism, causes excessive sea-sickness. Nephritis, with its diminished blood carbonate reserve, and diabetes with pre-existing ketosis are also predisposing causes. The well-known type of person who vomits before the ship sails again comes under a different category, and requires different treatment. Such a case should be treated by reassurance, and if very agitated a sedative such as pot. brom. gr. xx is useful.

Differential Diagnosis

Sea-sickness is liable to occur with, and to obscure, certain much more serious conditions, and it is imperative to ascertain that no grave underlying disease is present. The condition most commonly met, and one which may cause great difficulty in the differential diagnosis, is *acute appendicitis*. This may mimic sea-sickness very closely; vomiting, abdominal pain, and headache may be complained of in either case. The abdominal pain in sea-sickness, however, does not cause rigidity, there is no rise in temperature, but rather the reverse, and an hourly pulse and temperature chart will make the diagnosis clear. *Acute intestinal*

obstruction may be a complication of sea-sickness, since the act of vomiting may cause either obstruction by a band or incarceration in a hernial sac. The pain in obstruction is far more severe than that caused by sea-sickness, and once suspicion is aroused a careful abdominal examination and the administration of one or two enemata will leave no doubt as to whether obstruction exists. Perforations, especially of gastric ulcers, may be masked by sea-sickness ; a perforation causes much more severe pain and shows those characteristic signs of rigidity and collapse which are pathognomonic of this catastrophe. There are medical conditions also liable to be overlooked, including the typhoid and paratyphoid fevers, and, especially when sailing in the East, small-pox. These possibilities have been stressed because the patient invariably attributes all his symptoms to sea-sickness and may mislead his physician unless the latter always keeps the graver diseases in his mind.

The Breaking of a Vicious Circle

When other diseases have been excluded and the type of case being dealt with has been ascertained, the treatment of sea-sickness resolves into the breaking of a vicious circle.[1] Whatever the cause of the initial vomiting, whether nervous, due to labyrinthine stimulation, irritation of the splanchnic sympathetic, gastric irritation, or ketosis following hypoglycæmia, the persistent vomiting combined with the absence of food soon causes a ketosis. It is vital, therefore, to administer carbohydrate to the patient, and the easiest and pleasantest way is to give orangeade made with glucose (glucose, one tablespoonful, one squeezed orange to one tumbler of water with ice). This is absorbed directly from the stomach, and if it is only retained a few minutes some is absorbed. The patient should be encouraged to sip a little of this drink as often as he likes and very soon the worst feelings will pass away. Diminished urinary excretion is a marked feature in sea-sickness, the urine giving a considerable deposit of urates on standing ; if the kidneys are not very active they are unable to excrete this concentrated urine, and waste products accumulate in the blood ; this is another good reason for encouraging the consumption of fluids.

Drug Therapy

Combined with the administration of fluids and glucose, various drugs which have been recommended from time to time may be tried. The list includes atropine, tr. belladonnæ, cocaine, sodæ bic., chloretone, pot. brom., morphia, hyoscyamus, acid. hydrocyan. dil., cerium oxalate, tr. iodi, bismuth and soda, soda-mint tablets, mothersil, seoxyl, and many others. None is

[1] *The Lancet*, 1927, ii., 811.

specific, but some are helpful under different circumstances. Pot. brom. gr. xx, combined with tr. belladonnæ ℥v, is useful in nervous patients, especially in those suffering from insomnia. Belladonna is given with a view to inhibiting the motor effect of the vagus on the stomach. On the same principle atropine may be administered combined with strychnine (atropine gr. 1/100, strychnine gr. 1/32) hypodermically when a patient shows signs of collapse. Chloretone has its advocates. This drug is a gastric sedative and cerebral depressant, and is also suitable for the nervous case. It is given in cachet form in doses of gr. v not more often than twice a day; generally it is absorbed with difficulty, but it may be absorbed in massive doses should it accumulate in the presence of fatty acids in the bowel. Chloral and bromide may be given per rectum in cases where nothing can be retained by mouth, in the form of a suppository containing chloral hydrate gr. xv and pot. brom. gr. xxx, three times a day. Morphia may be given hypodermically, but it is very rarely needed if the other remedies are used with discretion. A useful routine mixture consists of two powders: (*a*) pot. bic., gr. xv; (*b*) citric acid, gr. x; glucose, ʒiv. When dissolved in water and mixed these give a palatable effervescent drink which often cuts short an attack. In very bad cases where nothing can be retained by mouth, and where coma is threatening or present, glucose should be administered with saline per rectum, or better 6 per cent. glucose. This solution should be given in 15-oz. doses every four hours, and is nutritive as well as useful in replacing lost fluid.

Diet and Management

The patient should be kept warm, and the air fresh. This is very important as oxygen scarcity is a direct precursor of ketosis. Part of the increase in sea-sickness observable during storms is due to the necessity of shutting the portholes with a consequent diminution of oxygen-supply. Stewardesses have a habit of advocating a chair on deck as a curative measure; this is not advisable in a cold wind after an attack of sea-sickness, and the recumbent position should be maintained until two meals have been digested. In some cases closure of the eyes affords relief. All causes of emotional disturbance should be avoided, and it is therefore wise to have a receptacle, in a convenient position, for the early stages of the voyage, as this will allay fears rather than encourage its use. As soon as the patient begins to improve light food should be taken. Patients exhibit individual preferences, but chicken sandwiches without butter, biltong spread on dry toast, fruit, jellies, beef-tea are usually acceptable. Tea and coffee with milk are usually badly tolerated, but iced weak tea with lemon and sugar is beneficial. Dry ginger ale, with or without brandy, and champagne have their supporters. It is wise to recommend the patient to avoid all fats, but otherwise to take plenty of food even if it is not all retained.

Complications

Apart from the acute surgical emergencies which may arise either along with or due to sea-sickness, there are sequelæ which require treatment. *Constipation* is a common complaint which is due to the change of diet and mode of life. An effervescent saline aperient given before breakfast is very useful, Seidlitz powder being especially so, as it is laxative, effervescent, and alkalising. If these do not agree the aperient habitually taken by the patient should be allowed.

Diarrhœa often accompanies severe sea-sickness. The exact cause of this is uncertain, but it is possibly due to a pancreatic disturbance. It may be very troublesome but passes away as vomiting lessens.

Cystitis.—True cystitis does not occur as a sequela of sea-sickness, but a condition resembling it clinically is frequently seen. It is due to the unusual concentration of the urine and not to microbial infection. A few doses of the following mixture will soon alleviate the condition : pot. cit. gr. xx, tr. hyoscyam. ℥xx, inf. buchu co. ad ℥ss, t.d.s. This treatment is preferable to the giving of acid sodium phosphate and hexamine since the urine is usually very acid already ; the condition is not an infection, and tends to clear up when the urine is rendered more alkaline.

Headache.—If there is no acetone in the urine the headache should be treated on ordinary lines by the exhibition of aspirin gr. x, phenacetin with caffeine gr. x, etc.; the presence of acetone in the urine is a sign that more glucose is required.

Short Voyages

For short journeys a rather different method of treatment is required. Poor sailors should partake of a good meal two hours before embarkation, and take chloral gr. v or pot. brom. gr. x to xv. Immediately on embarkation the dose should be repeated and the patient should lie down. In this way a short journey may often be passed in comfort.

XXXVI

THE PREVENTIVE TREATMENT OF DISABILITY AFTER FRACTURES

By Alan H. Todd, M.S.Lond., F.R.C.S.Eng.,

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To attain success in the treatment of a fracture it is necessary first of all to have a clear idea of what we are setting out to do. The old aim of treatment—merely to produce strong bony union in good line—has caused incalculable pain and loss of wage-earning capacity, and the ideal towards which we should strive nowadays is something altogether wider—namely, restoration of the patient to the state of bodily and mental efficiency in which he was before the accident. Not only the injured bone, but the muscles, joints, and circulation, the dexterity, and even the mental outlook, have all to be brought back to normal.

Accurate diagnosis is the first step towards efficient treatment. Whenever possible in any case of fracture or probable fracture, two radiograms should be taken, in planes at right angles to one another. Where this is anatomically impossible, much may be learned from stereoscopic radiograms. It is not enough to know that a bone is broken; it is necessary to know exactly how it is broken. In many cases it is only by means of X-rays that the fact of fracture can be established. And it must be remembered that a small lesion does not necessarily connote a small disability; for example, a fracture of the carpal scaphoid (which is very commonly overlooked), or a chip-fracture of a finger, may be very disabling.

Splints

Having established the fact of fracture, the next step is *not* to choose a splint. On discovering the fracture the thought should not be, "What splint shall I use?" but rather, "Need I use a splint at all?" A splint is only required when an equally good functional result cannot be attained without it, and if in every case the mechanics of the fracture are carefully considered from this point of view, it will be apparent that splints are often put on when they are quite superfluous and even harmful. A cumbrous back-splint and foot-piece, for example, cannot influence

the position of a broken middle metatarsal ; the adjacent bones splint it, rest can be secured by slinging the foot, and other support only induces unnecessary stiffness of joints and wasting of muscles. A fracture of the lowermost end of the fibula, again, cannot possibly become displaced ; it is too firmly held by its ligaments. Here a splint is not merely unnecessary but actually does damage.

It should always be remembered that, apart from traction-splints, no splint should ever be used to produce reduction ; it serves only to maintain it. For instance, if the bones of a child's forearm are bowed, it is useless to try to push them straight by the pressure of a projecting pad on a splint ; the bandages will cause a splint-sore if they are tight enough to correct the deformity. The limb should first be " set " properly, and then kept in place by the splints. It is well to remember, too, that wooden splints, being made to fit everybody, really fit nobody ; they do not fix a limb, but only rest it. Often, it is true, that is all that is needed, but sometimes true fixation is required, for after fracture the muscles are in a highly irritable state and pull upon the fragments with much more than their normal power. Whether or not this will displace the fragments depends mainly on the type of fracture and the direction of the muscular pull. The risk is small where the fracture is transverse and the muscles run axially, whereas it is large when the fracture is oblique, or where the muscles pull obliquely on the fragments. When true immobilisation by splints is desired, it is usually a good plan to use plaster-of-Paris, carried well beyond the origins and insertions of the muscles which are acting on the fragments.

Reduction

If reduction presents the least difficulty, full anæsthesia should be employed. The abolition of pain and of muscular resistance more than compensates for the patient's aversion to being made unconscious, and for the additional trouble and expense. In particular, every case of Colles's and Pott's fracture should be reduced under general anæsthesia, for which purpose gas is inadequate, unless the surgeon and anæsthetist are both exceptionally skilful.

All fractures should be reduced at the earliest possible moment, before effusion and increasing spasm have made the conditions harder. It is wrong to wait until the swelling is going down, for by that time contracture has appeared, and both reduction and retention have become unnecessarily difficult. A good primary reduction, moreover, always gives a better result than any secondary reduction. This applies to operative as well as non-operative treatment. If it is thought that a fracture should be treated by operation, the surgeon should be called in at the earliest possible moment, that he may have the opportunity of

early reduction if he thinks proper. Anyone who has striven with an old fracture with shortening will appreciate this point.

Before undertaking reduction it is important to detect any injury of nerves, on which a charge of unskilful treatment is often based. Involvement of the musculospiral nerve in fracture of the shaft of the humerus, and of the circumflex in injuries of the neck of the bone, are cases in point. The former calls for hyperextension of the wrist, in splints, and the latter for abduction of the upper limb to a right angle.

Reduction should always be as complete as possible. Whilst bad alignment is sometimes compatible with good function it is nevertheless true in all cases that the better the alignment the better is the functional result. And it cannot be too strongly emphasised that in the case of the lower limb any deviation of the normal axes of the joints will inevitably result in serious and permanent disability. The leg differs from the arm in that it is a weight-bearing limb. To make it work with its joints " out of truth " is like driving a car with a bent axle, producing unequal strains. " Mechanical arthritis " appears — i.e. osteo-arthritis due to mechanical causes—and becomes steadily worse so long as the static fault remains. Shortening of the limb is of no great consequence if the bones remain parallel, as seen from the front. A slight lateral displacement of tibia and fibula is compatible with very good function provided that the upper and lower fragments remain parallel. But the moment that any abduction or adduction appears in any part of the lower limb, and the joint-surfaces are thrown " out of truth," disability is a certainty. Every such condition demands complete correction at the earliest possible moment. It is futile to hope for the least relief from massage, special boots, wedging the sole, osteotomies, and the like ; none of these can correct faulty mechanics. Permanent crippling will always occur, in Pott's fracture, unless the limb be set with the axes of the knee-joint and of the ankle-joint absolutely transverse ; the top of the astragalus must always be exactly parallel with the ground. Valgus is fatal.

Massage and Movements

After-treatment begins as soon as reduction is completed. Massage can be used with advantage in most fractures from the very day of injury ; it gets rid of effusion, allays muscular spasm, and so minimises pain. Skilled sedative massage often aids reduction. Later, massage is employed to prevent wasting, and all possible joints are exercised to full range. Especially with compound fractures is it important to maintain the movement of unaffected parts ; with fracture of the leg the hip must be moved daily, and with fracture of the forearm a stiff shoulder is a disgrace. It must always be remembered that the functional utility of the limb as a whole is the measure of success in treatment ; the bone is sometimes only a minor consideration. With

fractures near joints, for example, it is usually more important to consider the function of the joint than the state of the bone; early movements are indicated, and often it is possible to do without a splint and to move the parts from the first. A Colles's fracture impacted in good position—i.e. without backward rotation—is an example. Early mobilisation is often facilitated by operation—e.g. wiring of the patella, and direct fixation of supracondylar fractures.

This brings me to the question of movements. Passive movements affect the joint-surfaces and prevent adhesions, but do not affect the muscles or the tendons in their sheaths. Active movements are always preferable, therefore, and in addition they stimulate the patient's mind, and compel him to take an active interest in his cure. If there is ever any doubt about the propriety of movements, or the skill of the masseuse, active movements should be preferred to passive, as they provide the added security of pain. But passive movements are often necessary at first, because the freedom of the joints must be restored before tired, wasted muscles can be expected to move the dead-weight of a limb.

Apprehension, often amounting to hysteria, plays a large part in many cases of fracture. Patients are often afraid to move their limbs, or confidently anticipate much greater disability than is really present. Here, again, prevention is better than cure. Patients should be encouraged, from the first, to move as much of their limbs as possible, and to move them vigorously. In Colles's fracture, for instance, they should be made to clench their thumb and fingers quickly and powerfully from the moment the fracture is first reduced. The medical profession itself is responsible for much of the difficulty in the treatment of fractures to-day. The public has been taught for years that their limbs must be kept at absolute rest in splints for weeks, and they have learned their lesson too well. Passive exercises are bad, because they do not call for physical and mental coöperation on the part of the patient. The whole atmosphere of treatment should be stimulative, and the result, as I have said, cannot be regarded as satisfactory until not only the patient's injured limb, but his whole capacity for daily life and work, have been restored. At first mere range of movement and muscular power have to be regained, but dexterity and fine coördination must later be cultivated anew, and this can only be done by active, voluntary exercises. This may be very important to those whose occupations are highly specialised.

Electrical Treatment

Electricity is not a panacea in fracture-treatment. It is useful, however, in stimulating the circulation and muscular contractions in the early stages of treatment when a limb is still in splints, and later on in reinforcing a nervous patient's feeble

voluntary efforts. It is not enough merely to touch the muscles repeatedly with a faradic electrode without any effort on the part of the patient ; the proper way is to make him contract a muscle, and at the same moment throw in a powerful faradic current so as to bring the contraction up to maximum power. Keith's work has shown that muscular contractions are of foremost importance in causing bony union. Faradism is also useful in convincing a hysterical patient that he can contract his muscles quite well, although he thinks he cannot, and a really strong current cures many a malingerer.

XXXVII

THE TREATMENT OF CONGENITAL STENOSIS OF THE URINARY MEATUS

(PIN-HOLE MEATUS)

By Eric I. Lloyd, M.B.Camb., F.R.C.S.Eng.,

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This condition receives little notice either in the text-books or teaching of surgery, but it is quite familiar to those whose work is largely with children, and is indeed the most frequent cause of dysuria in male infants. It is important to be able to recognise and treat pin-hole meatus because it is often overlooked and the troublesome or even dangerous symptoms which it occasions are wrongly attributed to other causes. Treatment is nearly always successful and should be undertaken at the earliest possible moment.

Ætiology

The stenosis is restricted to the distal extremity of the urethra and rarely extends for more than a quarter of an inch proximally. It is found in babies a few days old, though diagnosis is commoner in the second, third, and fourth years of life. Congenital stenosis of the meatus is a particularly accurate name and exactly describes the condition, though it is difficult to account for it any more satisfactorily than we can explain the occurrence of other congenital anomalies such as cleft-palate and imperforate anus. Associated congenital defects are rare, but I have seen one patient in whom a double ureter and pin-hole meatus coexisted. The proximal part of the urethra is developed from the urogenital sinus and is apparently never involved. The distal part which traverses the glans penis is formed by the canalisation of a plug of epithelium. Pin-hole meatus is due to an arrest of this process before a channel of adequate size has been formed, but we cannot tell what determines this irregular development.

Signs and Symptoms

The signs and symptoms are due, in the first place, directly to interference with the outflow of urine, and in the second place

to the urinary infection which often follows it. Dysuria is the commonest symptom, and the child's mother will almost always describe straining at micturition, a small and intermittent stream, and frequent crying due to pain or the anticipation of pain. In older children there is often incontinence of urine or so-called frequency of micturition. The bladder becomes distended and the child is unable or unwilling to pass urine until an overflow incontinence is established and a little urine dribbles away at a time. If such patients are examined they will be found to have a bladder which is distended sometimes to the umbilicus. Acute retention may occur and the patient may pass nothing for 24 hours. This condition will gradually progress into the overflow incontinence described above. Stagnation of urine in the bladder is often followed by infection, and some of these children will arrive with a diagnosis of pyuria though the cause of the pyuria may have escaped detection. Another important group of symptoms is due to an ulcer at the meatus. It is surprising how often the parent will describe these " water-blisters " which form at the urethral orifice, and " then break to form a sore." This sore or ulcer frequently bleeds, so that hæmaturia may be the first complaint. This triad of signs (vesicle, ulcer, and bleeding) is probably caused by the irritation of a drop of infected urine which is retained proximal to the point of stenosis. Possibly the child's efforts to relieve pain and obstruction by frequent handling of the penis are contributing factors. It will be seen that the signs and symptoms are protean, and it is small wonder that a correct diagnosis is often delayed.

Diagnosis

The chief difficulty in diagnosing pin-hole meatus is to remember that such a condition exists. It is like scurvy and retropharyngeal abscess which usually offer no obstacle to diagnosis, except the all-sufficient one that other diseases which give a rather similar picture spring first to our minds. If poliomyelitis and osteomyelitis did not exist we should not forget scurvy, and if phimosis never occurred we should more often think of pin-hole meatus. There is a tendency for some doctors to think that circumcision is the appropriate treatment for almost any disease or abnormality of the baby's penis, and this operation is often performed without the careful preliminary examination that such patients deserve. It must be emphasised that phimosis per se rarely, if ever, obstructs the outflow of urine and, in the absence of balanitis and paraphimosis, circumcision is very unlikely to relieve dysuria.

A simple examination will reveal the presence of pin-hole meatus, but it may often be suspected before the examination is made. The most common complaint is dysuria, and this includes all forms of straining before, during, and after micturition. A story of urethral bleeding, blisters, sores, bed-wetting,

and every kind of incontinence of urine or frequency of micturition in a small boy should lead to a careful examination of the meatus before other causes are considered. In some children a long or tight foreskin completely prevents this examination, and circumcision should then be advised without hesitation. The practice of stretching the foreskin by forceps is not a satisfactory substitute for circumcision, because it often damages the delicate tissues and fibrosis may follow. It is wise to warn the parents that circumcision may have to be followed by a second small operation if there is any suspicion of stenosis and the meatus is invisible. If there is a clear view of the meatus it is usually only necessary to look at it to decide if stenosis is present. It is difficult to define the size of the normal orifice in exact terms, but the stenosed meatus is generally so like a pin-hole that it is easy to make the diagnosis. If there is real doubt whether diminution exceeds normal limits an attempt may be made to pass a sterile probe, but experience makes this rarely necessary. The margin of a normal meatus may partially adhere and simulate a minute orifice, but this pitfall is avoided if the meatus is compressed between the finger and thumb in an anteroposterior direction (i.e. in the line of the orifice) in every suspected case. This simple test will always show the real size of the orifice. Additional information may be gained by watching the stream of urine; its calibre must be observed, as well as any hesitancy or interruption in the act. There may also be incomplete emptying of the bladder, this being estimated by the eye and hand rather than by an instrument.

Differential Diagnosis

The differential diagnosis ought to be easy because there is no other condition which gives quite the same picture. Over-attention to one sign or symptom may, however, cause mistakes if examination of the urinary meatus is omitted. Hæmaturia is a common complaint in pin-hole meatus and the parents often do not know that the blood is coming from a meatal ulcer. Hæmaturia from a point higher in the urinary tract (e.g. nephritis, calculus, oxaluria, hæmophilia, tuberculosis, or new growth) should not be confused with it. Enuresis is of many kinds and due to many causes, but it is time enough to fall back on belladonna and good advice when a careful examination has disclosed no local lesion and the urine is normal. It is well to remember that spina bifida occulta and a stone in the urethra can produce some of the same symptoms as pin-hole meatus. Dermatitis and other superficial lesions of the penis should be recognised. It has been recently suggested [1] that dysuria in male infants is often due to a particular kind of dermatitis. It was shown that in certain circumstances urine, which is normal when passed,

[1] *The Lancet*, 1927, ii., 639.

becomes infected from the alimentary canal by a bacillus which liberates ammonia from the urine-soaked napkin. This ammonia fomentation induces a dermatitis of the napkin area, and this in turn causes dysuria. This condition seems uncommon in England, and one suspects that a little cleanliness is enough to avoid it. Epispadias and hypospadias are easily recognised and phimosis has already been considered.

Complications

The condition, if untreated, produces a series of back-pressure phenomena which may ultimately involve the pelves of the kidneys. Infection of the urinary tract readily occurs, and it seems possible that hydro- and pyo-nephrosis in children may be sometimes the direct outcome of congenital stenosis of the urinary meatus, though there is little evidence on this point.

Treatment

Treatment is fortunately simple, but demands careful attention to detail if recurrence is to be avoided. Instrumental dilatation is unsuccessful because it is followed by cicatrisation; it should never be performed without first carrying out the little plastic operation which will be described. Circumcision is an essential preliminary in a few patients, but it has usually been done already, and indeed, the parents often attribute the child's symptoms to the operation irrespective of the reasons which occasioned it. Circumcision has not, of course, caused the stenosis, but the operation does sometimes seem to have been performed in the false hope of relieving the urinary obstruction.

Operation: Meatotomy.—The simplest of plastic operations is sufficient, but a general anæsthetic is required. An injection of atropine (gr. 1/150 for a baby) is administered and the patient anæsthetised with ether. Iodine is applied to the glans penis and a fine scalpel or pointed tenotome is introduced $\frac{1}{4}$ inch into the urinary meatus. An incision is then made into the inferior surface of the urethra traversing the substance of the glans until its inferior surface is reached. A tapered glass bougie is inserted, and if this does not easily pass to the required distance the incision must be carried a little further up the urethra. Bleeding is negligible, and it is now only necessary to prevent the margins of the incision falling together. This is best done by a fishing-gut stitch on either side which passes from the mucous surface of the incised urethra through the glans and then traverses the corona before being tied on the outside of the glans. These stitches should be removed in about five days. The operation is completed by applying a little iodoform ointment on ribbon gauze.

After-treatment is simple but important. Epithelialisation of the raw surface occurs rapidly, but the enlarged meatus must

be prevented from contracting. The patient's mother is given a solid glass rod 4 in. long and 1/5 in. in diameter. One end of this is sharply tapered to 1/12 in. By this means the meatus can be dilated from 1/12 to 1/5 of an inch without passing the rod far into the urethra. The instrument must be boiled before use, smeared with iodoform ointment, and introduced twice daily for six weeks.

A similar condition occasionally occurs in patients suffering from penile hypospadias. There is sometimes a minute orifice on the under surface of the penis, and none upon the glans. It may then be necessary to perform the same kind of plastic operation on the existing meatus before undertaking radical treatment for the hypospadias.

Results.—The results which follow this simple procedure in pin-hole meatus are completely satisfactory and permanent. No special surgical skill or instruments are required, and the operation may be performed by any medical man under the most ordinary conditions.

XXXVIII

THE TREATMENT OF PHLEBITIS

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Phlebitis occurs in two forms, (1) the plastic, and (2) the suppurative. In the plastic form of phlebitis inflammatory changes occur in the endothelium of the veins and as a result a clot or thrombus appears within the vein. Organisation of this clot by fibrous tissue may occur, the vein being transformed into a fibrous cord. In other cases the clot becomes softened and broken down and the circulation of blood through the vein is resumed. During this process a portion of the clot may become detached and pass to the lungs, resulting in pulmonary embolism. In the suppurative form the vein and the clot which it contains become invaded by pyogenic organisms; leucocytes enter the clot and cause it to break down into a purulent fluid.

Ætiology of Plastic Phlebitis

Plastic phlebitis may be a result of (1) infective fevers, especially typhoid fever, (2) gout, (3) post-operative thrombophlebitis, (4) puerperal phlebitis or phlegmasia alba dolens, or (5) trauma, usually but not always, in cases when the veins are varicose.

Preventive Treatment of Plastic Phlebitis

In the *infectious fevers*, especially typhoid fever, phlebitis of the lower limbs is not uncommon. The diet recommended in typhoid fever was at one time confined to milk and this substance contains a considerable amount of calcium salts ($1\frac{1}{2}$ g. per litre: R. Hutchison). It is probable that in a long illness the coagulability of the blood will be increased on an exclusively milk diet and as a prophylactic measure in typhoid fever other liquids, such as beef-tea and lemon-water, should be given to avoid a diet solely composed of milk.

In *gout*, where the phlebitis is often multiple and sometimes symmetrical, the diet should be regulated and appropriate

medical treatment, such as colchicine, atophan, and Contrexéville water should be prescribed.

In *post-operative thrombo-phlebitis* we have a condition which needs the urgent consideration of both physicians and surgeons. There is an alarming increase of pulmonary embolism, and many deaths result from it after laparotomy. The work of J. G. Clark,[1] who has brought forward many convincing arguments to support his thesis, should be better known. He concludes that post-operative thrombo-phlebitis results from trauma to the deep epigastric vein during manipulation of the abdominal wall at operations. He has shown that the clot spreads to the deep epigastric vein on the opposite side and to the iliac vein. The long interval, 8–15 days, which intervenes between the operation and the appearance of the thrombosis in the femoral and iliac veins suggests a slow process with gradual extension of the clot into the femoral vein from a focus some distance away. The absence of much fever and the fact that the pulse is slightly, if at all, raised in rate suggests a traumatic lesion of the vein rather than an infective one. In one case, after a patient had been operated upon and had developed a typical thrombo-phlebitis with œdema of the right leg, it became necessary to perform a second laparotomy. At this second operation, two months later, both the epigastric veins were found to be tense, hard, and as large as goose quills, while the right one was found to be decidedly varicose and to contain phleboliths. The block in the iliac vein may or may not be complete; if it is complete we get a swollen œdematous leg, whilst if it is incomplete, pulmonary infarction may occur without swelling of the lower limb. It is clear from this that surgeons should use the utmost gentleness in manipulating the abdominal wall during operations. I am strongly against the modern habit of trying to remove an adherent appendix through the same abdominal wound that has been used for inspection or operative procedures in the upper abdomen. A great deal of stretching and pulling of the parietes occurs and it is far better to make a second incision over the appendix, if its removal is required after an operation on the upper abdomen. It is also clear that after abdominal operations the patients should be encouraged to move the legs as soon as possible so as to prevent stagnation of the circulation. W. A. Lister[2] has shown that the commonest source from which massive emboli arise is in the iliac veins and their larger tributaries, and he suggests as a preventive measure that movements of the abdominal wall should be encouraged after operation as soon as possible. He also suggests that massage to the lower limbs and breathing exercises should be undertaken as soon as possible after an operation on the abdomen. Another factor which may be of some importance in producing stasis in the femoral vein is the acute flexion at the groin which is produced by placing a bolster

[1] *Univ. of Penna. Med. Bull.*, 1902, xv., 154.
[2] *The Lancet*, 1927, i., 111.

beneath the knees in order to prevent the patient slipping down in bed. The use of this support should be condemned.

After operation it is advisable to begin, on the third or fourth day, to give a mixture containing potassium citrate and ammonia three times a day as a prophylactic against clotting.

Prophylaxis against *puerperal phlebitis* is similar to that already described against venous clotting after operation. The influence of puerperal sepsis in this connexion is, however, very important.

Trauma is a cause of phlebitis usually, but not always in cases where the veins in the lower limbs are varicose.

Treatment of Varicose Veins

The treatment of varicose veins may be summarised as follows :

(*a*) *Support.*—The use of crêpe velpeau and india-rubber bandages and elastic stockings has been condemned on insufficient grounds. They certainly help to protect the veins from trauma and prevent their over-distension, and in many cases this is the only treatment necessary.

(*b*) *Spa Treatment.*—A great many cases of varicose veins have been greatly benefited by treatment at Bagnoles de l'Orne in France. In my experience the greatest benefit from the hot springs of the spa has been in cases where thrombosis has already taken place in the veins and more or less œdema of the lower limb has resulted.

(*c*) *Surgical.*—Removal of localised bunches of varicose veins may be undertaken by surgical excision. In many cases where the valves of the veins have become incompetent and there is great distension of the veins when the patient stands erect, Trendelenburg's operation of ligature of the saphenous vein in the groin has been used successfully.

(*d*) *Injection.*—In 1919 Sicard [1] proposed to inject fluids into the varicose veins with a view of producing a sclerosing thrombosis. Five c.cm. of a solution of 20 per cent. sodium salicylate are injected into the vein, which becomes hard and a firm clot is produced, which eventually leads to shrinking and disappearance of the varix. Apparently embolism does not occur as the result of this method of treatment.

(*e*) *Treatment when Phlebitis and Thrombosis have occurred.*—Rest in bed is essential. The limb should be slightly elevated to favour return of the venous circulation. The inflamed vein may be gently painted with liniment of iodine and then covered with warm cotton-wool. If the whole leg is swollen it should be entirely encased in warm wool and covered with thin mackintosh. If the pain is severe, the skin over the painful area may be smeared with a cream made with green extract of belladonna

[1] *Presse Médicale*, June 2nd, 1926.

with twice its weight of glycerine. Massage and friction must not be employed for at least three weeks.

To prevent further clotting, citrate of potash and ammonia should be given, as in the following prescription :

℞	Potass. citrat.	gr. xv.
	Sp. ammon. aromat.	℥xv.
	Ammon. carb.	gr. iv.
	Glycerini	℥xx.
	Aq. menth. pip.	ad ½ oz.

Sig. A tablespoonful in water every four hours.

After three weeks, if the leg remains swollen, gentle friction to the skin may be employed but deep massage is contra-indicated.

Pulmonary Embolism

The symptoms of pulmonary embolism appear in most cases with dramatic suddenness. Some 10 to 14 days after an operation or after parturition the patient is suddenly seized with violent pain in the chest. The breathing becomes very difficult and the distress of the patient is very great. If the clot is large enough to block the pulmonary artery or one of its larger branches, the patient may die in a few minutes. If, however, the clot is not so large, the patient recovers and within the next 24 hours a pleural rub may be heard and the patient will bring up a quantity of dark-coloured blood. Within two or three days a dull area may be found at the base of one of the lungs and tubular breathing and increased vocal resonance may be elicited over this area. Indications that pulmonary embolism may occur after an operation are slight. After the post-operative pyrexia has settled down to normal on the third or fourth day, the temperature, instead of remaining quite normal, may show slight signs of oscillation, rising to 99° or 100° F. without any obvious cause. There is usually no pain in the lower limbs, but just before the embolus takes place there may be a little œdema of one or both feet. The prevention of pulmonary embolism is that of thrombosis in the iliac veins. Once thrombosis has taken place the patient must be kept absolutely still and any respiratory exercises and movements of the abdomen and legs must be immediately stopped. Should a clot in a varicose vein show signs of ascending the leg the inflamed vein should be removed and the saphenous vein tied in the groin. It is clear, however, that operative measures on a clot in the iliac vein must be of doubtful value, though in some cases they have been undertaken. When the patient is seized by the crisis of pulmonary embolism, the violent spasm and acute pain are best relieved by a small dose of morphia. In many cases œdema of the lung supervenes and the chest becomes full of bubbling râles. When this occurs one-fiftieth of a grain of atropine should be injected. If there is much cyanosis, oxygen inhalations may be tried, and if the pulse becomes feeble strychnine,

digitalis, and camphor should be injected. When once a pulmonary embolus has occurred it is obvious that another portion of clot may become detached and a second attack may follow, and I have seen cases where three or four small emboli have passed into the lungs during the course of two or three weeks and yet the patient has recovered. In view of this, it is essential that the patient should be kept absolutely quiet in bed for a period of four to six weeks until it may be hoped that the thrombosis in the iliac vein has become fully organised.

Ætiology of Suppurative Phlebitis

The pyogenic organisms reach the veins from a focus of suppuration around them. The most common varieties are the result of (*a*) mastoid disease, resulting in septic phlebitis of the lateral sinus and internal jugular vein; (*b*) facial carbuncle or boil resulting in infection of the angular vein and cavernous sinus; (*c*) septic conditions in the abdomen, such as appendicitis, gastric ulcer, and tuberculous glands resulting in portal pylephlebitis; (*d*) septic phlebitis of the iliac veins may follow certain cases of puerperal infection or uterine and bladder diseases.

Treatment of Suppurative Phlebitis

(*a*) The infective focus must be drained or removed—e.g. the mastoid process must be drained or the appendix removed.

(*b*) Whenever possible a ligature must be placed on the vein between the affected area and the heart—e.g. the jugular vein must be ligatured at the root of the neck in cases of lateral sinus thrombosis.

(*c*) When this has been done, the inflamed vein should be thoroughly laid open, the septic clot removed, and the cavity thoroughly cleansed and drained whenever anatomical conditions allow of this being done.

After these essential surgical procedures have been carried out, the patient's strength must be maintained by careful feeding; alcohol and other stimulants should be given when needed, while antistreptococcal serum may be given to combat the toxæmia.

XXXIX

THE PREVENTIVE TREATMENT OF DIGESTIVE TROUBLES IN YOUNG CHILDREN

By Eric Pritchard, M.D.Oxf., F.R.C.P.Lond.,
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The most satisfactory means of preventing digestive troubles in later life is to ensure the development of a robust and well-disciplined alimentary system during the period of its most active evolution—that is to say, during the first and second years of life.

Natural feeding, if properly conducted, ensures the normal development of the digestive tract during the most important period of all—namely, during the first nine months of life—and artificial feeding, if substituted for it, should aim at producing similar results by means of a milk diet modified as accurately as possible to the standard of breast milk. The moment that this milk diet, whether breast milk or artificial, is relinquished for the mixed food which is indicated at or about the time that the first teeth are cut, new difficulties and dangers immediately present themselves. Heretofore the infant has presumably had no form of carbohydrate food other than sugar (lactose, maltose, or sucrose). Now he has to learn how to convert starch into sugar for himself—a most necessary accomplishment, since starch in some form or other will in future be the main article of his diet. He has to learn how to masticate solid forms of food and to tolerate roughage or ballast from vegetable fibre, in order that he may be provided with a solid basis for his stools.

It must be remembered that during the milk age the physiological basis of the child's motions is soap—insoluble soap—consisting mainly of stearate of calcium; hence the necessity for a generous allowance of fat in the food at this period. With the substitution of a mixed diet for the milk the same amount of fat is not required, but ample provision must be made for ballast of another kind. The milk diet ensures that the child receives at least some representation of every one of the elements required for growth and maintenance. There is no guarantee whatsoever that on a mixed diet all these elements will be provided; indeed, it may be taken for granted that a large number of them will fall

DIET TABLES—6–18 MONTHS

(6 to 7 Months)

6 A.M.	10 A.M.	Dinner, 2 P.M.	6 P.M.	10 P.M.
Breast or M.M., 6 to 7 oz.	Breast or M.M., 6 to 7 oz. Crust, butter, a trace.	Breast or M.M., 6 to 7 oz. Broth, 2 oz., *or* red gravy, ½–1 oz., given alone or with feed.	Breast or M.M., 6 to 7 oz. Crust, butter, a trace.	Breast or M.M., 6 to 7 oz.

(8 Months)

Breast or M.M., 7 to 8 oz.[1]	Breast or M.M., 7 to 8 oz.[1] Crust or rusk, ½ oz.; butter, ⅛ oz.; yolk of egg, ¼ oz., in feed or lightly boiled.	Strained veg. broth, 4 oz., *or* red gravy, ½ oz.; crust or twice-baked bread, ½ oz.; butter, ⅛ oz.; milk, 4 oz., alone *or* given with broth.	Breast, 7 to 8 oz., and crust, ¼ oz., or M.M., 7 to 8 oz. with groats or baked flour, ½ oz., *or* crumb, ¼ oz.	Breast or M.M., 7 to 8 oz.

(10 Months)

6 A.M	8 A.M.	12 noon.	4 P.M.	8 P.M.
Orange juice, ¼ oz.; sugar, ⅛ oz., with water.	Milk, 5–6 oz.; sugar, ⅛ oz.; toast or crust, 1 oz.; butter, dripping, or bacon fat, ¼ oz.	Gravy, 1 oz., *or* broth, 4 oz.; potatoes, ½ oz.; veg. marrow, cauliflower, or other veg., ½ oz. Alternative meal: Fish pudding, 2 oz.; bread, ½ oz.; milk, 5–6 oz. sugar, ⅛ oz.	Milk, 5–6 oz.; sugar, ⅛ oz.; bread or crust, 1 oz.; butter, ¼ oz.; stewed apples, 1 oz., *or* jam, ½ oz.	Milk, 5–6 oz.; sugar, ⅛ oz.

(*1 Year Old*)

Breakfast.	Dinner.	Tea.	Supper.
Milk, 6–8 oz.; sugar, ¼ oz. Bread, toast, rusk / Singly or combined, 1–1½ oz. Butter, dripping, bacon fat, etc. / Singly or combined, ¼ oz. Jam (without seeds, pips, or skins), jelly, treacle, honey, ¼–½ oz.	Fish, 1 oz., stewed in milk (2 oz.), *or* egg, 1 oz., *or* tripe stewed in milk, ¾ oz. (milk, 2 oz.); potato, 1–2 oz., mashed with ⅛ oz. fat. Veg.: cauliflower, veg. marrow, Jerusalem artichoke, turnip, or Brussels sprouts, 1 oz. Milk pudding, 2 oz., or custard, baked or boiled. Stewed prunes or baked apple, 1 oz.; bread, 1 oz. Water to drink.	Milk, 6–8 oz.; sugar, ¼ oz. Bread, toast, rusk, plain / Madeira cake,[2] oatmeal biscuits. Singly or combined, 1–1½ oz. Butter, ¼ oz.; jelly or jam without seeds, pips, or skins, ¼–½ oz.	Bone and veg. broth, 3–4 oz. *or* milk, 6 oz.
(*18 Months*)			
Milk, 8 oz.; sugar, ½ oz.; cocoa, ½ oz. Bread, toast, or rusk, 1½ oz. Butter, dripping, bacon fat, ½ oz. Jam, jelly, treacle, honey, ¼ oz. Watercress or lettuce in season.	Fish, steamed, 1½ oz. (and served with white sauce); potatoes, steamed and mashed with butter (¼ oz.), 1½ oz.; carrots, turnips, boiled Spanish onions, or soft veg., 1½ oz. Sponge pudding, 2 oz., or sponge cake. Stewed prunes, dates, apples, apricots, well stewed and skins removed, 1½ oz. Bread, 1 oz. Water to drink.	Milk, 8 oz.; sugar, ¼ oz. Bread, toast, rusk, sponge, or Madeira cake, oatmeal biscuits. 1½ oz. Butter or marg., ¼ oz. Jelly, jam, or treacle, ½ oz.	None. A hot drink if necessary.

M.M. = milk mixture. [1] Some of the water may be omitted. [2] Home-made

At *9 months* the diet is the same, except that dinner must be rather larger, and a few teaspoonfuls of stewed vegetable or baked apple pulp added.

short of the physiological requirement. The chief offenders in this respect are mineral elements, vitamins, and cellulose or roughage.

About forty different elements or proximate principles are required to complete the physiological dietary of the child. Hence it is obvious that unless the food programme is thought out very carefully, or consists mainly of milk, many omissions or defects in balance may occur and mar its physiological rectitude. One of the chief necessities in changing from the milk to the mixed diet is to introduce every innovation very gradually.

Accompanying is a series of tables suitable for different ages between 6 and 18 months, which I have drawn up in order to assist those who would find it irksome to arrange one themselves.

These tables, with or without modifications, either by myself or others, have already been published elsewhere, but are not for the most part easily accessible.

At all periods of life included in this survey the need for accessory food factors (vitamins, mineral elements and extractives) should be kept constantly in view, and though some provision is made for them in the combination of foods suggested in the accompanying tables, it is wise to ensure the inclusion of a full complement of them from independent sources.

The younger the child the greater the need for these essential imponderabilia of diet. It is often thought unnecessary to supply infants under three months of age with orange juice or other antiscorbutic. There cannot be a greater mistake, and the same applies to all other accessory food factors. It is comparatively easy to supply the latter from ordinary domestic resources, without having recourse to special preparations, but many of these are now offered in concentrated and convenient form by well-known drug-houses.

Vegetable and bone broth prepared according to my own formula from chopped bone well boiled down with vinegar for many hours in order to decalcify it, with an addition of green vegetables which are only boiled for a short time, and liver, kidney, and other internal organs, together with marmite, provide in fairly concentrated form a valuable ensemble of most of the required accessory factors ; it can be given to infants and children of all ages.

Many commercial preparations such as roboleine, vitmar, vitaminose, virol, brestol, jecomalt, and radiated malt, are all good and reliable preparations of mixed vitamins. Vitamins A, C, and D are well represented in small-leafed green vegetables, such as spinach and brussels sprouts. Marmite is a concentrated preparation of water-soluble B, and so are other yeast preparations, of which there are several on the market. Ostelin is a reliable and concentrated preparation containing the antirachitic factor. Mineral elements in physiological balance can be obtained by using a preparation which is now prepared for me by Parke Davis, known as " nutritive salts."

XL

THE TREATMENT OF EMERGENCIES IN ANÆSTHESIA

By J. K. Hasler, M.B., B.S.Lond.,

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There may come a time to all anæsthetists when the death of the patient appears imminent. The unavoidable occasions are those in which an operation is performed as being the only means of saving a patient's life, but entails bad risks both for the surgeon and for the anæsthetist. In the avoidable cases, which diminish as skill in anæsthesia increases, there has usually been a failure on the part of the anæsthetist to observe, or to interpret, such untoward signs as may have been present. For the successful treatment of such cases it is of supreme importance that the anæsthetist should not wait until the patient is *in extremis*. The futile administration of oxygen or CO_2 after the stoppage of respiration, or the injection of potent drugs under the skin when the heart has ceased to beat, is still seen too frequently.

Emergencies fall naturally into two groups: (*a*) partial or complete stoppage of respiration; (*b*) failure of the circulation. The failure of either of these systems may be nervous in origin, and if one fails the other will do so unless remedial measures are taken speedily, and are successful.

Respiratory Difficulties

The causes of respiratory difficulties may be classified, according to their manner of affecting the respiration, as (1) obstruction of the air-passages; (2) interference with the respiratory movements, and (3) interference with the nervous control of respiration.

Obstruction of the air-passages.—In the first division are included such conditions as spasm of the upper respiratory tract; the presence of foreign bodies such as teeth, tonsils, or blood-clot in the larynx or trachea; the presence of fluids such as blood, pus, mucus, or vomit in the trachea; swelling of the mucosa, as in œdema of the glottis; and alteration in the normal anatomy

of the tract as in the collapse of the trachea in goitre, or the falling back of a wash-leather epiglottis. Treatment must aim at relieving the obstruction without delay. In a condition of spasm the obstruction usually occurs in the early stages of anæsthesia, and is due to the administration of a greater concentration of anæsthetic than will be tolerated by the patient. Temporary cessation of the anæsthetic and a few breaths of air or oxygen will usually relieve this. If necessary, the mouth must be forced open and the tongue held forward. If a foreign body descends to the larynx, the patient's head must be lowered at once and an effort made to remove it. This is a type of accident that occurs not infrequently in children's clinics for the removal of tonsils and adenoids. Blood-clot, tonsils, or loose temporary teeth may drop down the throat and become a source of danger. The child should at once be held up by the legs while a careful search is made for the foreign body. If impaction in the larynx takes place, a tracheotomy may have to be performed. For fluids in the throat the same treatment must be adopted. To lower the head is the best means of removing the fluid. The passage of a stomach-tube during induction in cases of acute intestinal obstruction will often prevent the inhalation of large quantities of fæcal vomit. Where there is the possibility of hæmorrhage, as in buccal operations, the anæsthetic should be given by means of a nasal catheter, the pharynx being well packed with gauze or sponge. In cases of retropharyngeal abscess, where there may be a sudden burst of pus into the throat, if a general anæsthetic is required it should be given either by the intratracheal method or through a laryngotomy tube. The anæsthetist must be prepared to lower the head rapidly should the abscess burst during induction. With an œdematous larynx, as in Ludwig's angina, a tracheotomy may be a necessity. In the removal of large goitres a softened trachea may collapse suddenly and obstruct the respiration. Intratracheal anæsthetic should always be given in such cases to avoid trouble in the middle of the operation. Lastly, it sometimes happens that when full anæsthesia is reached the epiglottis may fall backwards and cover the top of the larynx. If this so-called " wash-leather " epiglottis be hooked upwards, respiration will proceed normally, and for the continuation of the anæsthetic a tracheal catheter should be passed.

Interference with the respiratory movements may be due to the pressure of instruments on the patient's epigastrium ; to the pressure of the viscera on the diaphragm in a high Trendelenburg position ; or to pressure on one side of the thorax if the opposite lung is out of action. Operators are liable to forget that although the abdomen makes an excellent instrument table it was not intended to serve as such. Two or three pounds of cold steel placed on the epigastrium of an already shocked patient or a child may cause marked dyspnœa. With very obese patients, especially if chronic cardiac or pulmonary disease is present, a high Trendelenburg position sometimes produces cyanosis and dys-

pnœa. To these patients oxygen must be given, and they should only be kept tilted for as short a time as possible. Patients who have only one functioning lung may require operation on the diseased side of the chest. If lying on the sound side causes embarrassment, the shoulder should be supported with a pillow so as to enable the chest wall to expand freely.

Interference with nervous control of respiration may be brought about by (1) toxæmia, from overdose of anæsthetic ; (2) anæmia, from excessive fall in the blood pressure ; or (3) reflex inhibition, as when operative measures are started on a partially anæsthetised patient. The treatment is the same for all cases. The anæsthetic must be discontinued and the patient's head lowered. Oxygen and CO_2 (5 per cent.) should be administered by inhalation, and if respirations have ceased they must be continued artificially. A powerful stimulus, such as the stretching of the anal sphincter, will often start respirations again. Two drugs are particularly useful here, and both should be injected. Strychnine gr. 1/30 is valuable for its action on the motor cells of the spinal cord, and lobeline gr. 1/10 is a powerful stimulant to the respiratory centre. It has sometimes happened that premature lowering of the head in cases where a spinal anæsthetic has been given has led to paralysis of the phrenic nerves. In such cases strychnine must be injected and artificial respiration carried on until the effect of the drug has passed off.

Circulatory Difficulties

Circulatory difficulties may be (1) due to the direct effect of the anæsthetic ; (2) due to the effect of the operation ; and (3) due to failure of respiration. Generally speaking, the anæsthetist is given warning by the presence of a rapid and possibly irregular pulse, and by the presence of cyanosis.

Effect of the anœsthetic.—Where the anæsthetic is directly responsible for cardiac failure, either myocardial degeneration or a poorly compensated valvular lesion is usually present. Chloroform is the chief offender. It exerts a toxic action on the heart muscle, which action is accentuated in the presence of cyanosis. Prolonged administration of gas and oxygen in old and feeble persons may also cause heart failure. Its effect has been described as similar to that which would be produced if the patient were made to run uphill. An overdose of anæsthetic is liable to produce cardiac inhibition and bulbar paralysis. The anæsthetic is also held responsible in deaths from status lymphaticus. In treating these cases of circulatory failure the head must be lowered so as to keep the brain well supplied with blood, and an effort must be made to eliminate the anæsthetic. For this purpose oxygen with 5 per cent. CO_2 should be administered. If the heart has not actually stopped beating the anæsthetist should inject cardiac stimulants intramuscularly. Those most likely to be of value are strophanthin gr. 1/240, caffeine sod.

sal. gr. i–iii, or ether 1 c.cm. if the patient has not been having this drug. If the heart has ceased to beat, 5 minims of adrenalin (1/1000) should be injected directly into the left ventricle. Failing this, and as a last resort, the heart should be massaged through the diaphragm. Sudden concentration of chloroform vapour in the early stages of induction may cause the heart to fail by vagal stimulation. An injection of atropine gr. 1/100 given before operation is the best means of preventing this catastrophe.

Effect of the operation.—Failure of circulation due to the operation is most often attributable either to shock or to hæmorrhage, or to an embolus; less frequently to the lowered blood pressure which follows the injection of a spinal anæsthetic. In cases of shock and hæmorrhage it is essential that the patient be supplied with warmth and fluid. A transfusion of blood is undoubtedly the best method of giving fluid, and, failing that, saline should be given intravenously or by the rectum. The patient should be returned to bed as speedily as possible and warmth supplied by hot blankets or a hot air cradle. The foot of the bed should be raised on blocks and an injection of morphine should be given. If collapse occurs as a result of diminished blood pressure following a spinal anæsthetic, the head should be lowered and 1 c.cm. of pituitary extract (10 international units) injected intramuscularly. Pulmonary embolism is, fortunately, rare during anæsthesia. Its occurrence is sudden, and is accompanied by cyanosis and immediate cardiac failure. The anæsthetist can do little but administer oxygen.

Effect of Respiratory Embarrassment

Where the respiration is primarily at fault, it is obvious that if breathing has actually ceased it will only be a matter of time before the heart also ceases, unless effective measures are taken promptly. If the respiration is obstructed a strain will be thrown on the patient's heart because of the greater muscular effort required to breathe and the deficient oxygenation which is liable to occur. If partially obstructed respiration is present for any length of time it may lead to heart failure in feeble or fatty patients or in cases where the heart is already weakened by chronic valvular disease or by myocardial degeneration. To treat the heart one must treat the lungs, and the obstruction must be relieved by whatever method the occasion demands, whether it be the use of an airway, support to the chin, alteration of posture, or alteration in the method of giving the anæsthetic.

Conclusion

Prevention is notoriously better than cure. If there is any one method better than another in the prevention of fatalities

under anæsthesia it is in the maintenance of a perfectly free airway. If emergencies should occur, let the careful anæsthetist remember these two rules—(1) keep the head low; and (2) let the remedies be prompt. It is better to start treatment five minutes before the patient is dead than five minutes after.

XLI

THE TREATMENT OF ILEUS FOLLOWING OPERATIONS

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Ileus or intestinal obstruction secondary to operation may be of two types—paralytic, when it results from failure of peristaltic action, and mechanical when it is due to some organic block of the bowel.

Paralytic Ileus.—In this variety there is paralysis of some portion of the intestine and the effect may be transitory. Such ileus may follow the reposition of large strangulated herniæ, but the most important cause of all is acute peritonitis either localised or diffuse. In this condition the intestine becomes inflamed and is unable to propel its contents.

In *mechanical ileus* the intestine may be strangulated or kinked by bands or cords, the result of peritoneal adhesions following operation, or a tear in the omentum or mesentery made by operative trauma may lead to intestinal obstruction. Ileus may also be produced as the result of cicatricial contracture affecting the wall of the bowel following an artificially made anastomosis.

Mortality

The mortality from acute intestinal obstruction has fallen very little during recent years. The death-rate after operation in early cases is not less than 20 per cent., whilst in any large collection of cases it may reach 50 per cent. It seems to be generally agreed that the high and rapid mortality in obstruction of the small intestine is due to the absorption of toxic material developed within the bowel. Evacuation of the bowel contents is therefore of first importance, but restoration of peristalsis is also essential for recovery. If the bowels can be made to act the patient frequently recovers, whilst if they fail to act he will die. In the late stages of fatal cases of acute peritonitis paralytic obstruction develops and this is largely responsible for the symptoms of toxæmia. The most common cause of peritonitis met with by the general surgeon is acute appendicitis. Of cases

dying of peritonitis 5–10 days after operation for appendicitis probably 75 per cent. are due to intestinal obstruction, which is a most difficult and dangerous complication. If intestinal obstruction does not supervene peritonitis often yields to treatment.

The treatment of paralytic ileus has always been unsatisfactory. The efficacy of drugs such as castor oil, calomel, eserine, or pituitary extract depends on contraction of the bowel. If the bowel is paralysed these drugs will fail to act and will add to the strain on a heart already damaged by toxæmia. Enterostomy in the paralysed bowel in such cases only drains the affected loop, and therefore is of but limited value. It is, therefore, apparent that in cases of paralytic ileus attempts to stimulate peristalsis in the bowel should be avoided. The most effective measure is to give it complete rest, and thereby a chance to recover its power of active contraction. This treatment, combined with an enterostomy above the affected portion of the bowel, does undoubtedly prove successful in many cases. Enterostomy is an easy and quick operation and makes little demands on the patient's vitality. In addition, glucose and sodium bicarbonate can be run into the bowel and is absorbed better than from the rectum or elsewhere. The toxins are thus diluted, and this process is of distinct advantage to the patient.

Clinical Features

Post-operative ileus is usually seen at two periods after operation—early, within the first two or three days, or later during the convalescent period. The treatment to be adopted will depend on the stage at which the condition arises. The management of early cases arising after operations for peritonitis due to acute appendicitis presents a most anxious and difficult problem. These cases are usually due to multiple kinking of inflamed bowel by plastic lymph. This condition chiefly affects the lower ileum, having been set up by perforation of a gangrenous appendix. The bowel becomes acutely inflamed and then paralysed by extension of the inflammation to the muscular wall. Death in these cases is due to intestinal obstruction and not to peritonitis. The clinical picture is fairly typical. The patient shows little or no improvement after operation, and the abdominal distension becomes more marked; vomiting is progressive and enemas produce no satisfactory result. About the fourth or fifth day after the operation the signs of intestinal obstruction become well marked and further operation is then essential.

Enterostomy

When obstruction develops shortly after operation it is rarely complete and the intestine will not infrequently recover its

function if given a reasonable chance. In these cases all nourishment by mouth must be entirely stopped so as to avoid further overloading of a distended bowel. Fluids should be given freely by the rectal and subcutaneous routes. Where vomiting is troublesome gastric lavage is valuable, and can be repeated as often as necessary. Morphine in doses of gr. 1/6 gives relief from pain, and in spite of apparent contra-indications will be found useful.

If improvement does not follow this treatment in about 48 hours operation will be necessary. This involves drainage of the small intestine by an enterostomy above the site of obstruction and above the level at which the bowel is paralysed. It is an extremely easy procedure and should be carried out by the following method.

Technique.—A local anæsthetic (2 per cent. of novocain) is used. A left paramedian or rectus-splitting incision just above the umbilicus is made, and the first distended loop of intestine that presents is withdrawn into the wound. This is clamped after it has been emptied, and a tube or large catheter with a terminal opening is sutured into the bowel by Witzel's method. According to this method the tube is laid for 3 or 4 inches along the bowel, and the serous and muscular coats sutured over it. The tube is then brought out through a gap in the omentum and the wound closed round it. This enterostomy of the valvular type will close when the tube is removed without the necessity of a second operation. The intestine will empty itself of its toxic contents through the enterostomy, and irrigation with sodium bicarbonate can also be carried out.

This is the easiest and safest procedure to adopt when the patient is in a poor condition. It is often a life-saving measure and will tide the patient over an apparently hopeless condition. After the intestine has emptied itself through the tube the lumen of the bowel is usually restored and the contents begin to pass normally. The tube can then be removed and the fistula will close spontaneously.

Ileus Duplex

Sampson Handley has described under the name of ileus duplex a condition where there is paralysis of the bowel below the level of the pelvic brim—that is, in the lower coils of the ileum and the terminal portion of the colon. He recommends as treatment for this condition short-circuiting of the ileum by a jejuno-colostomy with drainage of the large bowel by a cæcostomy. This operation would appear rather severe in a patient whose condition is desperate. Enterostomy is a quicker and simpler operation and can readily be performed by any surgeon with far less strain on the patient.

Mechanical Ileus

Patients may develop symptoms of intestinal obstruction any time after the tenth day following operation. At this period the obstruction is due to fixation of the bowel by adhesions, and an operation to separate the adhesions and free the bowel will always be necessary. If it is thought desirable, an enterostomy may be added to drain the bowel for a few days. The outlook in such cases is fairly good provided that operation has not been unduly delayed.

Anti-gas Serum. — It has been suggested that the severe toxæmia of acute ileus is due to the presence of the toxins of the *B. welchii* in the fæcal contents of the bowel above the site of obstruction, the absorption of this toxin by the damaged mucosa leading to the grave general condition of the patient. The symptoms certainly resemble those seen in cases of gas gangrene. The natural outcome of this suggestion was the administration of anti-gas serum to patients, and this has been tried by B. W. Williams [1] during the past two years with encouraging results and noteworthy reduction in the mortality-rate. A prophylactic injection of serum before operation may lead to still better results. The initial dose of serum should be 80 c.cm. given intramuscularly, and later 40–80 c.cm. should be given daily intramuscularly until the bowels are acting effectually.

Administration of Bile.—More recently R. St. L. Brockman [2] has suggested that the symptoms which develop in cases of intestinal obstruction are for the most part due to the prevention of the passage of the bile along the alimentary canal. The administration of bile by the rectum has given encouraging results, the vomiting and toxæmia being diminished in some cases. The dose given was human bile 2 oz. in 4 oz. saline per rectum every four hours and relief was almost immediate. The toxic symptoms may be further controlled by the use of hypertonic saline given intravenously. A quart of 3 per cent. saline given before and again after operation gives favourable results.

Spinal Anæsthesia.—Spinal anæsthesia may be regarded as a valuable alternative to general anæsthesia in cases of intestinal obstruction. This anæsthetic gives perfect relaxation and allows manipulation of the distended coils of bowel to be carried out with great ease. Not infrequently, after the injection of a spinal anæsthetic, the bowels act spontaneously on the operating table, and such injections have been suggested as a line of treatment in cases of paralytic ileus.

Preventive Treatment

With the practice of earlier operation for acute appendicitis the number of cases where post-operative ileus arises is likely to

[1] *The Lancet*, 1927, i., 907. [2] *Ibid.*, 1927, ii., 317.

decrease. This probability is sufficient reason for immediate operation in acute appendicitis as soon as the diagnosis is clear. If the appendix can be removed before it has perforated ileus will not arise. The avoidance of a drainage-tube is an important factor in preventing the formation of post-operative adhesions, for intestinal obstruction is far more common when a drainage-tube has been used. In some cases of acute appendicitis the presence of ileus may be recognised before or actually at the time of operation, and for this reason an adequate incision is necessary to enable the lower ileum to be inspected. For this purpose either the paramedian or the Battle incision is to be recommended. After the appendix has been dealt with the condition of the ileum is examined. If it is fixed by recent adhesions it is gently freed and its mobility restored. Where the gut appears inflamed, sodden and apparently paralysed, either an enterostomy or ileo-colostomy and cæcostomy as advised by Handley should be performed. The early administration of purgatives should be avoided after operation for acute appendicitis. In the treatment of strangulated intestine following hernia operations, a lateral anastomosis to short-circuit the damaged loop is often a valuable procedure where the condition of the bowel is doubtful. Finally, a further cause of ileus after abdominal operation is the over-purgation of patients prior to operation, and the use of castor oil, which causes severe intestinal irritation, should be avoided.

XLII

THE TREATMENT OF TUBERCULOUS EPIDIDYMITIS

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Before considering the treatment of tuberculosis as it affects the testicular apparatus it is essential to appreciate the cardinal features of its onset and course. The age-incidence is from puberty onwards; tuberculosis of the testis is unknown in childhood, apart from generalised miliary tuberculosis, and the majority of cases occur between the ages of 25 and 45, after which time the condition becomes progressively less common. This accords with the period of fullest activity in the testis. It is agreed that the disease attacks the epididymis first, the body of the testis if involved being affected secondarily. Any gross degree of hydrocele is therefore unusual, though a small amount of fluid in the tunica is a common feature. There is general consensus of opinion that the part of the epididymis attacked first as a rule is the globus minor, and the earliest clinical sign is a nodule in this situation. If the disease spreads unchecked the nodule will enlarge, and tend to soften and caseate, becoming adherent to the skin and forming a sinus on the postero-lateral aspect of the scrotum. The rest of the epididymis becomes involved with secondary caseating foci. The testis is destroyed by caseation and fibrosis, but the process being slow testicular sensation remains unaffected for a long time. The vas deferens exhibits nodular thickening, and rectal examination reveals thickening and softening in the vesiculæ seminales or prostate. Later the testis of the opposite side becomes affected, and the bladder may be the seat of tuberculous cystitis. The kidney also may show evidence of infection.

Differential Diagnosis

Differentiation from such conditions as syphilis or neoplasm of the testis or the acute infections of the testicular apparatus should offer little difficulty. There are, however, certain conditions which give rise to fibrous thickening in the epididymis which must be borne in mind. Fibrosis may follow previous inflammation due to the gonococcus or *Bacillus coli* or damage

produced by vascular interference through partial torsion of, or thrombosis in, the spermatic cord. A careful consideration of the history, combined with rectal examination and possibly prostatic massage and urethroscopy, should clear up the diagnosis.

Healing without Operative Interference

What has been described is the extreme picture of progressive disease ; the rate of spread, like that of tuberculosis elsewhere in the body, is, in fact, extremely variable. Thus a nodule may remain indolent in the globus minor for a number of years or breaking down may form a sinus, only to heal up again after discharging for a time. This last is important, as it is not recognised clearly that healing by fibrosis will occur in this particular situation. Although occasionally the whole process is a rapid one, so that an acute form of the disease may be described, the average duration of symptoms before relief is sought is nine months. Quite half the cases exhibit discharging sinuses when they are first seen. The inference to be drawn from the above facts is that, given a high enough resistance on the part of the patient to the tubercle bacillus, and the means of augmenting this are well known, the disease, like tuberculous inflammation occurring elsewhere in the body, has a tendency to natural arrest through healing by fibrosis. This healing process is encouraged by local rest.

Medical treatment, or rather the withholding of surgical treatment, is indicated when a firm nodule in the epididymis is the only evidence of disease. If at any time softening or spread in the epididymis commence, surgical treatment, as detailed below, is required. In certain of these cases presenting merely a nodule in the epididymis, in spite of the most complete investigation, it is obvious from what has been said above the diagnosis must remain in doubt.

To the surgeon, at any rate, the eradication of the primary focus of the disease in the urogenital tract would seem to be a more rapid and certain procedure. Unfortunately, however, we are still ignorant of the exact site of primary infection in the genito-urinary system. The epididymis may be the primary site, being attacked via the blood stream, or it may be infected via the vas from a primary focus in the prostate or vesicle, as in the commoner disease of gonorrhœal epididymitis. In substantiation of the latter view is the fact that many cases exhibiting early and trivial signs in the epididymis show marked involvement of the vesicle and prostate, and that in many cases of very early and radical removal of the testis, epididymis and vas involvement of the opposite epididymis nevertheless occurs. H. H. Young, in a series of 222 cases of genital tuberculosis, found that in 47 cases the prostate and vesicle were infected by tuberculosis without any lesion in the epididymis. Moreover, the focus is found first in the globus minor or prostatic end

of the epididymis, whereas the frankly blood-borne infections of the testicular apparatus, such as mumps and gout, attack the body of the testis primarily.

Surgical Measures

The forms of surgical treatment appropriate for different types of case include (1) incision and curetting, (2) epididymectomy, (3) orchidectomy, (4) radical removal of the seminal tract.

Incision and curetting.—This may be utilised as a temporary measure where a caseating focus in the scrotum is on the point of ulcerating through the skin. As a rule it will be followed by more radical treatment, although in cases where there is extensive tuberculosis of other organs, such as the lung, it may be injudicious to undertake any further surgical interference.

Epididymectomy.—This operation can be undertaken without fear of endangering the blood-supply of the testis, and should be carried out where the disease has not yet involved this organ. The lower third of the vas deferens should be removed at the same time. Obviously this would be the operation of choice if the epididymis were known to be the primary focus in the genito-urinary tract, but it may be asked whether it has any value if the vesicle and prostate are affected. Even where these organs are involved, primarily or secondarily, however, it is clear that by removing part of the infected tissue, particularly if it happen to be the major part, the recuperative powers of the body are given a better prospect of overcoming the infection. In practice, a vesicular or prostatic lesion often clears up or ameliorates after epididymectomy. Similarly, in the operative removal of a tuberculous joint it is unlikely that all tuberculous tissue is removed, but the results of excision in suitable cases are well known.

Orchidectomy.—This should be reserved strictly for those cases in which the body of the testis is obviously affected. Apart from this it is unjustifiable. A high percentage of cases, in spite of all treatment, sooner or later attack the epididymis on both sides, and to remove the internal secretion of both testes unnecessarily in a man at the prime of life is manifestly unsound practice, and may have serious effects on the mental and general physical health of the patient.

Radical removal of the seminal tract.—This is an extensive and formidable operation. As advocated by Young, it is carried out through a perineal incision. The seminal vesicles and ampullæ are isolated, and the prostate, if infected, is removed also. The epididymides are then exposed in the scrotum, with the patient in the dorsal position, and removed together with the whole remaining portions of the vasa. The risks of the operation consist in the difficulty in dealing with the base of the bladder and the fear of a perineal urinary fistula. The peritoneum

and rectum may be damaged, and, finally, the majority of the patients are not good subjects for extensive major surgery. Many exhibit active tuberculosis elsewhere, especially in the lung.

A less drastic operation may be carried out entirely through an inguinal incision, stripping back the peritoneum from the bladder until the vesicles and prostate are reached. However, if complete extirpation of the seminal tract, rather than removal of grossly infected material, is aimed at, the perineal approach to the vesicles must be adopted.

Conclusion

Treatment should consist as a rule in removal of the epididymis and lower part of the vas. If the body of the testis prove to be involved this must be removed also. Radical removal of the seminal tract should be reserved for those cases in which the whole tract is extensively involved, as offering the only hope of relief or as a secondary operation where, in spite of epididymectomy, lesions in the vesicle and prostate become well marked and progressive. Where a renal lesion coexists, this should be dealt with first if practicable. It must be emphasised that in every case there is the possibility of a renal infection being present, and examination of the urine for tubercle bacilli, together with cystoscopy, should form part of the routine examination. Lastly, and most important of all, the general resistance of the patient to the tubercle bacillus must be increased by the methods which have proved efficacious in the treatment of other tuberculous lesions—namely, fresh air, rest, generous fatty diet, and the use of tuberculin.

XLIII

THE TREATMENT OF MINOR DEGREES OF NASAL OBSTRUCTION

By Philip Jory, F.R.C.S.Eng.,

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I.—Deflections of the Septum and Abnormalities of the Turbinate Bones

Since the advent of the operation of submucous resection of the nasal septum there is little doubt that the operation has been much abused, and has been frequently performed when it is quite unnecessary. It must be remembered that a certain amount of septal deviation is the rule rather than the exception amongst the Anglo-Saxon and Hebraic races; it is important then that the practitioner should have some definite guidance as to the question of operation.

The importance of the rôle of infected tonsils and adenoids in the causation of nasal obstruction, especially when associated, as is so often the case, with varying degrees of septal deflection, must be emphasised. Experience in hospital out-patient work has repeatedly shown that the eradication of these septic foci has obviated the necessity for septal operations in many patients sent up as candidates for submucous resection.

Indications for Submucous Resection

Submucous resection is in present-day surgery almost invariably the operation of choice. Certain cases of *nasal obstruction with marked deflection* obviously require operative interference. Naturally the risk of a subsequent traumatic perforation is great, but provided such perforation be not too far forward the inconvenience is slight, and the perforation may in itself improve the airway. Marked external deformity is, of course, a justifiable indication for operation. In certain cases of *chronic middle-ear catarrh* the straightening of the airway may improve the aeration of the middle ear via the Eustachian tube, or may permit of the

introduction of the catheter for purposes of inflation. In deafness due to other causes submucous resection is in my opinion but seldom productive of improvement. An appreciable number of cases of *persistent frontal headache and supra-orbital neuralgia* are due to deviations of the upper part of the septum. The symptoms are probably caused by interference with the ventilation of the fronto-ethmoidal cells, and the straightening of the septum has most satisfactory results. In cases of *hay fever or asthma* where the presence of a septal deviation is aggravating the condition; also in *epistaxis* where the bleeding comes from the summit of the convexity or is due to the collection of dust in the pocket of a deep concavity. Resection of the septum may give most beneficial results in cases of *unilateral atrophic rhinitis* occurring on the roomy side of a nose. Lastly, the operation may be required as a preliminary to the efficient treatment of *nasal polypi*, or of suppuration in the accessory sinuses.

It must not be forgotten, however, that in many cases of nasal obstruction a deflected septum may be merely an accessory after the fact, the real criminal being a chronic rhinitis or a diseased sinus. Here it is obvious that the septum is not to be sentenced until the other offenders have been dealt with.

Collapse of the Alæ Nasi

Collapse of the alæ nasi is not infrequently the cause of nasal obstruction. Such collapse is almost always associated with the presence of adenoids or of a septal deflection, and the practitioner may well overlook the alar deformity in the presence of the other abnormalities. He is then apt to be disappointed when the symptoms do not disappear after the removal of the adenoids or the anatomically successful straightening of the septum. In the adult, of course, the alar collapse may persist long after the causative adenoids have undergone their customary shrinkage. It is often possible to relieve the condition by means of suitable breathing exercises, thus developing the atrophied dilators of the alæ. The patient should be shown the appropriate movements, and should practise them systematically three or four times daily. At the outset the practice should take place in front of a mirror until the muscles are well under control. If obstruction persist despite the exercises the use of Francis's nasal props may give much relief—these cause but little distress either physically or cosmetically.

Enlargement of the Turbinate Bones

The other great cause of nasal obstruction to be considered is the enlargement of the turbinate bones. Such enlargement occurs in three stages: (1) Slight general thickening of the mucous membrane. (2) Turgescence. (3) True hypertrophy.

These are the pathological changes found in patients suffering from what is popularly designated catarrh.

The first stage is liable to be a sequela of the acute rhinitis associated with the specific fevers, but may also be due to occupational conditions—for example, in stonemasons or tobacco workers, or to injudicious dietetic habits or insufficiency of outdoor exercise. Treatment then consists in the use of the nasal douche —I prefer the use of an all-rubber nasal bulb to the "sniffing" method as less likely to cause headache—or in regulation of the occupation, diet, or exercise of the patient.

Turgescence and true hypertrophy are prone to cause the practitioner to make errors of diagnosis; fully 50 per cent. of the patients sent to out-patient departments labelled "polypi" are in fact suffering from turbinal enlargement. Great disappointment and a certain amount of loss of faith are evinced when no polypus is forthcoming. The naked-eye appearances are admittedly often very similar, and the practitioner would do well to remember that without the use of cocaine and the nasal probe the differential diagnosis may be extremely difficult.

In the turgescent stage the application of cocaine and adrenalin will cause almost complete collapse of the swelling, and it is in such cases that the use of the galvano-cautery is extremely beneficial. It is generally advised that a deep line be made with the cautery point to cause a subsequent fibrosis, but experience shows that relief is often obtained by a light superficial application, which probably has a beneficial action on the vasomotor mechanism. A point to bear in mind is that a very pale and excessive turgescence is found in those addicted to snuff-taking, a practice which is more common than is usually suspected amongst shop assistants, who are debarred from the use of tobacco during working hours. The tumefaction may involve both the anterior and posterior ends of the bone, and in advanced cases partial turbinectomy of one or both ends may be required.

In the third stage there is true hyperplasia, and even after the application of cocaine, which will relieve any coexisting turgescence, the turbinal remains definitely enlarged. Either the middle or the inferior turbinals may be affected, and the treatment will be considered separately.

Hyperplasia of the Middle Turbinal

In my opinion the cautery should not be applied to the diseased middle turbinal; unpleasant and even dangerous results have followed its use. The main pathological changes are: (*a*) Enlargement of the anterior end. (*b*) Cystic enlargement of the head of the bone. It is well to remember that the pressure of the enlarged turbinal on the septum or its interference with the aeration of the fronto-ethmoidal cells may cause persistent neuralgia across the bridge of the nose or in the infra- or supra-orbital regions. Anosmia and aprosexia are also fairly common

symptoms. The best treatment consists in the removal of the enlarged end by the nasal snare, a proceeding which is facilitated if a deep incision behind the enlarged portion be previously made with a punch forceps such as Grunwald's. The same procedure may be used to remove cysts, but if these are friable their complete removal by the snare is often impossible, and a " mopping-up " operation with curette or forceps may be required. Glegg's nasal snare is the best. It has the following advantages : (1) The wire can be easily and rapidly threaded or unthreaded. (2) The size of the loop can be regulated *after* threading. (3) Should more than one application be necessary the loop can be pushed out without twisting.

Hyperplasia of the Inferior Turbinal

The treatment of the hyperplastic inferior turbinal is also operative, but one must be most conservative as to the amount removed, since marked dryness or even a pseudo-atrophic rhinitis may follow the sacrifice of too great a portion. Removal of the anterior end by the snare will be facilitated if an incision with angular scissors be first made along the attachment of the turbinal to the outer nasal wall, otherwise the snare is apt to slip.

For the removal of the enlarged posterior ends a general anæsthetic is usually advisable, when a finger may be passed into the post-nasal space to guide the loop of the snare into the desired position. The other operations mentioned may be performed under local anæsthesia.

After-treatment

My usual practice is to instil hydrogen peroxide drops t.d.s. for some three or four days, followed by the use of the nasal wash twice daily until healing is complete. The use of neb. menthol is often soothing and beneficial.

XLIV

THE TREATMENT OF MINOR DEGREES OF NASAL OBSTRUCTION

By Philip Jory, F.R.C.S.Eng.,

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II.—Nasal Polypi and Ethmoidal Disease

Nasal polypi cannot properly be considered except in relation to ethmoidal disease. The day has long passed when a nasal polypus was regarded as a benign new growth. Woakes first pointed out that the polypus was merely a symptom of underlying bony disease, and Lack later set our conception of this abnormality on a sound pathological basis. It is now almost universally conceded that the presence of nasal polypi and of ethmoidal inflammatory changes are intimately associated, a presumption which is strengthened by the fact that the more thoroughly the bone at the base of a polypus is removed, the less is the likelihood of the polypus recurring. It is then of the utmost importance that the practitioner should have some criterion as to the amount of associated bony disease present, and it may be taken that clinically the number and nature of the polypi give a valuable indication. The presence of merely one or two pedunculated polypi shows that the osteitis is localised or even arrested ; but when numerous small polypi occur, especially if associated with unhealthy mucous membrane in the vicinity, the bony affection is probably widespread and active. Thus by visual inspection of the nasal cavities the practitioner may glean much useful information as to the prognosis and the extent of the necessary operative treatment. A good skiagram is of the utmost value in determining the presence of an associated accessory sinus infection or the extent of the ethmoidal disease. In the case of a choanal polyp, the skiagram may show some involvement of the maxillary antrum, although paradoxically enough the antrum may on transillumination appear to be brighter on the affected side.

Incidence and Symptoms

Polypi are most often met with during the third and fourth decades, and are stated to be very rare under the age of 10 years ; but during the past year I have seen three cases in girls of 8 years and under, in which the polypi were removed with the snare, and shown by histological examination to be of the ordinary character. They vary greatly in size and number, but usually appear as greyish, gelatinous, oyster-like masses, especially when they are of the pedunculated variety. If, however, they protrude into the vestibule, or into the naso-pharynx, they may be reddish in colour and simulate a papilloma. Almost invariably they originate from the ethmoidal region under cover of the middle turbinal, and this is an important factor in the correct diagnosis. The other point to be borne constantly in mind is that they are freely movable with a probe, and examination with the probe should therefore be the invariable rule. Observance of the above two points should prevent mistakes in connexion with hyperplastic growths ; these are not thus freely movable and often spring from the inferior meatal region. Other conditions are less likely to be mistaken for polypi, but it must not be forgotten that a malignant growth of the ethmoid may be overlaid by polypi, so that the real condition only becomes evident after the latter have been removed. Frequent attacks of spontaneous epistaxis in the presence of polypi should arouse suspicion of malignant disease. The use of cocaine plus the probe will serve to distinguish between true polypi and mere turgescence of the turbinals. The main symptoms are those of nasal obstruction, and patients often complain that such obstruction varies with the state of the barometer, being aggravated by cold or damp weather. Occasionally the sufferer states that he has something which flaps like a valve in the nose, or, as mentioned above, the polyp may even present at the anterior naris. The obstruction is frequently associated with a profuse nasal discharge of varying consistency. There is often a peculiar nasal intonation of the voice, and in severe cases the nasal bridge may be obviously distended. Aprosexia and anosmia are not infrequent, whilst supra- or infra-orbital neuralgia may be complained of. Hay fever and asthma are often aggravated, if not caused, by the presence of polypi, whilst a dry purposeless cough is frequently a part of the train of symptoms. A certain degree of deafness or giddiness is at times produced, and some authorities state that polypi may be a cause of epilepsy.

Prognosis

Prognosis is extremely difficult. If polypi are left untreated, they tend to increase in size and number, and may in time lead to marked impairment of the general health or even to serious

complications. It is obvious that some form of operative interference is necessary, and that topical applications can have no curative effect where bony changes are present. A few prognostic points may however be formulated.

1. A single pedunculated polypus—especially if cystic in nature—does not tend to recur after local removal.
2. Polypi associated with obvious disease of an accessory sinus are amenable to treatment if the patient is prepared to face the appropriate operation.
3. Even though the patient refuse a radical operation he may be promised considerable relief of the obstructive symptoms if he will permit of occasional removal of the polypi by means of the snare.
4. In the case of the choanal polypus, its removal is usually curative in effect, as the bony disease has almost invariably been arrested by the time the polypus is discovered.

Treatment

The treatment may be: (1) simple removal of the polypi by the snare; or (2) radical removal of the polypi and the underlying diseased bone.

In *simple removal* it is necessary to have: (*a*) good anæsthesia; (*b*) good illumination; and (*c*) a good snare. Local anæthesia suffices, and may be induced by the application of cotton-wool pledgets soaked in 10 per cent. cocaine solution (and well squeezed out) to the polypi and their attachments. Efficient illumination is an obvious necessity where the work has to be done in a confined space such as the nasal cavity. The best snare is Glegg's, which has the advantages mentioned in the previous article, and in which the end of the barrel is crossed by a bar. This prevents the wire from being drawn into the barrel, and the polypus is thus torn away from its attachments and not merely cut through at the level of the wire as by a sharp guillotine.

The wire noose is gently slipped round the lower end of the polypus and then with a slight side-to-side movement is insinuated under cover of the middle turbinal to reach the attachment of the growth. The noose is then tightened, and the polypus sharply pulled away from its attachment. As a rule, the whole of the pedicle will come away, often accompanied by a scale of the subjacent bone. In some cases when the polypi are growing from the anterior end of the middle turbinal, the latter may be removed with the polypi; such removal is beneficial as it diminishes the likelihood of recurrence. Should bleeding obscure the view, it is well to press on the area with a mop of cotton-wool soaked in hydrogen peroxide, which for this purpose is a better and safer styptic than adrenalin. If both sides of the

nose are affected, we should endeavour to clear one side completely in order to restore nasal respiration, and defer treatment of the second side for a week or ten days. Rather brisk hæmorrhage may follow, but can usually be controlled by applying compresses of iced water to the bridge of the nose; if it persist a little cotton-wool, soaked in hydrogen peroxide, may be temporarily packed into the nose. This should be removed in ten minutes, when a loose pledget of dry wool may be inserted in the vestibule to prevent blood trickling over the lip. In no circumstances should the nose be tightly packed with gauze, lest severe sepsis supervene. The immediate after-treatment consists in trickling a few drops of hydrogen peroxide into the nostril at frequent intervals for two to three days; later a mild nasal wash should be used several times daily for a week. Another important part of the after-treatment is the regular inspection of the nose for recurrence of growth and the immediate removal thereof. Recurrences should be dealt with promptly.

With patience and perseverance even bad cases of polypi can thus be cured, but if after several careful removals the condition persists, a more radical procedure must be adopted.

For the more *radical operations* the question of anæsthesia must first be considered. Local anæsthesia by cocainisation (with or without adrenalin) may suffice, especially if induced by Sluder's method, where a pledget of wool dipped in a saturated solution of cocaine is pushed up under the posterior end of the middle turbinal whilst a similar one is pushed up into the antero-superior part of the nose, both being left in situ for ten minutes. In this way the branches from the spheno-palatine ganglion and the nasal branches of the ophthalmic division are dealt with, and excellent anæsthesia results. In many cases, however, it is preferable to induce general anæsthesia after packing the nasal cavities with wool soaked in 10 per cent. cocaine. If general anæsthesia be employed, it is important to remember that the use of adrenalin to stop hæmorrhage during the operation may be fraught with danger. As far as possible the polypi are first removed with a snare or Luc's forceps, and the subjacent diseased bone is then cut away by Luc's or Grunwald's forceps, or by Meyer's ring knife. It is of the utmost importance to avoid injury to the cribriform plate, and these manipulations should therefore be performed below the level of attachment of the middle turbinal, and the ring knife must be drawn from behind forwards and slightly downwards. Any attempt to cauterise the base of the polypus is at once useless and dangerous.

The after-treatment is as before—instillation of hydrogen peroxide drops will almost invariably arrest the hæmorrhage, and no attempt to pack the nose tightly is justifiable, save as a last resort.

Naturally, if associated accessory sinus disease be present, it

must be dealt with by suitable operation. Kisch has lately reported an external operation for the treatment of ethmoidal affections, but at present its execution should be confined to those who are accustomed to perform extensive intranasal operations.

Difficulties which may Confront the Operator

In a small percentage of cases the removal of polypi seems to cause a violent reaction in the ethmoidal region, and when next seen the patient has produced a copious crop of œdematous polypi. In such, it is well to hold one's hand and wait for the congestion to subside ere removing these fresh polypi. If this be done, a much longer period of immunity from recurrence will follow the second operation. In the treatment of the choanal polypus, a general anæsthetic is desirable, when a finger may be passed into the naso-pharynx to facilitate adjustment of the loop of the snare. Here, again, Glegg's snare will be found most convenient, for a large loop may first be passed over the polypus and then easily adjusted so that it will grip the pedicle firmly. In some cases it may be found necessary to introduce a pair of curved forceps into the naso-pharynx, grasp the pedicle therewith, and tear it from its attachment.

The major difficulties encountered, however, are due to spurs and deviations of the septum. Such obstructions may not be recognised until the anterior polypi have been removed, and it is in these circumstances that efficient illumination and cocainisation are of the utmost value. If the hæmorrhage be profuse and obscure the view, it is better to have the strength of mind to desist for the time being, and to postpone the completion of the operation for 10 to 14 days. Manipulation in the dark will lead only to incomplete removal of the polypi and the causation of troublesome adhesions. In cases of marked septal deflection it may be necessary, or at least advisable, to perform a submucous resection before dealing with the polypi.

Finally, it should be borne in mind that children tolerate cocaine badly, and strong solutions therefore should on no account be used for them.

XLV

THE TREATMENT OF IMPOTENCE

By Kenneth M. Walker, F.R.C.S.Eng.,

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Impotence is the inability to perform satisfactorily the sexual act and is a condition quite independent of sterility. An impotent man is not necessarily sterile ; nor is a sterile one impotent, although failure to consummate normal coitus is naturally a handicap to fertility. Cases of impotence may be divided into two classes, *secondary* impotence in which the disability is the result of an organic lesion in the genitalia or elsewhere in the body, and *primary* impotence in which no such lesion can be found.

Secondary Impotence

The lesions of the genitalia that may give rise to impotence are numerous, but are not often met with in practice. Amongst them may be mentioned ectopia vesicæ, hypospadias, induratio penis plastica, elephantiasis, and arrested development of the penis, the result of some such glandular deficiency as eunuchoidism. More common are those cases in which the impotence is the result of lesions situated elsewhere in the body. In this connexion diseases of the central nervous system are of the greatest importance, and for this reason every case of impotence should be submitted to a careful neurological examination in order that such diseases as early tabes and disseminated sclerosis may be excluded. It must also be remembered that the disability may be secondary to any impairment of the general health, or to such conditions as diabetes, thyroid insufficiency, and the taking of drugs. In old age it may be physiological, although men differ widely in the age at which the sexual power is lost.

Sometimes, when an organic lesion is found, it does not appear sufficiently grave to explain the impotence. As an example may be cited the impotence that may follow an infection of the genital tract or a comparatively trifling operation on the bladder or genitalia. In these cases a psychological factor can generally be discovered, the patient having developed a fear that his previous trouble may have impaired the sexual function.

Such cases really belong to the type of impotence now to be discussed.

Primary Impotence

In these cases no lesion can be found either in the genitalia or elsewhere in the body to account for the disability. The patient is usually of the psychopathic type, intelligent, introspective, emotional, and nervous. He must be carefully handled, as it is only with great difficulty that he gives his confidence, and unless that confidence is gained nothing can be done to help him. In the majority of cases his disability is only discovered after marriage, for such men are more likely than not to have been continent previously.

Careful inquiries should be made on the subject of any previous sex experience, nocturnal emissions, and the efforts that have been made to consummate marriage with their results. Sometimes the impotence will be found to have been preceded by a period of incomplete erections with premature ejaculation and frequent nocturnal pollutions. During the interrogation the patient should be encouraged to speak freely, so that an insight may be gained of his knowledge of sexual matters, and a clue obtained to his particular psychological problem.

In some cases the impotence will be found to be a symptom of a well-established neurosis, and the only method of dealing with the patient will be to place him in the hands of a competent psychotherapist. In other cases the detection of the psychological cause of the trouble presents less difficulty, and the practitioner will feel capable of dealing with it himself. Here it is possible only to give a few examples of some of the simpler problems that may be met with.

Fear is by far the commonest factor in the production of functional impotence, and sometimes the particular form of fear which is at the root of the trouble may be discovered in the course of the preliminary conversation. The majority of men have at one time or another masturbated, and not infrequently there has become linked up with the practice the fear that permanent damage has been caused entailing loss of sexual power. With such patients it is only necessary to dispel this illusion in order to cure them. Another type that is commonly met with is the patient who has been brought up since childhood to regard anything connected with sex as something that is essentially unpleasant and wrong. Any sex urge that he may have felt prior to marriage has been sternly repressed, and even when he is married, although the taboo placed on sex may have been superficially removed, the old sense of guilt still persists in his subconscious mind and inhibits coitus. In order to cure such a patient a complete change in attitude towards the whole subject of sex must be effected. This may only be achieved with great difficulty, and the help of a skilled psychologist will almost certainly be required.

It is, of course, necessary to make sure that actual impotence exists before embarking on any treatment, as a patient may easily be wrong in his conclusions. I have seen more than one patient who has mistaken the outpouring of secretion from the secondary sex glands that takes place at times of sexual excitement for an emission of semen, and has persuaded himself that this denotes premature loss and impotence.

The Partner.—It may also be discovered in certain cases that the failure to consummate marriage is due to a mechanical obstruction in the passages of the female partner, and that normal coitus can take place when this has been dealt with. Less favourable are those cases in which the difficulty offered by the partner in marriage is not a mechanical but a psychological one. Impotence may be relative—that is to say, while remaining impotent with one partner the patient would be quite capable of consummating the sexual act with another. In some cases in which impotence supervenes some years after marriage, the explanation will be found in a transference of the patient's affection to some other woman. The patient himself may not be conscious that such a transference has taken place, and yet to the doctor the true state of affairs may be obvious.

As Freud has pointed out, for the complete realisation of the sexual life two "trends" must become fixed harmoniously together—namely, the sentiments of tenderness and of sensuality. Only too frequently the fusion of these two sentiments is incomplete, so that a man may find that in his marriage he is able to satisfy his sentiment of tenderness but not his sentiment of sensuality. The handling of such cases is fraught with difficulties and at the best only a compromise can be effected.

Allied to these is a large group of cases in which the sexual act can only be carried out provided certain conditions have been satisfied. The patient himself may not be conscious of the setting demanded for the successful carrying out of the act. The investigation of any dreams that are associated with nocturnal emissions or fantasies that have been held in the mind during masturbation may indicate the direction that further psychological research should take.

Adjuvant Measures

It will be seen, therefore, that the treatment of primary impotence is almost entirely psychological, and that not infrequently it demands knowledge that only a skilled psychologist is likely to possess. Other measures, although of secondary importance, are often useful. Whilst under treatment such patients should be forbidden to attempt intercourse, and, if possible, should sleep in a room by themselves. As a rule, it is advisable that the medical man in charge of the case should see the wife personally in order to explain to her the reason for this change, enlist her help, and, most important of all, prevent the arising of difficulties that are only too likely to have an unfavour-

able repercussion on the patient himself. In some cases it will be found that the mere forbidding of intercourse acts as a stimulus. Attention must also be paid to anything that affects the patient's general health, and he should above all be cautioned against overwork. It is a common delusion amongst such persons that they can return from their offices at the end of an exhausting day and yet retain sufficient energy to carry out an act which involves the expenditure of a great deal of emotional and nervous force. In those cases in which erections occur but are associated with premature ejaculation, benefit may result from the instillation of silver nitrate (grs. x to the ounce) into the posterior urethra through an Ultzman catheter and syringe. Electricity is useful chiefly on account of its suggestive action, and for this reason is more likely to be effective than aphrodisiacs. Tonics, cold baths, douches, exercises, diathermy to the prostate, injections of testicular extracts or other glandular products may all have stimulative value. In nervous patients and those who have completely lost confidence as the result of past failure a small quantity of alcohol taken before resuming sexual relations may produce the proper " devil-may-care " attitude that is essential to success.

Conclusion

The majority of patients who retain memories of many failures are likely to attempt coitus when the period of abstinence is at an end in a frame of mind that is almost certain to produce failure. The sexual act, instead of being a natural and almost mechanical reaction associated with a certain amount of pleasurable sensation and emotion has become for them a test at which they are almost certain to fail. The least subsidence of erection is noted and is taken as an omen of failure, and instead of pleasurable emotion there exists a state of anxiety and fear. For this reason the first coitus attempted after treatment is a critical period, and much judgment will be required on the part of the physician in charge to prevent disaster. The patient should be told that on no account must any deliberate planning take place as to when coitus shall be attempted. The act should be entirely spontaneous, and if better erections be present in the morning on awaking than at night—as is not unlikely—coitus should take place at that time. Moreover, an endeavour should be made to induce both husband and wife to regard the question of whether coitus is or is not achieved as of secondary importance, so that the element of anxiety may be reduced as much as possible. The fear of failure and the existence of a difficult situation between the two partners are both factors that militate against success, and must, therefore, be eliminated as far as is possible. Once the act has been achieved and confidence regained, the battle will have been won, and any artificial aids that may have been used during the period of preparation can be laid on one side.

XLVI

THE TREATMENT OF PLEURISY

By L. S. T. Burrell, M.D.Camb., F.R.C.P.Lond.,

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The frequency with which pleural adhesions are found during routine post-mortem examinations suggests that pleurisy is far from being an uncommon disease. Attacks of pain in the chest or shoulder are often due to pleurisy although they may not seriously affect the general health, and are considered by the patient to be the result of muscular rheumatism, growing pains, or indigestion.

In the great majority of cases pleurisy is due to the tubercle bacillus and it is better to consider the disease under two headings, non-tuberculous and tuberculous. First, however, I will discuss briefly a few general principles of treatment.

Principles of Treatment

1. *General Treatment.*—During the acute stage when the patient is febrile he should be kept in bed in a warm but well-ventilated room. The diet should be light but must depend on the state of the patient's digestion. If the tongue is clean and the digestion good a generous diet should be given, but if the patient has nausea and cannot digest food it is best to rest the stomach and give a very light diet until the desire for food returns. The bowels should be regulated, and it is wise to give a dose of calomel at the onset of the illness.

2. *Pain* can usually be relieved by strapping the affected side. The strips of strapping should pass from the vertebral column completely round the chest to beyond the sternum. They should be applied and drawn tight when the chest is in a state of expiration, and it is important to see that they are fixed evenly on the chest. This restricts the movements of the affected side of the chest and relieves pain, but it is not necessary to strap the chest unless there is severe pain.

Where there is very little pain or only a dull ache the application of antiphlogistine or thermogene wool is quite sufficient to relieve the pain, and the feeling of warmth produced is very

comforting to many patients. Aspirin or a mixture containing pyramidon and bromide will relieve the continuous aching pain of which some patients complain. If the pain is very severe a small quantity of air or oxygen should be introduced into the pleural cavity to separate the parietal and visceral layers of pleura; 200 c.cm. is usually sufficient to do this, and not only does it give immediate relief, but when the two pleural surfaces again come into contact the pain does not return, possibly because a layer of lymph forms over the inflamed surfaces. It is not therefore necessary to repeat the injection of the gas.

3. *Cough* is generally dry and useless, and if troublesome should be controlled by a linctus such as: morph. acet., gr. $\frac{1}{16}$; acid. nit. hydrocy. dil., ℥ii; glycerini, ʒss; aq. ad ʒi. If this fails a linctus containing heroin should be substituted.

4. *Fever.*—The temperature usually falls by lysis in a few days. If it persists one may suspect either the formation of an effusion or a spread of tuberculosis. It is unwise to try to control the temperature by drugs.

5. *Sleeplessness* may be due to pain, dyspnœa from effusion, or cough, and the treatment is to deal with the cause. If, however, the patient cannot sleep, and there is no apparent cause, omnopon, gr. $\frac{1}{3}$, given by the mouth, soneryl, grs. $1\frac{1}{2}$, or medinal, grs. 7, will usually give the patient a good night, but drugs of this sort should be discontinued as soon as possible.

Non-tuberculous Pleurisy

Pleurisy may be due to a variety of causes. It is not uncommon in the late stages of chronic diseases such as nephritis, and it often follows malignant disease of lung or adjacent organs. It may result from the spread of local inflammations such as pericarditis or pneumonia. In cases of pneumonia due to the pneumococcus there is always some pleurisy which usually heals as the pneumonia resolves. If, however, it leads to an effusion, the fluid formed is purulent and not clear, and we are not concerned with the treatment of empyema in this article.

Streptococcal pneumonia may cause a pleural effusion which is cloudy and opaque, like milk-and-water. These cases are very acute and often fatal, but it is better to aspirate than to resect a rib and drain the effusion. If the fluid re-forms after aspiration and the temperature remains high, the pleural cavity should be washed out with normal saline or a 1 per cent. solution of methylene-blue, and left as dry as possible. At the same time oxygen should be introduced into the pleural cavity to replace the fluid removed. The quantity of oxygen necessary must depend on the size of the effusion and the amount of fluid removed, but enough should be given to leave the intrapleural pressure between 0 and −5 cm. water. Good results are often obtained by these methods even in severe cases, but aspiration alone is usually quite sufficient in the milder cases.

When pleural effusion is due to nephritis or heart failure aspiration relieves the dyspnœa, and the removal of 15 or 20 ounces, especially in cardiac cases, will often make the patient much more comfortable. When the effusion is secondary to neoplasm it should be remembered that it will soon re-form after aspiration, and that there is no need to remove any fluid except to relieve pressure symptoms. In some conditions, such as endothelioma of pleura, the fluid forms very quickly so that it may be necessary to aspirate every day or even twice a day.

Tuberculous Pleurisy

Patients suffering from pulmonary tuberculosis always have some pleural involvement and are liable to recurrent attacks of pleurisy. But pleurisy often occurs in patients previously regarded as healthy, and in whom there has never been a suspicion of tuberculosis. If we regard such cases as due to the tubercle bacillus which has reached the pleura through the lung it follows that the patient is in grave danger of developing pulmonary tuberculosis. It has been estimated that over 40 per cent. of patients with so-called dry idiopathic pleurisy subsequently develop pulmonary tuberculosis. Of course a large number of patients with tuberculous pleurisy do not develop the disease in the lungs, but completely recover or are left with nothing more than some adherent pleura. There is, however, no doubt that the very great majority of cases of pleurisy are due to the tubercle bacillus, and treatment must therefore be directed to preventing the development of pulmonary tuberculosis as well as to curing the pleurisy. It is often said that tuberculosis of lung is one of the most curable of diseases if treated early enough. Here we have the disease in the earliest stage, and if later a definite and active lesion develops in the lung one cannot help feeling that it might have been prevented.

During the initial acute stage of pleurisy the patient should be put to bed and treated on the general lines already described; recovery is usually quick and uninterrupted.

Sometimes, however, a pleural effusion develops. The fluid is clear and straw-coloured; it contains but few cells, most of them being lymphocytes; tubercle bacilli are not found at first, but they appear in effusions which have persisted for three or four months; no other organisms are found. With the formation of fluid the pain disappears and the patient usually feels much better in himself although the temperature persists.

As soon as an effusion has been diagnosed it is safest to remove 5 c.cm. of the fluid for examination in order to make certain that it is not an empyema. If the fluid is clear and appears to be of tuberculous origin it will usually become absorbed in the course of a week or two, and it is better to allow a natural absorption than to aspirate.

Aspiration should be performed only if the effusion is so large

that it causes considerable dyspnœa or pressure symptoms, or if it is desired to convert the effusion into a pneumothorax. When more than 15 ounces of fluid are removed it is always best to replace it with air or oxygen, otherwise the sudden expansion is apt to set up an acute tuberculosis of the lung, and the rapid lowering of the intrapleural pressure may cause œdema of lung, faintness, or even sudden death. Oxygen should be given to replace the fluid if one wants the lung to expand in a day or so, but air is better if it is desired to maintain a pneumothorax. This should only be done if the lung shows signs of active tuberculosis.

In some cases where the fluid has taken a long time to absorb autoserotherapy has been performed. About 10 c.cm. of the fluid are drawn into a syringe, and the needle is removed from the pleural cavity, but before withdrawing it from the skin the fluid is injected into the subcutaneous tissues. I have seen no advantage from this procedure, but it is true that the removal of a few c.cm. of fluid for examination is often followed by the rapid absorption of the effusion.

When the patient has recovered from the attack of pleurisy or effusion it is very important to restore his general health and guard against the development of pulmonary tuberculosis. The patient has the right to be told of his danger and will have a very real grievance if he is not told, although one does not want to alarm him unduly. He should be advised to go through a course of training, living regularly, and combining periods of rest with a graduated and gradually increasing amount of exercise. This treatment can be carried out in a sanatorium better than anywhere else, and in no type of case is the value of sanatorium treatment seen to greater advantage. Some patients dread the word sanatorium, and others consider the suggestion of going there a personal insult. In most cases, however, the patient is only too willing to do anything to avoid becoming consumptive, and if it is explained that sanatorium treatment is advised not because he has consumption, but to prevent him from developing it, he will usually agree to that or at any rate to some similar course of treatment.

XLVII

THE TREATMENT OF LICHEN PLANUS

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Lichen planus may be of the most trivial import as regards its effect on the patient or may be one of the most distressing diseases. It may begin gradually and insidiously or acutely, but I do not think it ever disappears very quickly. At the outset, therefore, it is well to treat every case with caution, as it may be difficult to tell, even in the presence of an apparently mild case, whether one may not be confronted rather suddenly by a serious outbreak.

The treatment may be divided primarily into that aimed at suppressing the disease as a whole by measures which may be called constitutional, and the purely local measures designed to allay discomfort and disfigurement. As a matter of fact, there is some overlapping of these measures, since lichen planus is one of the diseases in which local traumatism determines in a striking measure the appearance of new lesions.

Constitutional Treatment

In determining the seriousness of the attack I think attention should be paid chiefly to the presence or absence of itching, and its degree when present. In the more moderate cases where itching is not extreme in its severity one may choose as the form of constitutional treatment the administration of drugs. Of these, two stand out pre-eminently—namely, mercury and arsenic—though opium and drugs of the phenazone group are often useful in addition. If the itching be fairly severe and the eruption be coming out acutely, it will be better to avoid arsenic and to rely on mercury, combined or not with one of the above-mentioned sedatives.

The time-honoured liquor hydrargyri perchloridi introduced by Liveing is extremely valuable and may be given in doses of ½ to 1 drachm three times a day. Of recent years, however, I have been greatly struck with the efficacy of the yellow mercurous (not mercuric) iodide, which may be given in doses of an eighth of a grain three times a day, preferably between meals.

If sleep is much broken a dose of opium, say, tr. opii ℥xv, may be given at night for a time.

As soon as the more acute phase of eruption and the irritation subside, this treatment may be changed, and arsenic substituted, and arsenic may also be used by the more experienced from the beginning, where itching is absent and the type of eruption not very fiery. It may be given as liquor arsenicalis (℥v, t.d.s., post cibos), and, in my experience, is as efficient in this way as in any other, unless the patient has an irritable alimentary tract and is unable to tolerate arsenic by the mouth. In this case one may resort to injection, and the most approved form of recent years is the drug known as acetylarsan. It may be given in doses of 3 c.cm. (equal to 0·7 g. of the salt) twice weekly, up to 15 injections.

In very severe cases, where itching is intense, sleep almost entirely lost, and the patient's condition threatening, I can confidently recommend the treatment introduced by Thibierge and Ravaut, of lumbar puncture and the withdrawal of from 6 to 8 c.cm. of the cerebro-spinal fluid. In almost every case in which I have used it the result has been dramatic and not infrequently the whole aspect of the case has changed within 24 hours, the maddening itching subsiding, and sleep being restored.

It should never be forgotten that the nervous condition is almost invariably unstable in severe lichen planus, and that insomnia not only distresses the patient but aggravates the eruption. I invariably keep my patients in bed for 48 hours after the treatment by lumbar puncture, but, as a rule, in a case severe enough to demand this form of treatment the patient should be kept in bed in any case.

Lastly may be mentioned, as having a somewhat similar effect, the radiation of the spine with X-rays, a pastille dose being given through an aluminium filter. Very strong claims have been put forward in favour of this form of treatment, but I have not used it, as it does not appear to be so rapid in its action as the withdrawal of cerebro-spinal fluid, and I feel that we are more absolutely certain that the latter does no insidious damage.

Local Measures

The local treatment of the more recent case depends on the form of the eruption. Where the typical plane papule is present alone I find that lotions act better than ointments, as the latter give a feeling of heat. I generally find either liq. picis carbonis 2 per cent. in lotio calaminæ, or the following lotion efficacious :

Phenol cryst. } Camphor }	āā ʒss.
Hydrargyri perchlor.	gr. i.
Pulv. tragacanth.	grs xv.
Sp. vini meth. industrialis	℥iv.
Glycerini	ʒi.
Aq. destill. ad	℥viii.

In some cases and at some stages the horny follicular papule is the chief lesion, and in such I find the following ointment useful :

Acid. salicyl.	grs. xxv.
Sapon. mollis	℥ii.
Ol. olivæ	℥i.
Adip. lanæ ad . . .	℥i.

This should be thoroughly rubbed in once a day and washed off before applying afresh.

Verrucose Patches

Lastly must be mentioned the verrucose patches usually seen on the limbs and chiefly below the knees. Such patches seem to have little or no tendency to spontaneous cure and may last for many years if untreated. Sometimes they are very irritable, at others merely disfiguring. Many forms of treatment have been recommended for them, and it is usually believed that constitutional treatment is without effect upon them, though I have seen them flatten down and disappear in a remarkable manner after lumbar puncture.

The local treatment recommended includes that by X-rays, by freezing with carbon dioxide snow, and even destruction with the actual cautery. All of these are unsuccessful at times, though one or other may occasionally succeed. Of recent years, however, I have had remarkable success by the following method. The patch is thoroughly rubbed in with the following ointment :

Phenol cryst. } Camphor } . . .	āā grs. xxv.
Ung. hydrargyri . . .	℥ii.
Adip. lanæ ad . . .	℥i.

An area larger than the patch is then covered in with zinc oxide strapping, which, of course, adheres only at the edges beyond the greased area, but keeps the whole area, as it were, locked up in a waterproof dressing. It should be renewed daily, and should it excite some inflammatory reaction it should be stopped for a time and the part soothed down with lead or calamine lotion, and then reapplied after the reaction has passed away.

XLVIII

THE TREATMENT OF INFANTILE CEREBRAL PARALYSES

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The treatment of infantile spastic palsies is frequently approached with an attitude of extreme pessimism which is probably unmerited. This is largely due to the existence of a considerable number of cases in which the prognosis is hopeless, and for which no effective treatment is possible. Nevertheless a large number also exist in whom there is a possibility of obtaining an extremely good result, provided that an appropriate line of treatment is adopted at an early age. It is therefore most important that the factors upon which the prognosis depends shall be clearly recognised.

The Outlook of Treatment

Certain features may be indicated which place the case beyond the reach of effective treatment.

(1) *Evidence that the disease is progressive.*—A small minority of them are manifestations of some condition such as amaurotic family idiocy, or combined degeneration of cortico-spinal and other tracts.

(2) *Presence of a profound degree of mental defect.*—Caution must be observed in making this diagnosis. It must be remembered that mental *retardation* alone is often present in these children, and that under favourable conditions considerable progress may be made in later years. The diagnosis of mental defect in the first three years of life is extremely difficult and uncertain when the picture is complicated by a coexisting motor disability. This significance should never be attributed to inability to talk; for practical purposes the symptom which renders them unsuitable for treatment is apathy, lack of desire to make movements or handle objects.

(3) *Persistent occurence of fits.*—A history of occasional fits in infancy is often obtained in children who have made excellent progress. But in those who suffer from repeated convulsions

persisting through the second year, the development of some degree of dementia is the rule ; it is commonly associated with an attitude of negativism which presents an equally insuperable barrier to treatment.

Two other types of case may be recognised, in which the prognosis is decidedly unfavourable, though an attempt at treatment should be made, as some improvement is possible : (1) in which choreiform or athetoid movements are present ; (2) in which a high degree of generalised muscular rigidity is present, sufficient to render active movement impossible. In this type nothing can be accomplished unless the spasm can be reduced by surgical means. This condition is not often found in cases which have received early treatment.

Excluding the patients who exhibit these symptoms, there remains a large number—the majority, I believe, of those who survive the first year of life—in whom the prognosis is by no means so gloomy, and whose future depends to a very great extent on the treatment and management which they receive. It is of the greatest importance that this shall be started during the first two years ; when this is done, one may confidently expect that almost all of them will be able to walk and make good use of their hands, while a large proportion of them will attain a degree of improvement which hardly falls short of complete recovery of function.

Prophylaxis

To cases of primary neuronic degeneration this does not apply, but the question may arise as to whether spastic paralysis may be averted in an infant whose condition at birth suggests intracranial hæmorrhage. A measure which inevitably suggests itself is lumbar puncture ; opinion is divided on its merits and demerits. It has been advocated from various motives ; to confirm the diagnosis, to relieve the intracranial pressure, and to minimise the effects of the hæmorrhage on the cortex and subcortical areas. In practice it usually leads to disappointment in all of these expectations. Moreover, the disturbance occasioned by the operation involves an element of danger to the infant. The safest prophylactic routine in such cases is to keep the infant at complete rest, avoiding all manipulation, and feeding from a medicine dropper to obviate the effort of sucking.

General Considerations of Treatment

The fact must be borne in mind that the defect is in the brain and not in the limb, and that treatment must be directed primarily towards the former. No form of passive treatment appears to be effective in preventing the onset of spasm and contracture, whereas some forms certainly aggravate it. Active movements performed by the child—whether purely reflex or to

some extent " volitional " is immaterial—are the only agents which seem to produce a really lasting effect on the tone and functional activity of the affected limbs. The exact process by which this improvement is brought about is not clear. It is impossible to expect development of function in the neurones which have been injured, or have degenerated. The possibility that new synaptic connexions may be formed, that other neurones may acquire the functions which the (as yet undeveloped) pyramidal tracts were intended to subserve, is an entirely hypothetical one, yet it is suggested by the remarkable recovery of function in the child as compared with the adult. The effect exerted by active movement in reducing spasm is probably accounted for by the inhibitory impulses (to antagonistic muscles) which are an essential component of the innervation of voluntary and reflex movement. Relative integrity of the cortical areas may be necessary for this improvement; in imbecile children active movement has been found to aggravate spasm.

Cerebral palsies are not always recognised at birth. It is common for cases of diplegia to be brought for advice in the second year, owing to the parent's disappointment at their inability to stand. The cortico-spinal tracts play so small a part in the infant's activity that there is little obvious abnormality in the earlier months. Hemiplegic cases tend to attract attention somewhat earlier, as the asymmetry is noticed by the parents. If at this stage of development, while behaviour is still to some extent controlled by infra-cortical centres, the child can be assisted to make habitual use of the affected muscles, contracture does not usually develop, and the results of the treatment are often remarkably satisfactory.

Measures directed to the limb.—The use of warm baths, or limb baths in older children, is at any rate rational, as some degree of relaxation takes place under the influence of heat. Massage and passive movements are frequently employed; I have never observed any good effect from them, but they are innocuous and may satisfy a parent who is clamouring for " something to be done." Unfortunately the parents' desires are often fixed on the one form of treatment that is absolutely contra-indicated and definitely harmful—i.e. electrical stimulation. It is most important to warn the parents at the start that this must never be permitted, and to explain to them that the muscles are already contracting too much, and that electricity will only make them contract more. I believe that the existence of so many permanently spastic children, which is responsible for the pessimism with which these cases are so often regarded, is due very largely to the widespread prevalence of this practice.

Methods of Initiating and Assisting Active Movement

(1) *During infancy.*—The number and extent of the motor activities developed by an infant are influenced considerably by

its habitual position. While the infant lies on its back, movements are comparatively few and aimless ; as soon as it sits up, new and more complicated ones develop with remarkable rapidity. A very constant symptom of cerebral palsy is delay in sitting, standing, and other " milestones " of infancy, and the acquisition of movements is greatly restricted thereby. The first step in the treatment is to get the child into a sitting posture, and the result of this alone is often very striking. In many cases it can be done by simply propping the child with pillows. In others, more often in the second year, spasm of the erector spinæ and glutei renders it difficult to keep the back and thighs flexed. The child may then be placed in a baby's chair with a sliding bar in front. A small pillow on the abdomen receives the pressure of the bar and maintains a position of flexion. In a surprisingly short time the muscles of the trunk adjust themselves to the new attitude, and the child is enabled to practise a number of new activities and will handle objects which he took little interest in while in a recumbent position. Similar attempts should be made at a later stage to combat the retardation in crawling and standing.

In *hemiplegic* infants, as soon as an increase of motor activity has been attained by these means, steps should be taken to develop the motor paths for the paretic limb. There is only one possible way of making an infant use an arm that is stiffer than its fellow, and that is to immobilise the sound one. The normal limb is bandaged to the chest for about half the day, and objects of interest are placed within reach of the paretic hand. If this is done in the early months of life the maximum result will be obtained, but this procedure is the essential therapeutic measure in the treatment of a residual hemiplegia at any age. The foot should be relieved of the weight of clothes. Occasionally a light splint is required at night, but it is usually best to avoid these during the first two years.

(2) *During later years.*—The immediate object is to get the child walking and to avoid any measures which wili necessitate remaining in bed. At the stage when the child is just unable to stand alone, a most useful apparatus consists of a wheeled frame with crutch supports which are adjusted to the axilla. After a few weeks of practice in the frame, the child is often able to support the weight of the body, but still finds difficulty in maintaining its balance. At this stage he can usually obtain sufficient support from the handle of a doll's perambulator in the front end of which some weights are placed. The first attempts at walking alone should be made on grass, so that the sufferer may not be deterred by painful tumbles. A horse-tricycle may also be of assistance in re-educating a paraplegic child, particularly if adductor spasm is present.

For *hemiplegic* children the immobilisation of the sound arm should be persisted in for part of the day, as long as there is a tendency to use that arm alone. At other times exercises should be devised and toys provided which encourage the use of sym-

metrical bilateral movements. The best of these is furnished by a wheel-barrow, fully loaded, which the child is encouraged to make use of without spilling the contents.

The range of passive movements must always be kept under observation. If this is restricted by actual contracture of any muscle-group, no good result can be obtained by attempts at active movement, and the assistance of the surgeon is required. One particular movement—supination—is especially difficult to establish, and often becomes restricted in a hemiplegic child in whom all other movements have been successfully developed. If the pronator spasm is dealt with by some measure such as Stoffel's operation, attempts at active movement may be resumed within a few days.

The limited experience which I have had of the results of sympathetic ramisectomy have not led me to regard it as a justifiable measure.

XLIX

THE TREATMENT OF DISTURBANCES INCIDENTAL TO EARLY MENSTRUAL LIFE

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It is of considerable importance to a girl that her guardians and medical adviser should realise that the menstrual function, from its onset, should be free from any disturbance of a pathological nature.

I will not refer to the physiological changes which take place at puberty, except to those which are sometimes treated as though they were abnormalities. The pathological disturbances may be considered under the following headings : Primary Amenorrhœa, Secondary Amenorrhœa, Dysmenorrhœa, Menorrhagia, Neurotic Disturbances.

Primary Amenorrhœa

It is sometimes difficult to decide if a case is one of primary amenorrhœa or of delayed development. If a girl has not begun to menstruate by her sixteenth birthday it is usual for the mother to seek advice. This delay in the onset need not in itself cause anxiety. In my experience the age of onset has varied between 8 and 19 years, and in both extremes normal womanhood has supervened. In all cases, however late the development, some growth, both in height and weight, has occurred for at least a year after the first menstrual period. This fact may be helpful in prognosis.

Before one is justified in reassuring the mother with regard to a girl over 16, in whom the menses have not appeared, the following particulars should be ascertained : 1. That the health is good. 2. That the secondary sexual characteristics have developed. 3. That growth is continuing, and that there is no sudden fall in the *rate* of growth, especially with regard to weight. 4. That there is no abnormality found on medical examination. This should include inspection of the hymen and a pelvic examination per rectum, by which any gross abnormality of the genital organs may be excluded. It must be remembered that atresia of any part of the genital canal may be the cause of apparent amenorrhœa.

If all these conditions are satisfactory it is important that

both mother and daughter should have their minds set at rest, and be told that no treatment is necessary. If, on the other hand, the girl is in good health, but growth appears to have stopped, or to be definitely diminishing in rate, a more serious view must be taken, and an attempt should be made to stimulate development of the generative organs by endocrine therapy. Treatment by small doses of thyroid substance (with or without anterior pituitary) or by multiglandular tablets, is sometimes followed shortly by further growth and the onset of the menses. But it seems impossible to know if, in these rare cases, the course of nature has been affected by such therapeutic measures, especially as it is not so very uncommon for growth to stop for a time and then to recommence without any medical interference. In cases where secondary sexual characteristics have not developed before growth has ceased, I have seen no sign of development of the sexual organs after prolonged treatment.

Secondary Amenorrhœa

In addition to the minor irregularities of periodicity so common during early menstruation I have noticed three types of secondary amenorrhœa in young girls.

Type 1, in which amenorrhœa, lasting six months or more, sets in after the first few periods. This is of frequent occurrence in children who begin to menstruate early—at the ages of 10, 11, or 12—and must be of developmental origin.

Type 2, in which amenorrhœa, lasting for three to nine months, occurs in girls in whom regular menstruation has been established for some years. This phenomenon is common in those who have experienced some change in environment. The same thing may occur after a shock or an operation on any part of the body, and is probably due to an upset of the endocrine balance due to emotional disturbances.

Neither of these two types of amenorrhœa is associated with anæmia or ill-health. No treatment is called for except to reassure a nervous patient.

Type 3.—The third type of amenorrhœa has a greater significance. It occurs too late to be of developmental origin and is not associated with change of environment. In young women of 17 or over in whom pregnancy, anæmia, tuberculosis, or other specific disease, both local and general, can be excluded, the onset of amenorrhœa, especially if it is associated with insomnia or other symptoms of neurosis, cannot but give cause for anxiety, since the condition is not infrequently linked with a morbid psychology and may even be a forerunner of insanity. These are cases in which glandular treatment may have a definitely beneficial effect. The administration of thyroid substance (a quarter or half a grain daily) and of small doses of multiglandular preparations has been followed by the recurrence of regular periods and an increase in the general welfare of the patient.

But relapses may occur if the treatment is discontinued and administration of the remedies must go on for an indefinite period.

Dysmenorrhœa

This term is here used to mean any suffering definitely associated with the menstrual period. Treatment in the first place should be prophylactic and the measures I would advocate are: (1) That all girls be taught that menstruation is a natural function and should not involve any pain or disability, and that no change need be made during the period in their ordinary habits with regard to baths and exercise or brain-work. (2) That school authorities be urged to rescind rules restricting the natural activities of children during menstruation, and that cycling, gymnastics, and games, such as hockey be allowed. (3) That employers of young women engaged in sedentary and standing occupations be urged to provide opportunity for daily exercise, such as drilling, the exercise to be continued throughout the period. This has proved to be of mutual advantage to employer and employed in factories.

When dysmenorrhœa has become established the treatment I adopt, after assuring the patient that her suffering is unnecessary, has a two-fold object: (*a*) To stimulate the circulation of the blood in order to relieve the hyperæmic uterus. The quickest means of doing this is a hot bath; the more lasting measure is vigorous exercise. (*b*) To direct the patient's attention from herself by providing interesting occupation. Hence games or active work are preferable to set exercises.

The most beneficial exercises are those involved in: picking up objects from the floor and placing them on a shelf above the head; kneeling and swinging the hands round alternately as if polishing the floor; squatting on the floor and bending to and fro, as in rowing; and standing and doing swinging movements, as in driving a golf-ball. All these movements can be executed in a small bedroom and if they are practised for 10 to 15 minutes daily for a week before the onset, and continued throughout the period, the pains will not develop or will be so slight as to be negligible. In severe cases the exercises may have to be repeated during the day. After three months they can generally be relaxed with impunity. For nervous patients it is useful to prescribe a sedative, such as tab. acetanilid co. (B.P.), to be taken thrice daily on the day preceding and for the first two days of the period. In no case do I consider that the operation of dilatation, with or without curetting, is justifiable treatment for dysmenorrhœa in a young girl whose generative organs are healthy.

Menorrhagia

Uterine hæmorrhage, severe enough to be called menorrhagia, is rare in young girls. The flow is sometimes rather excessive for

a few periods, and, until the normal loss is established, outdoor games and sports during the period must necessarily be restricted; but they should be replaced by exercises at home suited to the severity of the condition. The exercise in the kneeling position is useful for this. In cases of true menorrhagia, where the periods, previously normal, have become persistently prolonged and the flow excessive, the cause in young girls is generally a toxæmia. A septic focus should be looked for and can often be found in adenoids, tonsils, or teeth, or in a chronically infected appendix. Severe constipation may be the sole cause of the trouble even when regular evacuations are reported.

Neurotic Disturbances

The occurrence of irritability, increased emotionalism, depression, and other symptoms of nervous instability during the menstrual period has, I think, been over-estimated. These symptoms are certainly rare among girls who are expected by their elders to remain well during the period, and are often only detected by those who expect to find them. It is found that teachers who have not been informed are not, except in rare instances, able to detect when their pupils are menstruating. Nevertheless this type of neurosis certainly exists, and the victims can generally be cured by what might be called "verbal treatment." I have usually found it successful, and there is no doubt that in many the nervous disturbance has in the first place been induced by suggestion. Who would not be depressed on being told, at the age of 13, that, in future, she would be an invalid for three days every month? Prevention is therefore in most cases dependent on a sensible upbringing. When there is pain or discomfort the presence of neurotic symptoms is not surprising and the treatment for both conditions is the same—namely, employment in some interesting active work or game. It is for the purpose of discouraging introspection, which leads to these neurotic states, that I advocate outdoor games or active work rather than set exercises as a cure for menstrual disorders.

L

THE TREATMENT OF DIVERTICULITIS OF THE COLON

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Observations of recent years have shown that the occurrence of diverticula of the large intestine ("diverticulosis") is comparatively common, and that these diverticula become inflamed and give rise to a variety of pathological and clinical conditions. The diverticula are hernial protrusions of the mucous membrane through the muscular coat of the bowel, and they may project from its peritoneal surface or may be hidden in the fat between the layers of the mesocolon or in appendices epiploicæ; they are usually present in large numbers and affect most commonly the pelvic colon, but they may also be found with some frequency in the descending colon and in the transverse colon to the left of the middle line.

Pathological Changes

Diverticulitis is essentially a disease of later middle life, between the ages of 45 and 65; the condition is commoner in men than in women and affects fat people more often than thin. Many of the patients suffer from chronic constipation, and it is likely that the resulting distension of the colon plays some part in the development of the hernial protrusions. The openings of the diverticula into the lumen of the bowel are very small, and they may easily be overlooked even at a post-mortem examination.

Illness associated with the presence of diverticula is generally caused by inflammation of their walls and of the tissues with which they are in contact. There may be retention of fæcal material in the diverticula, causing spasm of the colon; infection causing small abscesses in the wall of the bowel; or perforation leading either to diffuse peritonitis or a localised abscess or fistula. Such fistulæ may communicate with the surface of the body, with the bladder, or with other parts of the bowel. In another class of cases chronic inflammation leads to great thicken-

ing and sclerosis of the affected loop of colon, closely simulating carcinoma and causing partial or complete intestinal obstruction. There is some evidence to suggest that carcinoma is liable to develop in a segment of gut affected by chronic diverticulitis.

Varieties of Clinical Picture

As the result of these pathological changes a number of clinical pictures may be produced and diagnosis may be difficult and delayed until a late stage of the disease, not only because the condition is insidious but also because it simulates a number of more common diseases. The clinical varieties most often seen are: (*a*) attacks of subacute inflammation associated with temporary spasm of the colon; (*b*) the formation of a localised abscess in the pelvis or left iliac region; (*c*) the development of an external fistula in the left iliac region; (*d*) diffuse perforative peritonitis; (*e*) involvement of the urinary bladder, by adhesions, cystitis, or the formation of a vesico-colic fistula; and (*f*) chronic and acute obstruction of the colon.

(*a*) *Attacks of subacute inflammation.*—The patient, who perhaps has noticed an increasing tendency to constipation, is seized suddenly with pain of moderate severity in the left lower quadrant of the abdomen, referred in some cases to the perineum, groin, or penis. The pain is spasmodic in character and increases in severity during the first few hours; it is made worse by exercise, and particularly by jolting—a somewhat characteristic symptom. The bowels are confined and the temperature rises to between 99° and 100° F. If the patient lies up and the bowels are cleared the first attack will, as a rule, subside within a week and leave him apparently in his usual good health.

Palpation of the abdomen in the early stages of the attack will reveal tenderness and possibly slight rigidity above the pubes just to the left of the middle line. On bimanual examination a tumour can be felt, usually about the size of a small orange, high in the pelvis, and sufficiently movable to allow of its being pushed down on to the finger in the rectum; it is tender to the touch below as well as above. Active movements of the hip may elicit pain. If the attack subsides without the formation of an abscess the tumour gradually shrinks and usually becomes impalpable within ten days.

In the diagnosis of early cases X-ray examination is often of great value. Two observations may be made: (1) A barium enema sometimes reveals a narrowing of the lumen of the gut for two or three inches in the inflamed and spasmodic area, the film even showing no barium here though the colon above and below is filled. (2) A barium meal may show numerous diverticula extending up the descending colon, which appear as small opaque areas about the size of peas, persisting after the main bulk of the barium has been evacuated. On the other hand, a negative X-ray finding does not exclude diverticulitis, for the barium in

the pelvic loop or rectum may mask the defect, and it is sometimes only on repeated examinations that the barium will enter the diverticula, because of the small size of their mouths, and because they may already be loaded with stiff fæcal material. Sigmoidoscopy is of little value in the diagnosis of diverticulitis, except in some cases by excluding new growth. The thickened inflamed loop does not allow the sigmoidoscope to approach it easily, and the openings of the diverticula into the bowel are so small as rarely to be visible.

During the attack the patient must be kept in bed on a light diet with plenty of fluids, and the contents of the large intestine must be liquefied as early as possible by large doses of a saline aperient; the bowel should be washed out by simple enemata, which must be given slowly and carefully, as they are apt to cause pain, and any sudden tension would be dangerous. After the attack has subsided further trouble may be warded off by the initiation of a régime which should be continued indefinitely. This has two main objects—the production of a bulky food residue in the colon and at the same time the reduction of this residue to a liquid form, of about the same consistency as that usually present in the small intestine. For this purpose an ounce of liquid paraffin should be taken three times a day and may be expected to produce two or three loose actions of the bowel daily. Should the patient at any time become sufficiently constipated to form a hard stool he should at once take a large dose of a saline purgative so as to produce watery motions. Any carelessness in this respect is likely to be at once followed by another attack of inflammation, which may go on to the formation of an abscess. As to diet, the patient must carefully avoid all fruits which contain small seeds (and these unfortunately are the most attractive to many people), such as figs, currants, strawberries, raspberries, and gooseberries; the seeds of these are small enough to enter the tiny mouths of the diverticula and produce inflammation. The foods that produce a bulky residue and prevent spasm of the colon are to be encouraged, such as brown bread, oatmeal porridge, and vegetables.

(*b*) *Abscess formation.*—Any attack of diverticulitis may go on to perforation and the production of a localised abscess, which will usually be situated either on the left side of the pelvis or in the left iliac fossa. Such abscesses require drainage, and this will usually be followed by a temporary fæcal fistula; the operation wound of the abdominal wall may be expected to become heavily infected, and the incision therefore should as far as possible be planned to allow for this, a short oblique or transverse cut being much preferable to a vertical one.

(*c*) *Fistulæ* in the left iliac or hypogastric region not only follow the drainage of an abscess, but may open spontaneously. In such cases a transverse colostomy will usually be necessary, but sometimes it is possible to short-circuit the affected segment of colon.

(*d*) *Acute diffuse peritonitis* from the perforation of a diverticulum or the rupture of a peri-diverticular abscess is the most dangerous complication of the disease, for the patients collapse rapidly from the severity of the toxæmia. They are not able to withstand a prolonged operation, and gas-oxygen and local anæsthesia are strongly indicated. The peritoneum must be drained, and, if the patient's condition will allow, it is advantageous at the same time to perform a colostomy above the site of the perforation.

(*e*) *Vesical complications.*—Diverticulitis of the pelvic colon not uncommonly involves the bladder, adhesions between the two viscera and the migration of bacteria from the colon causing chronic cystitis, with pyuria and frequency of micturition, and acute exacerbations from time to time; considerable general debility and cachexia are usual. In such cases the intestinal symptoms and signs may very easily be masked by the more obvious urinary ones, but a careful bimanual examination is likely to reveal the presence of the typical inflammatory tumour. If a vesico-colic fistula forms the patient will pass fæcal material per urethram, and his condition will rapidly deteriorate; cystoscopy is made difficult by the heavy infection of the bladder, but it may be possible to see the fistulous opening in its wall and to distinguish it from a malignant fistula by its more clean-cut edge. Where there is merely intermittent cystitis from adhesions this may be cleared up by initiating the régime of diet and aperients laid down above and by the administration of urinary antiseptics. For a vesico-colic fistula a colostomy should be performed.

(*f*) *Chronic and acute obstruction* resulting from diverticulitis are often indistinguishable from the forms due to new growths, and it has in fact been shown that a number of tumours due to diverticulitis have been excised in the belief that they were cancers of the colon. A diagnosis of diverticulitis as the cause of chronic obstruction—with diarrhœa, alternating constipation and diarrhœa, or constipation alone—may be suggested by a history of attacks of recurrent spasm and inflammation over a period of years. The symptoms of actual obstruction may be of longer standing than would be likely in a case of carcinoma; there is less cachexia, bleeding is less common, and a tumour is more often to be felt, slightly tender, movable, and usually as big as an orange. The presence of so large a mass without fixation would be strongly in favour of diverticulitis as against new growth. The treatment of such a case is to short-circuit the site of obstruction, if it is sufficiently high to allow this; for instance, for obstructive diverticulitis of the left half of the transverse colon the proximal part of the transverse colon may be joined up to the pelvic loop, and for obstruction at the upper part of the pelvic colon the transverse colon may be anastomosed to the lower part of the pelvic colon. If, as is often the case, the inflammatory mass is too low to allow of a short-circuit, a colostomy must be performed.

When diverticulitis causes acute obstruction the symptoms are those typical of obstruction of the large intestine; there is much distension, late vomiting, and the cæcum is palpable when in peristalsis, whilst it may be possible to feel the mass formed by the inflamed loop of bowel. For such patients a colostomy will usually be necessary, but occasionally they are fit enough to stand a short-circuiting operation; in this case it is advisable as a precaution to perform a temporary cæcostomy at the same time.

Fortunately, after drainage of the colon above a mass due to diverticulitis the lumen of the bowel at the site of the obstruction tends gradually to be restored, and a vesico-colic fistula will close; so that in some instances it is possible later on to close the colostomy. The bowel does not usually recover its lumen in less than three years, and in deciding whether the time has come to close the colostomy an X-ray examination will, of course, be of great help. After such an operation the patient must carry on the régime described for early cases.

LI

THE TREATMENT OF HEAD INJURIES

By Hugh Cairns, M.B., B.S.Adel., F.R.C.S.Eng.,
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I.—General Management

The treatment of head injuries causes more anxiety than almost any other emergency of practice, and in the early stages prognosis is quite uncertain. Each case differs from the last in the manner of its evolution, and successful management depends on close and continuous observation of the signs during the period of danger, and on a clear understanding of the many pathological processes that may be set in train.

Emergency Treatment

We are called, let us say, to treat a head injury shortly after the accident has occurred. The unconscious patient has been removed to the nearest shelter. A hasty examination is made to answer the following questions: (1) Is the patient collapsed? (2) Is there bleeding from the scalp? (3) Are there any fractures of the limbs? At this stage the patient is interfered with as little as possible, and if he shows signs of collapse it may be necessary to delay his removal to hospital for an hour or so, until his pulse has rallied. Stimulants are to be avoided; the state of concussion is one which tends towards spontaneous recovery, and any artificial stimulation of the blood pressure is likely to increase the risk of subsequent intracranial hæmorrhage. Cases which at this stage are showing signs of increasing collapse are inevitably fatal.

The patient is kept warm and is placed in such a position that his breathing is free. Bleeding from a lacerated scalp can be easily controlled by digital compression of the scalp against the intact part of the skull on each side of the laceration, if necessary at considerable distance from the wound itself. This is a matter which can be delegated to lay assistants after slight tuition. Tourniquets for the scalp are less satisfactory than pressure by the fingers, for they are apt to slip.

It is of great importance that the patient should be removed to a hospital or nursing home rather than to his own house. It is impossible to foretell at this stage whether an operation will later be required. Moreover, in hospital it is more easy to make the systematic observations that are necessary for the successful management of each case, and to enforce the prolonged rest in bed on which complete and permanent recovery so often depends.

Systematic Observations

Apart from the care of open wounds of the head, which will be considered later, the treatment of a patient who is suffering from a recent head injury is at first essentially conservative. He is placed in a warm bed in a room free from noise, and the following observations are made :

(1) The state of consciousness. If the patient is unconscious the depth of coma should be investigated by noting the pupillary and corneal reflexes, the response to pin-prick, the flaccidity of the limbs and so forth.

(2) The state of the pulse, temperature, respiration, and blood pressure.

(3) The size and reaction of the pupils.

(4) The sensation and, if possible, the movements of the limbs and face.

These observations should be made every hour, and the facts noted should be committed to paper at the time.

It is well to remember that an unconscious patient bearing the marks of a head injury is not necessarily suffering from the effects of head injury. In hospital practice, especially, a number of other conditions frequently masquerade as head injury—notably cerebral hæmorrhage, ruptured cerebral aneurysm, cerebral thrombosis, and acute alcoholism. Moreover, the irritability of a patient with severe traumatic intracranial hæmorrhage may closely simulate that of acute alcoholism. For the differentiation of these conditions lumbar puncture is of definite value. Blood is rarely absent from the cerebro-spinal fluid in severe intracranial trauma.

Though fractures of the skull are often absent and always relatively unimportant in head injuries, and though their discovery may even be confusing if it is not borne in mind that the greatest damage of the brain is apt to be, as a result of contre coup, on the opposite side of the head, it is nevertheless advisable that skiagrams of the skull should be taken. Occasionally they give information which is of immediate value, but their chief importance is medico-legal. X-ray examination is best made as soon as the patient is admitted to hospital and before he is put to bed, as undue movement is in this way avoided.

The Classification of Cases

During the period of observation it is necessary to make some estimate of the type of case being dealt with, in order that a rational line of treatment may be pursued. It will be found that each case can be assigned to one or other of the following groups.

(*a*) *Fatal Cases.*—In some cases deep coma is maintained from the moment of injury; while the respiration grows more stertorous, the pupils become dilated and inactive, and the blood pressure and temperature mount rapidly These signs indicate a greatly raised intracranial pressure, due to damage of the vital centres that we are powerless to repair. Such cases are invariably fatal. Operation, it should be emphasised, is of no avail in this type of case.

(*b*) *Mild Cases.*—In other cases it soon becomes evident that recovery is taking place. The initial unconsciousness is of short duration and is followed by a stage of reaction, in which the patient is apt to be extremely irritable and liable to sudden attacks of vomiting. There is severe headache. These are cases of mild concussion and contusion, and they are treated conservatively by methods to be described later.

(*c*) *Doubtful Cases.*—There is another group of cases in which the issue remains for some time in doubt. For a day or more the patient remains unconscious, or shows periods of semi-consciousness alternating with periods of actual coma. These are cases of severe contusion and laceration of the brain with secondary œdema. There is a moderately severe and sustained rise of intracranial pressure. Treatment is carried out on conservative lines, unless there are persistent focal signs to indicate an area of local contusion for which operative decompression will be of value.

Other doubtful cases are those which show what is known as the "lucid interval." The patient recovers partially or completely from the unconsciousness of concussion, but, after a lucid interval of variable duration, lapses once more into coma. In this category also are those cases in which the patient is only dazed at the moment of injury and is able to walk up to hospital, but then becomes unconscious. The lucid interval is an indication that the compression, or rise of intracranial pressure, which produces the secondary state of unconsciousness, is due to gradually accumulating intracranial hæmorrhage, such as hæmorrhage from the middle meningeal artery, or to a gradually developing cerebral œdema, rather than to actual damage to the brain at the time of the injury. It is not always easy to know, after a patient has recovered from the initial unconsciousness of concussion, whether he is merely drowsy or whether he is passing into the coma of compression. Here we are guided by our systematic observations; the onset of compression is

associated with slowing of the pulse, rise of temperature, and, most important of all, with a rise of blood pressure.

Those which show the lucid interval call for operation more than any other cases of head injury, with the exception of those in which there are compound fractures of the vault of the skull. Conservative treatment may be tried for a short time if the rise of intracranial pressure is not rapid, but should be immediately abandoned for operative treatment if it meets with no success.

Prevention of Infection

While an attempt is being made to ascertain the extent of injury to the brain the spread of infection to the brain through open wounds must be prevented. Compound fractures of the vault of the skull call for immediate operative treatment, in a manner to be described. A leakage of blood or cerebro-spinal fluid from the nose or ears is presumptive evidence of an open wound through fracture of the base of the skull. In such cases also there is risk of meningitis. The external ear should be gently swabbed out—*never syringed*—with a mild antiseptic, such as perchloride of mercury 1/1000, and the auditory canal should be lightly plugged with a pledget of gauze, soaked in similar solution, which is changed every hour. For a leak of blood and cerebro-spinal fluid through the nose all that can be done is to keep the anterior nares free from clot. Urotropine, grs. x t.d.s., should be given by mouth whenever meningitis is feared.

LII

THE TREATMENT OF HEAD INJURIES

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II.—Conservative and Operative Measures

In the stage of reaction from concussion the patient is apt to be extremely irritable, seeking to get out of bed. His bed can be put against the wall and the bed-clothes may be firmly pinned down, but other forms of mechanical restraint should be avoided, as they only tend to increase the irritability. Skilled nursing does much to control a patient in this stage, and it is important to remember that irritability is often in part produced by a full bladder or full rectum. The room should be darkened, for there is great photophobia.

Morphia should at all costs be avoided; it depresses the respiratory centre, sometimes excites the patient, and may mask a relapse into unconsciousness. For the severe headache that always accompanies recovery of consciousness potassium bromide and chloral hydrate may be given in large doses by the mouth (āā grs. xx every four hours) or by the rectum (in twice this dose), whilst hypertonic salt solution is of great value.

Hypertonic Salt Solution.—The administration of hypertonic solutions of salt forms a definite recent advance in the treatment of head injuries. As was originally shown by Weed and McKibben, the salt promotes resorption of cerebro-spinal fluid and thus lowers the intracranial pressure. It is used in head injuries to combat the rise of intracranial pressure that invariably follows the injury, and it has proved of great value in relieving the headaches and irritability which are associated with that rise, and in lessening the stupor produced by cerebral œdema. For mild cases 6 oz. of a 25 per cent. solution of magnesium sulphate can be run slowly into the rectum twice a day, fluids by mouth being at the same time restricted. If the magnesium sulphate is not retained in the rectum it can be given by mouth or even by stomach-tube. It is surprising how little diarrhœa is produced by large doses of the drug. In severe cases 70 c.cm. of a 15 per cent. solution of sodium chloride, or a similar amount of 50 per cent. glucose, can be given slowly by the intravenous route. The

glucose must be chemically pure. In using sodium chloride care must be taken that the solution is injected only into the vein, for if any escapes into the subcutaneous tissues it is apt to produce local necrosis.

Lumbar Puncture.—Another method of reducing intracranial pressure in head injuries is to withdraw cerebro-spinal fluid by lumbar puncture every two hours. The fluid should be withdrawn slowly and the amount to be removed should always be controlled by manometric readings. The method is open to the objection that it disturbs the patient considerably, and for this reason, whenever possible, the use of hypertonic salt solutions is to be preferred.

Treatment by Operation

1. *Compound Fractures of the Vault.*—Open wounds call for immediate treatment in order to prevent infection, which may give rise to meningitis, extradural or cerebral abscess, or osteomyelitis of the skull. As soon as his condition permits the patient is removed to the operating theatre. The scalp is shaved for a wide area around the wound and is carefully cleaned with antiseptic. Local anæsthesia (a solution of 1 per cent. novocain) should be used whenever possible.

If the edges of the wound are dirty they should be excised. All fragments of dirt and hair are removed and the underlying bone is carefully examined. A fissured fracture requires no surgical treatment, and when the wound has been thoroughly cleaned the scalp may be closed by primary suture. On the other hand, if there is the slightest overlapping of the edges of the fracture, a small trephine hole should be made so that the under surface of the fracture may be examined. The reason for this precaution is that at the moment of injury fragments of dirt may be pressed in between the broken edges of the skull and may become entrapped between skull and dura after rebound of the bone. Areas of bone which are obviously depressed should be elevated, but first it is necessary to get a good exposure so that the process of elevation may be carried out under direct vision. This precautionary measure is necessary because dislodgement of a sharp edge of bone may damage the blood-vessels of the cerebral cortex and dura, and thereby occasion severe hæmorrhage. All dirty fragments of bone should be removed. The osteomyelitis of the skull, which may develop if this procedure is neglected, is apt to be a most intractable condition.

The dura is then inspected. If intact, it is on no account opened; if it has been torn, the underlying brain is examined, fragments of clot and dirt are gently removed, and the dura is closed, a fine rubber drain being placed on its outer aspect. It is usually possible to remove the drain within four or five days. After operation for head injuries, the patients, being still in a condition of irritability, often seek to pull off their bandages.

It is therefore advisable always to reinforce the soft dressings with a bandage of starch or plaster-of-Paris.

Antitetanic serum should be given at the time of the operation.

2. *Simple depressed fractures* should be elevated within a few days of the injury, because if left they are liable to produce intractable epilepsy. In children they can easily be detected by palpation of the head; in adults, however, they may be closely simulated by hæmatoma of the scalp. When the diagnosis is in doubt it is well to remember that simple depressed fracture is uncommon in adults, so that an apparent depression of the head over which the skin is intact is in all probability a depression in the centre of a hæmatoma. The diagnosis, never immediately urgent, can always be settled by good stereoscopic skiagrams.

To elevate a depressed fracture a scalp-flap, erring on the liberal side, is turned down over the depression. Elevation of the bone should be carried out gently, for it is often followed by sharp hæmorrhage from the underlying meningeal vessels. The bone should be replaced.

3. *Relief of Cerebral Compression.*—When, in cases which have shown the "lucid interval," the intracranial pressure is mounting in spite of hypertonic solutions, and operation has thus become necessary, the question arises as to the situation and manner of exploration. Osteoplastic operations are rarely required. Having regard to what can be achieved by operation, and recognising the need of reducing operative interference to the minimum, it may be said that all we are capable of doing can be done through a simple subtemporal decompression. The side to be explored is determined by the neurological signs. Inequality of the pupils is particularly valuable in this connexion, for experience has shown that, if one pupil is dilated and fixed while the other is contracted, exploration should always be made on the side of the dilated pupil, even in the presence of apparently contradictory paralytic signs. There should, however, be no hesitation in exploring both subtemporal regions in doubtful cases.

Through a linear incision in the direction of its fibres the temporal muscle is divided and retracted. When the underlying bone is removed blood-clot may be encountered, resulting from that comparatively rare condition, rupture of the middle meningeal artery. The clot is removed (suction is the best method) and the artery, if still bleeding, is stopped by means of a silver clip or by bone wax. Whether extradural clot has been found or not the dura should be opened. Clot may be encountered on the surface of the brain and should be gently removed. More often, on opening the dura, no clot is found, but there is an escape of blood-stained cerebro-spinal fluid in unusually large amounts. In this type of case there is presumably a severe cerebral œdema and possibly some disturbance of the mechanism of absorption of cerebro-spinal fluid. These cases usually do well after decompression.

4. *Cerebral Contusion.*—Whether he be unconscious or not, a

patient who shows persistent localising signs, such as hemiparesis, astereognosis, or aphasia, should be treated by operation. These signs usually indicate a circumscribed area of cerebral contusion. By decompression at or near the site of contusion the process of recovery is hastened and probably rendered more complete. Usually a subtemporal decompression on the corresponding side suffices to relieve the symptoms of contusion and it has the advantage over decompression at the site of contusion that the resultant defect in skull and dura is protected by muscle, and is therefore less liable to disturb the patient in after life.

Prolonged Rest

In all head injuries that have been severe enough to produce distinct concussion it is of the utmost importance that the patients should take complete rest in bed for two or three weeks, or even longer, after the accident, according to the severity of the original injury. By so doing they provide the right conditions for repair of the injured brain and run the least risk of developing distressing and debilitating sequelæ.

LIII

THE TREATMENT OF THE SEQUELS OF HEAD INJURY

BY

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It is not within the scope of this article to treat of all the manifold disorders that may follow injury to the head—conditions as divergent as the rare traumatic diabetes insipidus and the common facial palsy. Attention will therefore be confined to the more common sequels, and to those whose treatment may become a matter of urgency, even at a time remote from the day of injury.

Persistent Cerebral Contusion

A rational treatment of persistent cerebral contusion can be based only upon a knowledge of its pathology, which we owe largely to Trotter.

Owing to the rigidity of the cranium the volume of the intracranial contents is constant. A limited swelling of the brain can be accommodated at the expense of the cerebro-spinal fluid, but any further increase in size must lead to compression of neighbouring veins and capillaries. A localised cerebral contusion, such as is produced by a blow or a fall upon the head, is characterised by small hæmorrhages and extravasation of blood plasma from damaged vessels. In any other part of the body these products of injury would quickly be removed by way of the blood-vessels and lymphatics. Owing, however, to the unique position of the brain within the rigid skull, the œdema impedes the circulation in its neighbourhood and so prevents its own absorption. Consequently, the contusion may persist unchanged for months or years, giving rise to distressing symptoms of which the most prominent are paroxysmal headaches, often of great

severity, attacks of giddiness, and mental disturbances, such as irritability, nervousness, and inability to concentrate. Treatment in such cases is directed to breaking the vicious circle upon which the persistence of the contusion depends and so permitting the absorption of the exudate.

Many cases of persistent cerebral contusion can be prevented if the injury, however slight, is adequately treated in the acute stage. Treatment of the late cases is based upon the same principles. Rest in bed is the first essential and the patient should be forbidden to get up for any purpose. Sometimes the headaches, which are apt to be most severe in the early morning, can be prevented by the patient's learning to sleep sitting up with his head and shoulders supported upon pillows. Hypertonic saline solution is administered, preferably intravenously, the dose being 70 c.cm. of 15 per cent. sodium chloride solution, slowly injected. Several such injections may be given at intervals of four or five days if necessary. Alternatively, six ounces of a 25 per cent. solution of magnesium sulphate may be administered by the mouth or by the rectum once or twice a day, the patient's intake of fluids being restricted meanwhile ; but in our experience the intravenous route is the most effective. The usual analgesic drugs may of course be used in addition, if necessary, for the relief of headache.

Cases of persistent cerebral contusion which fail to respond to treatment with hypertonic solutions require surgical interference. Inasmuch as there are usually no localising signs and the object of operation is to relieve a rise of intracranial pressure rather than to deal directly with a focal lesion, the operation of choice is a right subtemporal decompression. In the event of focal symptoms being present it is wise to do the subtemporal decompression on the affected side. If it is thought advisable to inspect the site of contusion an osteoplastic flap may be combined with the subtemporal decompression.

A new method of treatment for persistent cerebral contusion has recently been introduced by Wilder Penfield.[1] In a case presenting the classic symptoms of persistent cerebral contusion Penfield introduced air into the subarachnoid space in the lumbar region for the purpose of diagnostic radiographic studies. He found to his surprise that within a few days the patient was completely relieved of symptoms, and these did not recur in the ensuing five years. Subsequently he treated six other cases by injecting air in amounts up to 100 c.cm., with remarkable success. The air floats to the uppermost part of the subarachnoid space and can thus be manipulated, by arranging the position of the head, to the region where the headache is most intense. In this region pneumograms have frequently shown subarachnoid or subdural cystic collections. The explanation of the relief of the

[1] Penfield, Wilder, *Surgery, Gynecology, and Obstetrics*, December, 1927, p. 747 ; see also *The Lancet*, 1927, ii. 1401.

headaches is not yet clear, but the method appears to open up an important field in the pathology and treatment of post-traumatic headaches. The reader is referred to Penfield's paper for the technique of lumbar insufflation. We would point out that the method is still in its infancy and that it should only be used after most careful consideration and with all the precautions that a major surgical operation demands.

Traumatic Neurasthenia following Head Injuries

By traumatic neurasthenia we understand a state of anxiety neurosis which occurs in the absence of, or outlasts recovery from, an organic lesion produced by an accident. It is especially prone to follow injuries of the head since the potential seriousness of head injury is well known to the laity. It rarely occurs if the injury be so severe that its disabling effect is undeniable and, as Buzzard says, it hardly ever develops unless the patient is able to fix the responsibility for his accident upon someone else. This statement, however, is liable to misinterpretation unless it is further analysed.

The treatment of traumatic neurasthenia depends entirely upon a sympathetic understanding of its ætiology. In order to make this clear it will be helpful to trace the development of the condition in the imaginary case of a head injury sustained by a workman in the course of his employment.

A labourer while at work is struck on the head by a falling object and sustains a moderately severe concussion from which in other circumstances he would have recovered in a few days. On receiving his injury he is taken to hospital, where he is told by the doctor that he has had a narrow escape from a fractured skull. From his friends, who comment on his ill appearance, he learns that his accident was due to the carelessness of a fellow workman. His employers acknowledge their responsibility to the extent of allowing him half-pay. As a wise precaution against sequelæ he is kept in bed for three weeks and on getting up he naturally feels weak. He now begins to fear that he will not be well enough to return to work for some time. In view of his family responsibilities this excites in him a natural anxiety which intensifies his feelings of weakness. On returning home he feels somewhat better, but owing to lack of exercise he is out of training for heavy manual work. He inquires if his firm can give him a light job and is told that this is impossible and that he must wait till he is quite well before resuming work. This intensifies his anxiety, for he fears that if he returns to work and breaks down he will have sacrificed his half-pay and his earnings will cease. If, on the other hand, he remains at home indefinitely he knows that sooner or later his compensation will come to an end. He has by this time developed a definite anxiety neurosis as a direct result of the situation in which he finds himself. It is unnecessary to trace the familiar

story further in detail. Ultimately the man is medically examined on behalf of his employer and usually he is pronounced fit for work, and his compensation is withdrawn. He now embarks on litigation which further harasses him, threatening increased expense if it fails and rendering any retreat from his claim morally impossible. Finally his case is decided and, strangely enough to the superficial observer, whether he wins or loses his suit he speedily recovers from his neurosis, thereby confirming the cynic in his opinion that traumatic neurasthenia is merely a mercenary form of malingering. This, however, is an unjustifiable conclusion. The decision of the case cuts the Gordian knot by throwing the patient back upon his own responsibility. He has no longer anything to lose by partial recovery, which therefore ceases to be in itself a source of anxiety to him, and he rapidly recovers completely.

It is evident that traumatic neurasthenia is in its later stages, especially when complicated by litigation, temporarily incurable. It is, however, eminently preventable and, when it first develops, quite amenable to treatment. In dealing with industrial accidents and accidents involving possible claims for compensation every care must be taken, consistent with adequate treatment of organic lesions, to avoid suggesting incapacity to the patient. As soon as he gets up his symptoms must be explained to him and if there is no organic lesion present he must be told that any weakness or giddiness he may feel are the natural results of confinement to bed and will soon pass off. Positive suggestions of speedy recovery must be made. At the earliest possible moment physical exercises should be begun for the double purpose of restoring the patient's capacity for manual labour and inducing a feeling of well-being, one of the most powerful psychological aids to recovery. Lastly, an early attempt should be made to obtain the sympathetic coöperation of the employer or foreman, who can do much to remove the fear of a breakdown following a resumption of work. Many cases of traumatic neurasthenia would never develop if the employer and workman could be made to see that their interests are identical and not, as they are too often from the first assumed to be, mutually antagonistic. Unfortunately, the doctor can do nothing to remove the ultimate source of anxiety, an industrial situation in which "light jobs" are almost unobtainable and the penalties of incapacity so severe.

The problem of dealing with traumatic neurasthenia following head injury is complicated by the fact that persistent cerebral contusion is an organic lesion of the brain produced by trauma, which is usually associated with no abnormal physical signs. Since this condition may cause definite symptoms of anxiety it may easily be diagnosed mistakenly as neurasthenia. It is important, therefore, to exclude persistent cerebral contusion before attributing symptoms following head injury to a neurosis.

As in other states of neurosis, the bromides are of value for the relief of symptoms in traumatic neurasthenia.

Traumatic Epilepsy

Epileptiform convulsions following head injury may be either generalised or Jacksonian in character. Statistics derived from gunshot wounds of the head during the late war have shown that the proportion of cases developing epilepsy as a sequel is about 5 per cent., a figure which is remarkably constant in all countries. This fact suggests that the fits are not the result solely of the injury, but are probably the outcome of a predisposition to epilepsy, the trauma being only the precipitating cause—a point of importance in relation to treatment. The routine treatment of traumatic epilepsy should be medical, and conducted on the same lines as in the "idiopathic" disease. It is well to begin with potassium or sodium bromide, grs. 10 t.d.s., and to add luminal or luminal sodium, gr. ½ to gr. 1 t.d.s., if the fits are not controlled by bromides.

Operation should be considered in cases which fail to respond to medical treatment after a few months, for if it is to be undertaken it must not be delayed too long. If the presence of a focal lesion is indicated by the history, by radiographic signs, or by the focal character of the fits, exploration may be made at the appropriate site. In some cases benefit has followed excision of, or injection of alcohol into, a localised area of cortex. In view, however, of the probable presence of a constitutional factor in these cases too much must not be expected of such operations.

Subdural Hæmatoma

There is a curious condition in which blood accumulates beneath or within the dura and only gives rise to symptoms weeks or even months after the initial injury. The blood is for the most part in form of clot and is enveloped in a distinct membrane. It forms a solid mass on the convexity of one or both hemispheres. The condition is frequently mistaken for intracranial tumour, for the initial injury may have been slight and the symptoms are those of slowly increasing intracranial pressure, including papill-œdema, with slight and variable focal signs. The clot should be removed by operation, and particular care must be taken to leave the field of operation dry, for post-operative hæmatoma is very liable to occur. The condition is so frequently bilateral that when once hæmatoma is disclosed over one cerebral hemisphere an exploratory puncture should be made on the other side and at the same operation for, as Trotter has shown, there is danger in delay.

Cystic collections of blood and cerebro-spinal fluid occasionally form beneath the dura as a result of injury and give rise to symptoms like those of subdural hæmatoma. They are treated in the same way.

LIV

THE TREATMENT OF OCCUPATIONAL (NON-MALIGNANT) DERMATITIS

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Those who are familiar with the increasing volume of literature on the subject of occupational dermatitis will realise that its treatment falls into three compartments—preventive treatment, immediate alleviation, and the treatment of sequelæ. The use of and responsibility for preventive treatment is in the hands primarily of the sufferer and to a lesser extent is divided between the Home Office, the local health authorities, and all employers of labour. The immediate treatment may be carried out by works' surgeries, by panel doctors, or by hospitals ; and in the investigation and treatment of these cases every ancillary aid known to medical science may have to be invoked.

Prevention

Some types of skin are more hazarded by occupation than others ; patients whose bad circulation renders them susceptible to chilblains, the young, those who congenitally have an abnormally dry skin (xeroderma) and the rarer group of people who have hyperhydrosis of the palms, are all particularly liable to suffer from industrial dermatitis when exposed to deleterious dust or fluids. The rare type which exhibits on very slight irritation a vesicular interdigital eruption (cheiro-pompholyx) should above all others be excluded from occupational risks and retire to sheltered trades.

It is advantageous for employers to replace hand contact by machine labour whenever it is ascertained that bodily contact with industrial products is responsible for increasing the sickness-rate in an industry. Most notably was this done during the late war in factories where T.N.T. and poisonous gases were being made. Furthermore, a great deal of risk is eliminated by clean working ; thus in such a simple occupation as machine-ruling for account books, dirty workers suffer from severe aniline dye dermatitis of the hands, whereas clean workers escape. Some,

as their apprenticeship passes on, become cleanly, whilst others give up the trade. Instruction of the workers in the best method of setting about their jobs plays an essential part in the prevention of occupational dermatitis. Other protective measures include the introduction of exhaust fans and the arrangement of adequate washing facilities. Dermatitis is to be expected in bakehouses and factories where cold water is provided in the winter for washing, without soap and without towels. On the other hand, employees must be repeatedly informed that cleansing agents such as petrol, benzene, turpentine, and strong alkaline soaps are deleterious unless their use is exceptional; for dermatitis of the hands is quite often due not so much to occupation as to drastic cleansing. In some forms of work, where the hands are continually being immersed in water (fishmongers and barmaids) and in trades where there is a continual exposure to dry dust or alkalis (bakers or cement-workers), there is a constant loss of surface grease, the presence of which protects the skin and helps to keep it supple. Those exposed to such a risk often grease their skins freely every night with lanolin, lard, or similar substances, and so prevent or postpone the onset of dermatitis.

Immediate Treatment

Treatment naturally depends on the nature of the cutaneous reaction. Should the patient show acute ulcers such as "pigeonneau"—i.e. the iris-like ulcer with central slough found in silica and arsenic workers—or the very acute ulcers found between the fingers of chrome-workers, or the large follicular pustules sometimes seen on the forearms of oil-workers, the immediate need is for frequent fomentations. Boric lint is to be avoided; plain white lint should be frequently reapplied during the daytime, and at night the limb should be powdered with pulv. zinc. oxid. et calomel. and dressed with dry gauze. In this way maceration and multiplication of the septic foci can be avoided.

More often the reaction shown consists of a red scaling eruption on the back of the forearms, extending as high as the elbow and complicated by small fissures in the webs of the fingers and on the knuckles. Here the most valuable application is the following liniment:

℞ Calamine . . . 35 grs.
Solution of lime . . . ½ oz.
Olive oil . . . to 1 oz.

The best result is obtained if the patient is in bed between clean sheets with frequently changed body-linen; the cream is gently wiped on with cotton-wool three times a day and is allowed to dry without any external dressing. But if the patient returns to a home of dubious cleanliness, it is preferable to instruct him to clean the areas with a boiled bran bag and warm water twice daily, to apply the cream freely and cover the affected areas with a large dressing of white lint. The patient must be impressed

with the necessity of avoiding scratching, which is liable to set up coccogenic dermatitis with the development of septic follicles or large bullæ and scabs, possibly followed by septic adenitis. It is not uncommon for the dermatitis to spread on to the forehead, face, and neck. In patients with a greasy skin, accustomed to the wearing of uncleanly thick flannel vests, dermatitis may involve the whole trunk in large red desquamating sheets with an approximation to exfoliative dermatitis at the height of the eruption.

The patient should always be removed from work at once and there should be no doubt about his certification. Responsibility for the condition of employees is apt to be disputed, and payment of sickness benefit withheld, so long as the practitioner does not clearly say whether the dermatitis is or is not occupational in origin, and it is in the patient's interest to make a plain statement on this point as soon as it is possible to do so.

In all but trivial cases the patient should be advised to go to bed. The bedrooms, as a rule, are the cleanest part of a working man's house, and in bed a man is naturally more anxious to recover than when he is wandering around his leisure haunts, an object of sympathy. It is only too common for such patients to be receiving ambulatory treatment for 18 months to two years before hospital aid is sought, and by that time the skin capillaries and nerve-endings have learned bad habits of permanent flushing and over-sensitiveness which may take much longer to undo.

Sequelæ

The outstanding sequelæ of an attack of occupational dermatitis are dermatitis artefacta, stocking and glove erythemata, and chronic lichenisation. In young patients the return to work is often irksome and the lesson accidentally learned is utilised purposely to produce new lesions, which can only be cured by occlusive dressings. At the beginning of last year, for instance, I saw a girl with acid artefact ulcers, who in another employment at the end of the year appeared with a septic umbilicus from which I extracted two tin-tacks. In each case her motive was to leave a situation which she disliked, and she lacked courage to return home after the ordinary routine of giving notice.

The production of stocking erythemata is rather more subtle. Under this heading is comprised a group of patients who have received a definite injury of the skin which has become a site of local sepsis, and such patients present a red, scaling condition of their legs, which persists from 5 to 20 and sometimes 40 years from the date of their accident. These red legs rationalise the patient's mental conception of an anatomical leg. The eruption does not extend below the shoe level and ends in a fairly sharp line just below the patella ; that is to say, its distribution does not follow that of a vascular supply or a lymphatic tract, or the distribution of a nerve. It corresponds to that found in

hysterical anæsthesia and contrasts sharply with what is seen in true neuritis. It will often be found, on close inquiry, that the original spread of the eruption was due to the employment of strong mercurial ointments. If such patients are admitted into hospital and their legs are dressed with the blandest applications and their hands are kept from all contact, the superficial inflammation will gradually subside, leaving pigmented, rather glistening dry skin of a normal pattern. In these cases great benefit is obviously obtained by the element of drama in treatment; the paint known as Sir Lenthal Cheatle's malachite green stings slightly when sprayed on the skin and leaves a vivid green colour, which is very satisfying to these self-centred people.

Among nervous patients after the general eruption has faded an irritating reddened area of skin may be left at the wrist or elbow; this by prolonged rubbing may become rough and thickened, standing out almost as a piece of shagreen leather in contrast with the normal skin. This patch of altered, but not pathological skin, is apt to be fiercely irritable at fixed times and causes great depression. In such circumstances one-third of a Sabouraud pastille dose of X-rays, repeated in three weeks' time, is often magical in its effect. Continuance of irradiation is to be deprecated, although patients will press for it. Repeated exposure to X-rays causes atrophy of the skin, recognisable by white scarring dappled with pigmented spots and red blotchy vessels. Such atrophic skin is fragile and vulnerable, and in later years is apt to undergo a malignant metaplasia. This sequence may be avoided by changing over to treatment by ultra-violet light, which should be administered in large doses, such as ten minutes of a Jesionek lamp exactly to the affected area at a distance of one foot; this exposure may safely be repeated after a fortnight's interval.

In all these cases no general medical counsels should be overlooked. Bad habits of constipation must be corrected and oral sepsis must be adequately treated. Malnutrition is often present owing to bad home cooking. A mixture of iron, strychnine, and arsenic should be prescribed for the pallid town-worker, while the nervous, quick, and fretful patient, more than others, should be aided by the early administration of bromides in adequate doses.

LV

THE TREATMENT OF HEADACHE IN CHILDREN

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Headache is a symptom commoner in the adult than in the child. In infants and young children it is infrequent, but after the age of 5 years it becomes increasingly common as the child grows older. Among the reasons for this age-incidence may be mentioned the incomplete ossification and elasticity of the cranium in the early months, the freedom of the young from circulatory disturbances, and their relative immunity from the continued mental stress which produces the headaches of nervous exhaustion. Even apart from these factors, it appears that children are for some unexplained reason less liable to exhibit the symptom. In illustration of this fact may be mentioned the absence of headache in some cases of tuberculous meningitis occurring in children below the age of 6 years, and the unimportance of headache, as compared with vomiting, in young children afflicted with migraine.

Headache can only be recognised in infants by a correct interpretation of the signs which it produces. Cephalic pain, which may be taken to include both earache and headache, causes young infants to put their hands to their heads, scratching and rubbing them at times; it also causes wrinkling of the forehead, crying, and restlessness. Earache is by far the commonest cause of screaming and of putting the hands up to the head, and it is especially frequent in association with teething and the catarrhs of the first two years. Quite apart from earache, true headache may occur in infants, and is often a sign of an organic affection of the brain. Disorders of function, such as indigestion and constipation, do not produce headache at this age. Indeed, constipation in the infant is almost always unaccompanied by the toxic phenomena associated with it in adult life.

The younger the child the more important is the symptom, and the more apt is it to point to cerebral mischief. Headaches should never be treated symptomatically until every effort to reach an accurate diagnosis has been made.

Causation.—In infancy true headache (earache being excluded) may be caused by meningitis, intracranial tumour, and hydrocephalus. In the last condition it is only to be expected when the enlargement is slow and ossification of the cranium advanced. It is not always present in tuberculous meningitis. The persistent crying of syphilitic infants has been put down to headache resulting from meningo-encephalitis. The discovery of such signs as a tense and bulging fontanelle, head retraction, and optic neuritis will give a ready explanation of the symptom.

In children past the age of infancy there are several well-defined groups of conditions in which headache is prominent.

Ocular Headache

Eye-strain is the commonest single cause of headaches which are prolonged over a period of more than a few days. It seldom occurs before the age of 5 years, the age when most children commence their schooling. Persistent headache without obvious cause at or after 5 years of age should always lead to an estimation of any refractive error which may be present. It originates in minor degrees of hypermetropia and astigmatism more often than in serious refractive errors. The headache of ametropia is seen in its most typical form after school hours, and in this respect contrasts with headaches of toxic origin which occur most commonly in the morning. Overwork at school may of itself be a cause of headache, quite apart from any refractive error.

Toxic Headache

There are a large number of conditions which may be responsible for toxic headaches. All the acute infections may produce headache, but they are by no means so liable to do so as in adult life. Fever of less than 104° F. hardly ever causes headache, and its presence with a temperature of 100° to 101° should arouse suspicion of tuberculous meningitis. Scarlet fever, enteric, acute tonsillitis, and acute pyelitis, may all give rise to very severe headache, which is safely relieved by giving aspirin in doses of 5 grs. every four hours to a child of 5–10 years. It is but seldom that the headache of acute infections in the younger children is prolonged or severe enough to require any palliative treatment.

Two main varieties of toxic headache will be considered separately: The first of these is that due to digestive disturbances, the second that of juvenile rheumatism.

Digestive Disturbances.—A morning headache occurs in some children who have a prolonged disturbance of digestion. Such children are most commonly below the age of 7, an age when there is a remarkable improvement of digestive power, following the commencement of the second dentition. The children in this group are found to have furred tongues, foul breath, and

impaired appetite ; constipation and abdominal distension may also be present. For purposes of diagnosis and treatment, the group must be divided into two sub-groups.

First, the digestive disturbance may be dietetic ; the food itself may be at fault either in variety or quantity, or the digestive powers of the child may be subnormal. Sometimes the child is being forced to eat even when loss of appetite should have warned the mother to be careful. A common fault is the giving of a heavy meal shortly before bed-time, a procedure only too likely to embarrass a digestion already impaired. Treatment should be directed towards finding a diet which may be easily dealt with, constipation should be corrected, no food (not even milk) should be allowed after tea, and the time of this last meal should be adjusted so that an interval of at least two hours elapses before going to bed. The use of stomachic mixtures such as—

℞ Pulv. rhei . . . gr. i.
Sodii bicarb. . . . grs. ii.
Syr. zingib. . . . ℥vi.
Aq. menth. pip. . . ad ℥i.

Below 3 years give ℥i, and above 3 years ℥ii, before meals ; and

℞ Sod. bicarb. . . . grs. iv.
Spir. chlorof. . . . ℥ii.
Inf. gent. co. . . . ad ℥ii.

Sig., ℥ii t.d.s., a.c.

are useful but quite subsidiary to the general measures outlined above.

Secondly, digestive disturbance may be secondary to infections of the upper respiratory tract. Disturbances due to acute infections, such as coryza and tonsillitis, are comparatively short-lived, but may sometimes persist for a few weeks after the attack has subsided. More lasting is the digestive upset produced by the swallowed secretions of chronically infected tonsils and adenoids. Such children show the symptoms of indigestion (foul breath, furred tongue, loss of appetite), together with night cough, disturbed sleep, grinding of the teeth, puffy eyelids, and dark shadows round the eyes. An important and suggestive sign, which the physician may be lucky enough to see, is the presence of muco-purulent discharge running down the posterior wall of the pharynx. The tonsils in these cases are not necessarily enlarged, but scarring is often present, while the lymphatic nodes draining the tonsils are palpable. Enucleation of tonsils and removal of adenoids are the correct line of treatment in cases which continue to show such signs over a period of weeks.

Headache due to *juvenile rheumatism* occurs in children of the hospital class above the age of 6 years, and usually in the early part of the day. For the headache of chorea aspirin grs. v to x, according to age, three times in the day, is useful. In cases of subacute rheumatism with headache, symptomatic

treatment is seldom required if the general condition is dealt with.

Cyclical Vomiting and Migraine

Migraine is not very common in childhood, but it is seen occasionally during the later half of this period. Sir William Gowers pointed out that the migraine of childhood differs from that of the adult in showing a tendency to be accompanied by pyrexia.

There is considerable evidence in support of the view that migraine is manifested in the child by the disorder known as cyclical vomiting. The attacks of cyclical vomiting are often accompanied by pyrexia, and sufferers from this disorder may become liable to typical apyrexial migraine after puberty. On the other hand, the periodicity characteristic of cyclical vomiting is not always found in migraine, neither do most of the cases of recurrent vomiting develop migraine.

A large majority of the recurrent bilious attacks accompanied by headache fall into the group of acetonæmic vomiting, and for these treatment by the daily addition of glucose to the diet will almost invariably be an entirely satisfactory prophylactic measure. For younger children a teaspoonful of commercial liquid glucose given by itself or as an addition to porridge or milk pudding should be taken three times in the day. It is most important that this daily treatment should be followed religiously for as long as the liability to the attacks persists. For older children the dose should be doubled. In place of commercial liquid glucose, barley sugar or powdered glucose may be used. Most mothers become rapidly convinced of the efficacy of this treatment, and there is seldom difficulty in getting them to continue it for prolonged periods.

Endocrine Disturbances

Persistent headache is found in a certain small group of overgrown children with obesity. The usual clinical picture in these cases is that of a fat girl of about 12 years of age, who is considerably over weight, taller than usual, and subject to severe and persisting headache. Radiograms of the sella turcica are normal. The treatment of the headache is most difficult; phenazone, aspirin, and bromides may be tried, or the following mixture:

℞ Phenazon. . . . grs. v.
Sod. brom. . . . grs. v.
Glycerin. . . . ℥xxx.
Aq. camph. . . . ad ℥ss.

Sig., ℥ss, t.d.s.

In suitable cases extr. thyroid siccum may be tried, but its effects must be carefully watched. Headache is also a feature of dystrophia adiposo-genitalis (Fröhlich's syndrome), and it is

often complained of by girls at the age when menstruation commences.

There are other causes of headache in children which do not fall into any defined groups, but must be mentioned briefly. Headache occurs in some 50 per cent. of all cases requiring operation for adenoids; thus it will be seen that adenoids are commonly responsible for this symptom, but the influence of septic tonsils must not be overlooked. Dental caries may be a cause, especially when the headache is very erratic in its onset and disappearance. Uræmia, nephritis, anæmia, trauma, and lead-poisoning are occasional causes. It is also seen as an early symptom of juvenile general paralysis, and, like vomiting, it may be a symptom of hysteria. Sinusitis is a highly exceptional cause of headache in childhood, and only occurs at the extreme latter end of this period.

Headache without Discoverable Cause

Even when diligent search has been made for a cause all efforts may prove fruitless. Many cases admitted to a children's ward for headache alone are discharged undiagnosed and unrelieved, thus showing that even when all the causes of this symptom are investigated there remains a residuum of "idiopathic" cases. In this group a family history is sometimes obtainable. The ages when the liability to headache in the parent appeared and disappeared are data on which a guarded prognosis may be based.

LVI

THE TREATMENT OF CANCERS OF THE SKIN

By Louis Savatard, L.S.A.,

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It is essential before considering the treatment of cancers of the skin to have a clear conception of the varieties of skin carcinomata, and to be able to recognise them at an early stage. On neither of these important points is much assistance to be had from text-books.

In this country cancers of the skin are usually divided into two main groups: (1) squamous carcinoma; (2) basal carcinoma. The former arising from the prickle cells of the epidermis is spoken of as an epithelioma. When well established it grows rapidly, involves the neighbouring lymphatic glands, and produces metastases in the internal organs. It is rightly considered as being "generally malignant." Whilst the latter, arising from the basal cells of the epidermis, is termed a rodent ulcer because sooner or later it usually undergoes ulceration and if untreated may involve the deeper structures without however invading the lymphatic glands or producing metastases. Hence this, the commoner form, is regarded as being "locally malignant."

Squamous Carcinoma

The first evidence of an epithelioma is a local infiltration of the skin with central thickening or keratosis. This can be observed when the tumour is no larger than a pin's head, and at first glance suggests nothing more than a plugged follicle. If, however, we excise it and examine it at this stage, we find that the apparent plugging is due to an increase of the keratin layer. A slightly older growth, of two to three weeks' duration, gives a tumour of the size of a small pea, raised above the surface of the skin, of the colour of the skin, with a rose-tinted base due to dilated venules and presenting in its centre hyperkeratosis. If the skin is put on the stretch the periphery of the tumour may appear translucent. The growth is firm, though not necessarily indurated, can be felt to be invading the true skin, and is freely

movable in the skin; the tumour has not been invaded by pus cocci; there are no signs of inflammation around it and its contents cannot be extruded by ordinary pressure. The neighbouring lymphatic glands are not involved, and at this stage the epithelioma is quite benign.

Differential Diagnosis

From what have we to differentiate it in arriving at our diagnosis? Photographically it may simulate: (1) an early basal carcinoma; (2) a small boil; (3) a molluscum contagiosum; (4) a small sebaceous cyst; (5) a mole; or (6) a simple wart.

An early non-ulcerated basal carcinoma has a more translucent appearance than a squamous carcinoma. Its centre shows no keratosis, but gives the appearance of a slight depression. The tumour is softer and does not infiltrate the true skin to the same extent. It usually takes two *years* to attain the size of a two *weeks*' epithelioma.

A small boil invariably gives us evidence of inflammation, its necrotic centre exudes pus, and on trying to raise it from the skin it is found that there is infiltration of the dermis for some considerable area around the protuberance. A difficulty arises, however, when the epithelioma has become infected. Such a case was sent to me a short time ago as a rodent ulcer. The lesion was so masked by the super-added infection that though it was easy to exclude rodent ulcer with the history of but three weeks' duration it was not evident that we were not dealing with an infected granuloma. A week's treatment cleared away the infection and revealed a typical squamous carcinoma.

The tumour of molluscum contagiosum is usually multiple, but even when solitary it can readily be excluded. It is translucent, umbilicated, and soft. Its caseous contents of molluscum "bodies" can easily be expressed. It is more frequently situated *upon* the skin rather than *in* the skin.

A small sebaceous cyst is yellowish-white, translucent, and soft. It does not infiltrate the skin, and, on puncturing, its sebaceous contents can be expressed.

The history, colour, presence of downy hair and softness of the mole should be sufficient to exclude it, whilst the wartiness of its whole surface and the absence of infiltration should rule out the common wart.

Consideration of the above points explains why epitheliomas have, not infrequently, been described as originating in moles, warts, wens, "powkes," cysts, and boils. I have frequently seen cases in which the diagnosis has been missed because due consideration has not been given to their differentiation, and even at times when I have demonstrated what appeared to me to be a typical early epithelioma I have only convinced my audience by subsequently exhibiting a section of the growth. It seems as if it were difficult to realise that such a small innocent-looking

tumour is in reality a carcinoma which, if maltreated or untreated, may become highly malignant.

It is not easy to foretell how rapidly the early lesion may progress, nor how soon the lymphatic channels may become invaded, nor yet what character it may assume later, whether superficial or deep, discoid, cauliflower, crateriform, or fungating. It is certain, however, that the less invasion there is of the true skin, the less malignant will the growth be.

Basal Carcinoma

I have described above the general picture of an early basal carcinoma. The term rodent ulcer is misleading, for a large proportion of these growths are not ulcerated, though they may have been growing for many years. I wish therefore to emphasise the multiformity of basal carcinomas. Clinically, we recognise the following types: (1) superficial-cicatricial; (2) hypertrophic; (3) cystic; (4) morphœiform; (5) pedunculated; (6) nodular and indurated; (7) scirrhous.

When, however, ulceration supervenes and becomes well established, the multiformity is lost in the more uniform picture of the rodent ulcer with its uneven surface, covered by a glairy or hæmorrhagic discharge and its irregular rolled edge, which by gradual erosion may destroy muscle, cartilage, periosteum, and even bone. Fortunately this advanced picture, too often seen 20 years ago, is rarely met with to-day; due no doubt to its earlier recognition and to the more modern methods of treatment.

The *superficial-cicatricial* type is easily the commonest variety; it spreads eccentrically, cicatrising in parts, leaving scattered nodules within an area (the surface of which often presents a rosaceous tint due to dilated venules) bounded by a well-marked raised gelatinous-looking ridge. The multiple basal carcinomas of the trunk, which are often mistaken for lesions of seborrhœa, psoriasis, lichen planus annularis, or Bowen's precancerous dermatosis, are usually of this variety.

The *cystic* type must be differentiated from sebaceous cysts and lupus vulgaris. The *nodular*—arising from the basal cells of the hair follicles—and the *scirrhous*—arising from the basal cells of the sebaceous glands—are not infrequently diagnosed as epitheliomas on account of their induration, but the history of many years' duration should negative this.

Age Incidence—Multiple Growths

Though the incidence of cancer is much greater after middle age, one should not let the youth of the patient deter one from making a positive diagnosis. I have frequently seen epitheliomas and rodent ulcers in patients under thirty years of age. Two

further points call for mention. If a patient presents a carcinoma on the face, the whole surface of the body should be examined for further growths and the patient kept under observation for years afterwards to note the possible development of further lesions. Multiple growths are far commoner than is usually supposed.

Methods of Attacking the Growth

Excision.—The treatment of early carcinomas, whether squamous or basal, which I invariably adopt and advise is excision. It can easily be done under a local anæsthetic by the practitioner. It is not necessary to sacrifice more than one-sixth of an inch of the surrounding tissue, nor to dissect out the neighbouring lymph glands, but it is essential to remove the whole thickness of the skin and thus to get *beneath* the growth.

Diathermy.—Epitheliomas of more than six weeks' duration, in the absence of lymphatic invasion, I prefer to remove by means of the diathermy knife. By this method the neighbouring lymphatics and blood-vessels are sealed and the chance of recurrence or of dissemination of the cancer cells is very greatly diminished. If, however, the glands are suspected of being involved block dissection by a surgeon is indicated.

Curetting followed by X-rays.—For basal carcinomas, other than the smallest, my method of treatment for the last 25 years has been curetting followed by X-rays. The cosmetic result is excellent and "recurrences" very rare. Under a local or general anæsthetic (if necessary) I thoroughly curette the new growth, using adrenalin to stop the oozing, and then apply pure resorcin to the blanched surface, since resorcin has a selective action on epithelial cells. The ulcer is then exposed to a pastille dose of X-rays, which is repeated on the two following days. Boric ointment dressing should be applied to the lesion till the ulcer has completely healed, and the patient should be kept under observation for a period of at least two years. So satisfactory has this method proved that I have seldom resorted to other means. Where there is any doubt as to the diagnosis or where it is suspected that the tumour may be a mixed squamo-basal growth, then I would most certainly deprecate curetting and advise excision.

Solid Carbon Dioxide.—The more superficial the basal carcinoma—e.g. those on the trunk—the less readily does it respond to the X-rays alone. Hence many workers prefer to use solid carbon dioxide for this type of growth. In the hands of the expert it answers well, but I have had so many rodent ulcers referred to me which have been unsuccessfully treated by solid carbon dioxide that I hesitate to advocate its use. The apparent reason for failure is that it has not been applied long enough nor with sufficient pressure to produce total destruction of the diseased tissue. The cosmetic result is not always satisfactory.

Radium, in the hands of the radium expert, is a most useful method of treatment at any stage of the carcinoma. The resulting scar is supple and usually devoid of telangiectases. Recurrences are few. I have used it for small growths and for recurrent nodules with satisfactory results.

LVII

THE TREATMENT OF THE COMMONER INJURIES OF THE CARPUS

By E. Muirhead Little, F.R.C.S.Eng.,
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The mechanism of the wrist is unique among the articulations of the human body. It allows more kinds of movement than any other joint, and it takes a great part in the finely coördinated actions which characterise the hand. In the normal wrist a good many landmarks can be made out by palpation. In a case of recent injury, however, inflammatory swelling generally masks all or most of these points, and it is from radiographs that definite information must be sought.

It is therefore of importance to consider the manner of the use of X-rays. In all cases two views should be taken with the forearm in full supination, one antero-posterior and one lateral. The lateral view should be taken with the radius and outer side of the wrist resting on the plate and the hand and fingers in line with the forearm. In cases of doubt it may be advisable to take a third, an oblique view, from a point midway between the two others. In cases of unilateral injury radiograms of the sound wrist should always be taken for the purposes of comparison. The first point to be ascertained in examining radiographs is the integrity of the individual carpal bones.

If there is no obvious fracture, the contours of the carpal condyle should be closely studied. Any interruption or irregularity of its line of curvature, either in an antero-posterior or lateral view, is evidence of displacement or fracture of the scaphoid or semilunar, which if not corrected leads to arthritis, or at least to loss of smooth working of the joint. Gross displacement of a bone or bones will be obvious, but slight chipping of the edge of the articular surface of the radius may be less easy to detect, although such an injury may lead to ankylosis of the wrist. Fracture of either styloid process is generally obvious enough. The scaphoid, although not fractured, may be so tilted round a transverse axis as to cast an almost circular shadow on the plate in an antero-posterior view, but viewed in profile its kidney shape will be

evident, with its lower end projecting forwards beyond the neighbouring carpal bones.

In all carpal injuries symptoms attributable to interference with the median or ulnar nerves are likely to be encountered, especially in cases of dislocation. These include loss of sensation, pain, and in long-standing dislocations trophic signs, such as glossy skin.

According to Destot of Lyons, fractures of the scaphoid or semilunar and dislocation of the latter account for 95 per cent. of injuries to the wrist, excluding sprains.

Sprains

The symptoms of sprain of the wrist are familiar and in no essential way different from those of carpal fracture. Differential diagnosis depends upon a careful study of X-ray plates. When this provides no evidence of fracture or dislocation, sprain may be assumed by a process of elimination. Pain, stiffness, and swelling are the outstanding symptoms. Small marginal fractures of the radius are to be carefully looked for, and if found the case must be treated as of more gravity than a simple sprain, although the lines of treatment will be the same. Rest on a light palmar splint extending from the upper third of the forearm to the heads of the metacarpal bones, and supported by a sling, is advisable. Gentle movements of the fingers and thumb should be encouraged from the first. Massage is not recommended. The length of time during which the splint should be worn must depend upon the duration of the pain and swelling ; in most cases of average severity a fortnight should suffice.

Simple Fracture of the Scaphoid

Simple fractures of the scaphoid are almost invariably caused by falls on the extended hand and fingers, or by violence applied in the same direction, as in a man who tried to fend off a motor-car by pushing forcibly against its radiator with his hand. Falls from a height may cause extrusion of a carpal bone through the skin of the palm, as in a specimen in the Museum of St. George's Hospital, referred to by Mr. Hulke, in Holmes's *System of Surgery* (third edition, 1870, ii. 834), in which both semilunars were so extruded, one of them merely hanging by a small shred of ligament. In this case the forearm bones also projected through the skin. Such violence may cause fracture of the radius, with or without gross carpal injury, or the scaphoid may score the articular surface of the radius and itself escape fracture, or both the radius and the scaphoid may be broken at the same time. Many experiments have been made on the dead body with various results, but it is impossible in the cadaver to reproduce the conditions present in life, particularly as no artificial substitute can

be found for muscular action, which, by fixing the joint in a given position, must influence the nature of the resulting injury. All that is certain is that if the brunt of the blow is taken by the outer side of the palm the scaphoid is most likely to suffer, and if the hypothenar eminence is most exposed to violence the semilunar is likely to be dislocated or broken.

Cases of simple fracture of the scaphoid, without displacement, should be treated as sprains, the fragments having presumably sprung back into position after the momentary displacement which accompanied the original violence. If the wrist is locked, or if the displaced bone can be felt filling up the hollow of the snuff-box, or the X-rays show undue separation of the scaphoid and semilunar bones an anæsthetic should be given and the hand and wrist forcibly flexed and adducted, while with two thumbs the surgeon presses through the anatomical snuff-box upon the fragments, so as to readjust them to the head of the os magnum. The after-treatment is the same as for sprain. The injury may be immediately disabling, but it is on record that gymnasts and boxers and other athletes have incurred fracture as demonstrated by X-rays without ceasing their activities, although for a month or two some weakness may be felt. The condition of the upper surface of the carpal condyle, as seen in antero-posterior and lateral X-ray plates, will influence the surgeon in his treatment. In all carpal displacements radiographs should be taken after, as well as before, attempts at reduction in order to make sure of due correction. If reduction is unattainable, or if pain and disability persist after some weeks, it is advisable to excise the separated head of the bone through an incision running from the styloid process of the radius to the base of the first metacarpal bone, thus exposing the snuff-box.

Fracture and Dislocation of the Semilunar Bone

The elongated curved form of the scaphoid renders it more easily broken than the semilunar, whose form is more compact and its mobility greater. Dislocations of the semilunar bone are generally the result of falls or blows, but may be produced by violent torsion of the hand.

Unlike most carpal injuries, fractures of the semilunar are generally produced with the wrist and fingers flexed, as in grasping a hammer, crow-bar, or the starting lever of a motor-car.

Out of 24 cases of fractured semilunar recorded by Destot ten were unaccompanied by other lesions of importance. The remaining 14 were complicated by other injuries of the wrist. These were practically unknown until the introduction of X-rays, on which the diagnosis depends. The outline of the carpal condyle will be broken if any displacement has occurred. A fractured semilunar alone is of no more importance than a sprain and should be treated as such.

The semilunar is rarely dislocated and fractured at the same

time. In an extensive dislocation the ligaments are necessarily much torn and replacement may be difficult. If the semilunar is nearly, or completely, freed from its ligamentous attachments, its reduction is of doubtful value, as its nutrition must be seriously impaired.

The symptoms are typical, but the patient may not complain much unless the nerves are affected. The wrist is swollen and globular, with an increase more in the antero-posterior than in the transverse measurement, and this swelling is situated below the interstyloid line, which keeps its normal obliquity. There is no silver-fork deformity. The fingers are semi-flexed. The wrist is locked, and in case of gross displacement the ulnar nerve is likely to be pressed upon, and pain or anæsthesia in the region of its supply may be detected. The median nerve may also suffer. Some active movements of the fingers may be possible and some passive extension of the wrist, but not flexion. Lateral movements are also blocked. Pronation and supination are restrained by pain. The dislocated bone may in some cases be felt under the skin. Such an injury is rarely complicated by typical fracture of the radius, for the force is generally spent in the wrist and in partial fractures of the extremity of the forearm.

Nervous troubles may occur without dislocation, as in cases of fracture of the radius or of the scaphoid, which last may affect the median nerve.

Apart from X-ray evidence, the projection in the carpal hollow of the semilunar, along with its mobility on flexion, is the best clinical sign of its dislocation.

Reduction should be attempted in all cases, except where the semilunar is obviously freed from its attachments so as to form a loose body beneath the skin, in which case it should be excised. Destot gives the following instructions for reduction :

An anæsthetic is necessary. The supinated forearm should be firmly fixed by an assistant on a strong table with the hand just over its edge. The surgeon mobilises the wrist by means of movements in all directions. He then grasping the patient's hand with both his own, pulls forcibly in the axis of the forearm, keeping the wrist in hyperextension and adducting it with a view to opening the articulation. When the axis traction is thought to be enough, one hand relinquishes its grasp and seeks the projection made by the semilunar on the front of the wrist. With the finger this is pressed backwards into the joint under the end of the radius while the hand is brought from hyperextension into flexion. The object of the hyperextension is exposure of the head of the os magnum over which the semilunar must be pushed into position. The scaphoid can be left to find its place itself,

but if it is broken, pressure in the snuff-box with the hand in forced adduction should replace the fragment.

The sooner such a reduction is made the better, but it may be successful up to three weeks after the injury. In old-standing cases, when there is much disability or pain, excision is advisable. Haughton and Holt reported excision of the whole of the first row of carpal bones with a good result.

The forearm and wrist and hand should be put up in plaster in the position of flexion and slight adduction after reduction. At the end of three days the plaster distal to the metacarpus may be removed, so as to allow of passive and afterwards active finger movements. At the end of three weeks the whole splint may be removed and a sling substituted.

Rare injuries do not come within the scope of this article, but it should be noted that dislocation forwards of the cuneiform causes acute nerve symptoms and immediate reduction or excision is imperative.

LVIII

THE TREATMENT OF RICKETS

By Helen M. M. Mackay, M.D., M.R.C.P.Lond.,
Physician to the Queen's Hospital for Children

I.—Prophylactic Measures

The prevalence of rickets in London and probably throughout Great Britain has been greatly diminished during the last few years, but the present position cannot be regarded with complacency. The means for eliminating all but the slightest manifestations of this disease are readily available, yet efficient prophylaxis is very often omitted even when infants are under medical supervision. The following figures show the wide prevalence of rickets of a grade which is radiographically recognisable—the true incidence would be higher than the figures suggest as changes may be present in the bones of the head and the thorax before they are apparent at the wrist. Of 167 unselected infants of from 1 week to 2 years old seen in the out-patient department of the Queen's Hospital for Children in April, 1925, 8 per cent. had radiographic evidence of rickets, the percentage rising to 15 if only those aged from 4 to 13 months are included. This series did not include cases sent to hospital for rickets, and the disease appears to be much commoner in many parts of the British Isles than it is in London.

Diagnosis

The basis of diagnosis differs widely, but since more efficient treatment is closely connected with better diagnosis I would suggest that, where radiographic and chemical findings are not available, diagnosis should be based only on clinical evidence of *changes in the bones* and not upon head-sweating, pallor, late dentition, flabby muscles, pot-belly, or an excessive deposition of fat, all of which are often found in non-rachitic infants.

The early bone changes require careful and systematic examination for their discovery. Among the most useful are: craniotabes, enlarged rosary, and enlarged epiphyses. During the second six months of life an enlarged rosary is probably the most valuable early sign, but in an infant aged 4 to 7 months craniotabes, developing behind the ears, is often one of the

earliest signs, and craniotabes is the only conclusive clinical sign of *active* rickets which we possess. As soon as the process of "healing" begins—i.e. as soon as normal calcium deposition is re-established—calcification of the soft areas in the skull is increased, and craniotabes has usually completely disappeared within four weeks of the beginning of efficient treatment. Craniotabes, however, is rarely found in London after 9 to 10 months of age, and, in its absence, although a guess may be made as to whether the disease is active, healing, or healed—from such factors as the child's age, duration of treatment or season—yet the precise stage of the disease can only be accurately determined by one or more X-ray photographs or by chemical examination of the blood.

Prophylaxis

In considering prophylaxis one must constantly bear in mind the cause of the disease, and its seasonal and age incidence. In London it is comparatively rare to find cases of active rickets in the late summer. The disease develops during the winter, probably reaches its maximum incidence in April, and the great majority of cases heal in the course of the summer, though they may relapse in the following winter. In artificially fed children not receiving specific antirachitic treatment, *the deciding factor in the development of rickets is usually the amount of exposure to light, and this is determined primarily by season and by the amount of time the infant spends out of doors.* Some breast-fed infants, who have little outdoor life, also develop rickets. It must be remembered that both human milk and cow's milk are relatively poor sources of vitamin D (the antirachitic vitamin) and throughout the winter every artificially fed infant and those breast-fed infants who may not get sufficient outdoor life daily should receive special preventive treatment. During the summer, if the child is out daily, special treatment is generally unnecessary. In the latitude of Toronto it has been found that in April and May the sun's rays have about eight times the antirachitic value that they have in December, January, and February, and it is from the autumn until April that specific prophylaxis is required as a routine measure.

The great majority of cases of rickets begin during the first year of life, probably most often between 4 and 10 months of age, and consequently it is for children during the first year that prophylaxis is particularly needed, though it is desirable to give such special treatment during the winter to "toddlers" also. Since premature babies are specially liable to rickets, which frequently develops before 5 months of age, special treatment should whenever possible be given to these infants from 1 month old whether they are breast-fed or bottle-fed, and usually in summer as well as in winter. The susceptibility to rickets of Italian and of negro babies in this country and the United States has often been noted, and specific treatment throughout the year

is advisable for infants whose forbears lived in more sunny latitudes than our own.

General measures of prophylaxis are: (1) The procuring by all possible means of adequate outdoor life daily for infants throughout the year, and not only in fine weather; and the exposure of the child, so far as possible, to what sunlight is available. The mother should be persuaded to keep the child out of doors daily during the hours of light, and whenever possible with the hood of the perambulator down. (2) The encouragement of breast feeding. (3) The inclusion in the ordinary diet of infants and children not on the breast of an adequate amount for their age of those foodstuffs containing vitamin D—e.g. milk, eggs, and meat.

Specific treatment may be given either by supplying a substance rich in vitamin D by mouth—e.g. in the form of cod-liver oil—or by exposing the child to an artificial source of ultra-violet light and so bringing about the formation of vitamin D in the body. In either case the action of vitamin D appears to be identical, and to supply it by mouth is simpler and more economical in time and money. There are, of course, a very small proportion of infants—e.g. premature infants with poor digestive power—to whom it may be possible to give light therapy when cod-liver oil cannot be tolerated. The question arises whether artificial light therapy has any beneficial effect on the general health, other than that due to its power of forming vitamin D in the skin, which renders it more desirable than cod-liver oil as a routine prophylactic measure for infants. I have been unable to demonstrate any significant difference in rate of growth, hæmoglobin content of the blood, or liability to intercurrent illness between a group of infants getting light therapy as well as cod-liver oil and another group treated with cod-liver oil alone. I therefore consider that in the present state of our knowledge administration of cod-liver oil should be the routine method of prophylaxis. No method has been shown to prevent completely all manifestations of rickets in every case, but with proper cod-liver oil treatment, though slight craniotabes or costochondral enlargement may appear, changes of a grade radiographically recognisable are, in my experience, banished.

The antirachitic value of different specimens of cod-liver oil varies widely, but half a drachm of a 50 per cent. emulsion of most oils given three times daily is an adequate dose. To bottle-fed babies it is best given in the feed. Nearly all infants from the first weeks of life will tolerate it satisfactorily if the emulsion is started a few drops at a time, and increased to half a drachm three times daily within 4 to 14 days. Large doses may cause digestive disturbances and do not appear to have any compensating advantage. After infancy many children prefer the taste of cod-liver oil and malt, half a drachm of a good preparation three times daily being generally adequate for children over 12 months.

Certain concentrated forms of vitamin D are now on the

market — both extracts of cod-liver oil, and also ergosterol activated by irradiation. It is probable that in the future some such preparation will have a wide field of usefulness, but the correct dosage and the keeping properties of these preparations need careful investigation before they are used on a wide scale. An effective curative dose of irradiated ergosterol mentioned in the last report of the Medical Research Council is apparently equivalent in vitamin D content to nearly half a litre of cod-liver oil daily. Surely we need to be very certain that over-dosage has no ill-effects on children before such preparations are widely used. Moreover, if the keeping property of some of these preparations proves to be poor, one may be quite unaware whether one is using an extremely potent or a totally ineffectual drug. It seems to me far preferable to use cod-liver oil of a good brand rather than proprietary preparations of unknown vitamin D content. The use of ineffectual substitutes is certainly responsible for the development of many cases of rickets. Many manufacturers are now taking advantage of the facilities offered by the laboratories of the Pharmaceutical Society of Great Britain, where tests as to vitamin content can be performed, and it is possible that in the near future dosage will be on a proper quantitative basis.

Summary

General prophylaxis is best attained by as much outdoor life as possible throughout the year.

Cod-liver oil emulsion, or cod-liver oil and malt for older children, is advocated for routine specific prophylaxis. They should be begun gradually. Proprietary preparations of unknown antirachitic value should be avoided.

Specific prophylactic treatment should be given to—

(*a*) All artificially fed infants throughout the winter, and throughout the year if sufficient outdoor life cannot be ensured.

(*b*) Breast-fed infants who are little out of doors.

(*c*) All premature infants throughout the year.

(*d*) All infants of dark-skinned races living in this country—throughout the year.

LIX

THE TREATMENT OF RICKETS

By Helen M. M. Mackay, M.D., M.R.C.P.Lond.,
Physician to the Queen's Hospital for Children

II.—Curative Measures

The child who has developed rickets may be in apparently good general health and evidence of the disease may only be discovered on careful examination, or he may show all the classical signs of an advanced case. If treatment can be applied in the early stages, it is usually possible to remove all evidence of disease within a few months, but if severe deformities have occurred, they will persist long after the active stage is passed and possibly throughout life. If this is explained to mothers, even those whose coöperation is not readily given will generally try to ensure sufficient treatment for the child.

Treatment of the General Health

Most rachitic children require treatment of the general health as well as treatment of the rachitic process itself, and the bone lesions are frequently "healed"—i.e. the bones and osteoid tissues are satisfactorily calcified—some time before the general health reaches normal. Treatment of the general health usually includes adjustment of the diet, since in these cases there has often been much dietetic mismanagement. After the age of weaning I usually advise the inclusion in the diet of one pint of cow's milk daily, three to five eggs weekly, and from the age of 12 months, meat also on three to seven days in the week. Outdoor life usually brings about an improvement in general health, in contentment, activity, and appetite, which can seldom be attained without it. In summer it will bring about healing of the bone lesions in all cases, but if the exposure to sunlight is scant healing may be slow unless other treatment is also given. Other means of improving the general health frequently include the provision of proper hours of sleep, suitable clothing, and, if possible, massage, but these are not directly curative of rickets.

Treatment of the Defective Calcium-phosphorus Metabolism and so of the Rachitic Bone Lesions

The defective calcification of the bones is part of the active process of rickets—i.e. of the disturbed calcium-phosphorus metabolism. To renew normal calcium deposition in the bones we supply vitamin D in liberal amount, and this can either be given by mouth or be formed in the skin by exposure of the patient to ultra-violet light. Healing of the bone lesions usually proceeds at the same rate, whether the vitamin is provided by cod-liver oil administration or by artificial ultra-violet light therapy, or by exposure to sunlight. I have the impression that if the child does not get out of doors artificial light therapy produces greater improvement in the general health than does cod-liver oil alone. Cod-liver oil, begun gradually, can be used in double or more than double the prophylactic dose, say 1 to 1½ drachms of a 50 per cent. emulsion, or for an older child 1½ to 2 drachms of cod-liver oil and malt, three times daily. With adequate treatment an X-ray plate of the long bones usually shows evidence of calcification of the osteoid tissue in 10 to 21 days, and calcification is complete in times varying from one month in very slight cases to perhaps four months or longer in severe cases, but, of course, rachitic deformities may persist for years or even throughout life. There is no evidence that more rapid effects can be brought about by the use of concentrated preparations of vitamin D, but when more is known as to suitable dosage these should prove a definite asset in the treatment of older children who dislike cod-liver oil or in infants with enteritis or digestive disturbance.

The Prevention of Bone Deformity

Until the bone lesions are healed—i.e. until the bones are properly calcified—steps should be taken to avoid the production of any fresh bone deformities. Thus unless proper support is given to the back a chest sulcus may be increased by the child having a pillow under its head, or by its sitting in a hunched-up position with the back curved. Curvature of the bones of the lower limbs is often increased by bearing the weight of the body, and, in order to prevent this, all children able to stand should have a light straight splint, projecting several inches beyond the foot, applied to the outer side of the leg. This should be removed at night, or at other times when the child is not likely to try to stand, and only applied with the object of preventing standing while the bones are abnormally soft. The purpose of the splint should be explained to the mother. As soon as the X-ray plate shows calcification to be nearly complete the splints can be discarded. If no radiograms can be obtained, splinting should be continued for, say, one and a half to four months after the

beginning of treatment, according to the severity of the case, but the period is a matter of guesswork if no plate is available. If the case is only seen at the end of the summer, healing will probably be already advanced or possibly complete. There is one small point which may be helpful in such cases—if the costochondral junctions are of normal size while enlarged epiphyses and bending of the long bones are still present, this suggests that healing is complete—since a rachitic rosary disappears under treatment more quickly than enlarged wrist epiphyses—and in such cases it is unnecessary to prevent the child standing.

Orthopædic Treatment

Three stages of the disease have been mentioned: the *active stage* of disturbed calcium-phosphorus metabolism and deficient deposition of calcium salts in the growing bones; the *healing stage* during which the blood-calcium and blood-phosphorus return to normal and calcium salts are laid down in the osteoid tissue of the bones as well as at their growing ends; and the *healed stage* at which the bones are fully calcified, but deformities may still persist though the bones tend steadily to recover normal shape. Provided no recurrence of rickets takes place the amount of improvement which may occur in bent long bones in the course of one to two years is remarkable, and except in cases of severe deformity operative treatment is undesirable before there has been time to observe what improvement is occurring as the result of growth. In many cases it finally proves unnecessary, even when the initial deformity was considerable. If special appliances are required—e.g. on account of knock-knees and lax ligaments at the knee-joint—the advice of an orthopædic surgeon should be obtained.

Treatment of Rickets Associated with Other Diseases

There are certain diseases with which rickets is commonly associated. Spasmophilia is nearly always accompanied by rickets; in fact, it may be regarded as part of the symptom-complex of rickets associated with low blood-calcium instead of with low blood-phosphorus, the common form; hence antirachitic treatment should be given to all such cases, together with special treatment for any urgent symptoms such as convulsions or laryngospasm. The administration of calcium chloride, the drug most commonly used for rapid control of the symptoms of spasmophilia, does not *cure* the disease, and the child should be kept under observation until it has had an adequate period of antirachitic treatment.

Many cases of rickets first come under observation for bronchitis or other respiratory affections to which such children are particularly susceptible, and care should be taken to look for evidence of the underlying cause in such cases and to give specific

antirachitic treatment whenever the presence of rickets cannot be excluded. Infants and young children with scurvy not infrequently show evidence of other dietetic errors, and as in both rickets and scurvy there is enlargement of the rosary and of the epiphyses, it is frequently difficult to be sure whether one is dealing with scurvy alone or with scurvy and rickets—hence it is as well to give a liberal supply of both vitamin D and C in such cases. In cases of chronic intestinal indigestion or of cœliac disease with defective absorption of fat, cod-liver oil is not a suitable agent for prophylaxis or cure of associated rickets, and in such cases a concentrated vitamin D preparation (not in oil) or light therapy is indicated.

There is a close association between nephritis in infancy and early childhood and the development of rickets, and authorities are not agreed as to whether the bone changes which are associated with renal disease differ in any essentials from ordinary rickets. The bone lesions of some at least of these cases respond to ordinary antirachitic treatment. The possibility of renal disease should therefore be especially borne in mind in every undersized child with severe rickets and in every case of rickets in a child over, say, $2\frac{1}{2}$ years ; and all young children with chronic renal disease should receive regular antirachitic treatment, probably both in winter and in summer.

LX

THE TREATMENT OF ANEURYSM

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The history of aneurysm and its treatment is a long one. The experience gained from the study of this disease, from the observations of Morgagni in the eighteenth century to those made during and after the Great War, enables us to-day, by the correlation of sound clinical observations and accurate pathological investigations, to undertake the treatment of this condition in a rational way. But all measures are unsatisfactory when the disease is once established and palliation of symptoms must then be the aim.

Aortic Aneurysm

Preventive Measures.—The very close relationship between aneurysm of the aorta and syphilis—for only in rare instances is it due to other causes—is an indication of the need to begin antisyphilitic therapeutic measures early, before the development of symptoms and physical signs which characterise the disease have become manifest. The routine radiographic examination of the chest in patients suspected of cardiovascular syphilis makes this possible. If this method of examination were widely applied, and followed by suitable treatment with mercury, iodide, and arsenic the development of aortic aneurysm in many patients would be prevented. Mercury should be administered either by inunctions, injections, or by the mouth up to the point of saturation, and continued with free intervals of two or three months in the year, if the Wassermann reaction remains positive, for five years or longer. The Wassermann reaction is not likely to become negative in more than a quarter of the cases treated. A negative test is an indication to withhold mercurial treatment for periods up to six months in the year. Potassium iodide, grs. 30 daily, is an equally essential therapeutic measure. Larger doses are not easily tolerated, for this drug must be given over as long a period as the mercury with the same free intervals. Each year for five years there should be given a series of six to eight

intravenous injections of N.A.B., 0·6 g. at weekly intervals. An initial dose of 0·3 g. as a safety measure is to be recommended. These injections may be given in the out-patient department or in a consulting-room, and no special precautions regarding diet and rest are necessary. Accidents are not likely to follow the administration of this drug given in this way, and no symptoms of consequence should result from such treatment.

It is difficult, apart from specific treatment, to lay down any definite rules useful in the prevention of aneurysmal dilatation in a patient with specific aortic disease. Such instructions as are usually given to patients with chronic valvular disease due to other causes are helpful in arresting the progressive changes caused by intercurrent infections, focal sepsis, unsuitable work, and an unhealthy mode of living. An acute infection is an indication for rest in bed which should be continued for at least a week after the fall of the temperature to normal, the greater the constitutional reaction the longer should be this period of rest. Focal sepsis should always be treated with a view to removing a source of toxic absorption. It is important in choosing an occupation to select one that allows the patient to live within the limits of his cardiac reserve. It should not be arduous, nor expose the worker to cold, dampness, and heavy winds. Well-lighted and properly ventilated rooms, a climate without extremes of temperature, and an altitude not higher than 1000 ft. above sea-level, are points to be considered. If the patient has an anxious state of mind the judicious use of sedatives is called for ; of these bromides are of the greatest value in the treatment of nervous symptoms. They may be prescribed alone, or added to the iodide mixture, and in combination with nux vomica when exhaustion is noticeable in spite of the fact that the patient is physically at rest or has undergone only slight exertion.

Pain due to Structural Damage.—If it has not been possible to prevent structural damage of the aortic wall symptoms will appear. Pain of an anginal character may be the outstanding clinical feature of the disease at this time. It is usually associated with coronary and myocardial changes. The treatment is that of angina pectoris of specific origin. Inhalations of amyl nitrite are indicated when the pain is paroxysmal and occurs at rest. Sodium nitrite, grs. 2, two or three times daily, may prevent the onset of pain caused by slight exertion. Potassium iodide, grs. 30 daily, or in larger doses for a short time, is a remedial agent which sometimes proves satisfactory in treatment of this symptom. Mercury is of less value, but should be given a trial. In many instances physical rest alone brings relief, and a month in bed with a simple diet is a wise recommendation, particularly when there are peripheral vascular changes and a raised blood pressure. If arsenic is given it is advisable to keep the patient in bed throughout the whole period of the injections. Many patients show no improvement ; a few have less pain, but in others the symptom may be aggravated. There is thus a certain

risk attached to this form of treatment, and the results are, on the whole, unsatisfactory.

A long period of many months with complete physical rest, a depletion diet, and a low fluid intake is sometimes advised. This is not justifiable if undertaken as a curative measure, but if all other methods of treatment for the relief of symptoms have failed, such a régime, if it can be endured, may be tried.

It sometimes happens that the gradual increase in size of the tumour is arrested by the formation of an organised thrombus, which, spread over the inner surface of the aortic wall, may fill a large part of the tumour cavity. Acupuncture, electrolysis, the insertion of long coils of wire and other foreign bodies, are methods of treatment which have been employed with the object of stimulating artificially the coagulation of the blood—a natural healing process. Unsatisfactory results have led to the abandonment of these surgical measures.

Pressure Symptoms.—In the natural course of the disease the symptoms which dominate the clinical picture and are an urgent indication for treatment, are those caused by the pressure of the aorta on neighbouring structures in the chest cavity. The irritating paroxysmal cough, due to pressure on a bronchus, accompanied by breathlessness in all grades of severity, is a distressing symptom. Alterations of posture or rest may be tried, but often the discomfort is relieved only by the administration of opium in some form. A morphine or codeine linctus and a sedative inhalant may help, especially when there is laryngeal palsy from paralysis of the recurrent laryngeal. A useful prescription is :

℞ Codeinæ phosphatis . . . gr. ½
Glycerini . . . . . ℥xv.
Spt. chloroformi . . . ℥ii.
Aquam . . . . . ad ℥i.

Expectorants are useful when bronchiectasis is present and should be combined with some antiseptic if there is much toxic absorption. When there is pressure on the œsophagus food must be given in small quantities and in liquid form if it is to be easily swallowed. The choice of food which is not bulky and is sufficiently nourishing can in most instances be left to the patient, who will be guided by his own experience and tastes. The boring, agonising pain from pressure on the vertebræ, the spinal cord, the brachio-cephalic and other spinal nerve routes, is an indication for sufficient morphine to give the patient a few hours' sleep. Sometimes relief can be obtained from rest in certain positions. One may be comfortable in a sitting posture, another only when lying flat on his back or side.

When the pain is less severe aspirin, phenacetin, and medinal in combination may have some effect and give the patient longer hours of sleep than he would otherwise have.

Slight bleeding from the aneurysmal wall should be treated

by long and continuous rest ; this should lessen the hæmorrhage, which may even cease for a time.

Aneurysm of the abdominal aorta, when below the level of the renal vessels, may give rise to pain with an iliosacral distribution. Proximal ligature for a few hours has led to a diminution in the size of the tumour and a relief of pain for a month or longer ; fatal results of such ligature are frequent. Some successes have been reported, with fewer fatalities, from digital compression. Some surgical intervention is worth a trial when aspirin and morphine fail to relieve the pain.

Aneurysms in Peripheral Vessels

When a peripheral vessel is the seat of an aneurysm of specific origin, surgical treatment may be recommended with the hope of obtaining a good result. The technique is intricate, particularly when a subclavian or iliac vessel is involved ; the operation takes a long time, and careful aseptic precautions are necessary to avoid gangrene or some other serious disturbance of the peripheral circulation. Proximal ligation of the vessel, or ligation of the proximal and distal ends of the aneurysmal sac are operations devised to obliterate the sac and not interrupt the peripheral circulation in this region. Such operations are possible in an area where there are other vessels which can carry on the circulation interrupted by the occlusion of the aneurysmal sac. In other regions ligation is not feasible because of the anatomical distribution of the vessels ; here complete excision of the sac and the union of the proximal and distal ends of the vessel by suture has been attempted with success in a large number of reported cases. Only those with a knowledge of the special technique required should attempt this operation. When the seat of the aneurysm is a small vessel it is sometimes possible by external pressure for many hours to obliterate permanently the aneurysmal sac.

These are operative measures valuable in the treatment of aneurysm of peripheral vessels of specific congenital or traumatic origin. Such treatment is not indicated in mycotic aneurysms of these vessels when part of a general infective process, as in malignant endocarditis. The disease is anyhow likely to be a fatal one, and the aneurysm is an accident unlikely to affect its general course.

Arterio-venous Aneurysms

Arterio-venous aneurysms, the result of gunshot wounds, were frequently observed during the war, when many of them were treated surgically with success. In civil life they are generally of traumatic origin. Some are congenital. When possible, the sac should be excised. Proximal ligation of the sac is a simpler operation, but gives less satisfactory results owing

to the danger of embolism. This is an especially important consideration when the vessels of the neck are involved. The obliteration of the sac by ligation of the proximal and distal ends avoids this danger, and the possibilities of gangrene from the unsuccessful excision operation. It should be remembered that an arterio-venous aneurysm leads to enlargement of the heart and probably myocardial disease from malnutrition of the heart muscle. There is some evidence to support the view that the relationship between an arterio-venous aneurysm and cardiac disease is a close one, resembling in many ways the reaction of the heart muscle to a defective aortic valve

LXI

THE TREATMENT OF BRONCHIECTASIS

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From the point of view of treatment, bronchiectasis may be classified into two main types: (1) obstructive; (2) non-obstructive.

Obstructive Bronchiectasis

The causes of obstructive bronchiectasis are foreign body, pressure by tumour or aneurysm, cicatrisation, a malignant or innocent growth in the bronchus. Of these foreign body and an innocent tumour are alone amenable to treatment. Bronchoscopy must be employed whenever there is the slightest possibility of the bronchiectasis being due to obstruction. Evidence of this may be obtained from the history of the case or the employment of lipiodol injections. If either of the above conditions is found it must be dealt with surgically. Even after successful removal, treatment on the lines about to be described for non-obstructive bronchiectasis will probably prove necessary.

Non-obstructive Bronchiectasis

Preventive Measures.—A common cause of bronchiectasis appears to be the after-effects of unresolved broncho-pneumonia. It is, therefore, essential to treat this disease adequately. Long convalescence at the seaside, or some warm dry place in the country, with much rest and later on bathing and sun baths, is indicated. If this régime does not bring about complete resolution diathermy treatment should be tried. A course of vaccines may help. If all these measures fail, a temporary collapse of the affected lung by artificial pneumothorax should be considered, the patient being placed under the healthiest possible conditions of living during the treatment. Sanatoriums for chronic non-tuberculous diseases of the lung are needed.

THE RECOGNITION AND MANAGEMENT OF ESTABLISHED CASES

Bronchiectatic dilatation may exist with slight symptoms and equivocal physical signs that are in no way pathognomonic. There may be no more than cough, some expectoration and occasional streaks of blood. It is only by the injection of lipiodol and subsequent radiography that the diagnosis in such cases can be made. The general principles of treatment have next to be considered. The essential underlying cause of all types of bronchiectasis, whatever hypothesis may be held of the mechanism of dilatation, is an inflammatory process in the walls of the bronchi. Our first aim is to overcome this inflammation; our second is to close the cavities if necessary and if possible, or to prevent their extension. The following are the methods that may be adopted:

General Hygienic Treatment.—Prolonged climatic treatment is essential in a warm seaside or country place. Fresh air is important and also rest, especially while the temperature is raised. As in the preventive treatment, bathing and sun baths may be allowed after a few weeks. If no sun is available ultra-violet rays may be employed. Care must be taken of the teeth, throat, nose, and its accessory sinuses, any focus of infection therein must be removed. The diet must be full and well balanced.

Diathermy applied to the affected part is well worth trying.

Postural Treatment.—Two or three times a day the patient must lie with the head and shoulders lower than the rest of the body, the pus will then flow into the larger bronchi, excite a cough reflex and so aid in emptying the dilatations. In some cases it is well to let the patient lie for some time with the foot of the bed well raised. This treatment must be carried out thoroughly and conscientiously.

Creosote Chamber.—This is an excellent measure if the patient is not too ill or debilitated. By provoking cough the creosote helps to expel the pus. It also tends to render the breath less offensive. Frequently a crude creosote chamber can be improvised in an outhouse in the patient's garden.

Vaccine Treatment.—I am doubtful of the value of vaccine treatment in definite bronchiectasis. I have seen some alarming reactions and am a little afraid of vaccines in this condition. If they are tried it must be with great caution, starting with small doses and increasing them very gradually.

Medicinal Treatment.—(*a*) *Inhalation*: A few drops of the following solution—carbolic, chloroform, creosote, 2 parts, iodine and ether, 1 part, placed in a Yeo's inhaler and inhaled for increasing periods of time render the breath less offensive and may have an antiseptic action. (*b*) *Drugs by mouth*: Creosote in capsules may be given by mouth in increasing doses up to 20 or 30 minims three times a day. Guaiacol carbonate, ipecacuanha, oil

of sandalwood, turpentine, garlic, or arsenic may be tried. (*c*) *Intratracheal injections*: Many substances have been injected into the trachea, such as preparations of menthol or menthol and guaiacol in oil. More recently gomenolised oil, 1 to 5 per cent., and lipiodol have been used in this way, but their value is uncertain. In many patients it is a very easy matter to inject 5 to 20 c.cm. of lipiodol into the lung by the oral method. The patient sits on a chair with the tongue protruded and held while the oil is slowly injected over the back of the tongue, the patient being encouraged to breathe deeply and to relax. In a tolerant subject the whole of the injection will flow at once into the right or left lower lobe as desired without the least difficulty. No cocainisation is necessary. Other oily preparations can be injected in the same way. In my opinion a further trial of these methods should be made.

Collapse Methods.—If the above methods fail some form of collapse therapy will be indicated. The simplest of these is artificial pneumothorax. If this is successful and produces the desired result the problem will usually arise how to make the collapse permanent. In certain cases, especially in children, it seems that a temporary collapse will cause a great improvement and appear to arrest the progress of the condition. Several such results have been reported from different parts of the world and I have observed the same thing in my own clinic. This was before the days of lipiodol, however, and it is a matter of common knowledge that to differentiate between a simple fibrosis and slight bronchiectasis is impossible without the use of lipiodol. Nevertheless, it is not difficult to understand how a temporary collapse may tend to cure even in definite early bronchiectasis, for the bronchi will be relieved of strain and stresses while the subacute inflammatory process subsides. As a rule, however, a temporary collapse will be insufficient. A life-long pneumothorax is impracticable even if it were possible, and unfortunately in bronchiectatic dilatations the walls of the cavities will not adhere as they do in tuberculosis after compression. There are two possibilities: (*a*) converting the pneumothorax into an oleothorax; (*b*) collapse operations.

By *oleothorax* is meant oil in the pleural cavity. The oil that has been most commonly employed is olive oil containing 5 per cent. of gomenol. This will remain unabsorbed for at least six months and refills are therefore needed only at long intervals. The oil remains sweet and apparently unaltered. The discomfort to the patient is surprisingly small. One of my patients, with his left pleural cavity completely filled with oil, has been doing full work for over two years and he complains of no discomfort.

Collapse Operations.—If the disease is basal and the methods described above have not proved successful *phrenic evulsion* should be first considered. It is a simple procedure, has been performed probably thousands of times, and there have been few

complications. If it does not cure the disease no harm has been done, as it is an excellent preliminary to procedures about to be described. If the disease is not basal but definitely localised in some other part of the lung, *pneumolysis* is the operation of choice. It involves little or no shock and no mutilation. Performed as it may be from an axillary approach, no visible scar results. The objection to this otherwise ideal procedure is that no really satisfactory packing substance is known. Paraffin and fat are most commonly employed, but both are apt to be extruded little by little through a pin-hole sinus. If this fails, or if the disease is widespread, *thoracoplasty* must be considered. This, however, is a big and a mutilating operation and demands very careful consideration before it is embarked upon. Nevertheless, in suitable cases and performed skilfully, the operation gives the patient what is probably, at the present time, the greatest chance of complete and permanent recovery. The collapse to be successful must be very thorough. It may be necessary after the complete paravertebral operation to resect ribs anteriorly as well. Amyloid disease, a toxæmic or degenerative condition of the myocardium, pyæmic abscesses in other parts must be carefully excluded, before such operative procedures are advised. *Rib mobilisation* used to be performed before thoracoplasty achieved its present popularity, and I can recall one case particularly where a striking cure was obtained by this method.

Removal of the Diseased Area.—Attempts have been made to remove the affected lobe by simple lobectomy or cautery lobectomy. This method is still in a tentative and experimental stage; theoretically it is an ideal process for the purpose, and when the technique improves and the operation becomes safer it will probably be employed extensively.

Drainage of a Large Bronchiectatic Cavity.—When the symptoms appear to be due chiefly to a very large single cavity, drainage may be attempted. This may relieve some of the most distressing features, diminishing very considerably the amount of pus expectorated. For this operation it is essential for the two layers of the pleura to be firmly adherent, as in drainage of a pulmonary abscess. A rib is resected, the ribs above and below are retracted, and the parietal pleura is carefully exposed, any injury to it being avoided. If not adherent the parietal layer of the pleura can usually be seen moving upon the visceral layer, or it can be lifted up with blunt forceps. If it is found free, the external surface of the parietal pleura is painted with iodine and packed with iodine or iodoform gauze, and the wound is lightly stitched up. After four to seven days the two layers of pleura will be found adherent. The lung may then be incised and the cavity drained.

Advanced Bilateral Disease.—If the disease is well established on both sides, none of the collapse methods will avail. All that can be done is to employ the other measures outlined above. If one side has advanced disease and the other side is but slightly

affected, it will be a matter of judgment whether it is better to employ some form of collapse therapy on the worse side in the hope of arresting the further extension of the disease. Prolonged medical and climatic treatment must in any case follow. In bilateral disease, however, operative procedures must not be undertaken lightly.

LXII

THE TREATMENT OF CANCER OF THE BLADDER

By J. Swift Joly, F.R.C.S.Eng.,
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It is fortunate that cancer of the bladder is comparatively rare, as there is no organ in the body where malignant disease gives rise to more intense suffering. Vesical neoplasms only form about 0·5 per cent. of all new growths, and about half of them are malignant. Approximately two-thirds of the bladder tumours are found in the male, the age-incidence being 50 to 70. A large proportion of vesical carcinomata arise from villous tumours of the bladder which have undergone malignant degeneration. It is probable that most of these growths ultimately become malignant if untreated, but in a few instances removal of an apparently benign growth has been followed by a definitely malignant recurrence. I have never seen this type of recurrence when the original growth was fulgurated.

Several types of cancerous tumours are found in the bladder. They are the villous carcinoma, the scirrhus, the squamous-celled, and the adeno-carcinoma. Of these the scirrhus form is in my opinion the most malignant. The villous form, when malignant from the start, and not the result of changes occurring in a papilloma, is likely to remain localised for a considerable time, and the operative results are good.

The postero-lateral wall is by far the most common site for all tumours of the bladder. The next most common site is the anterior wall, while they are comparatively rare on the vault. Recurrences are located at the site of the original growth, in the suprapubic scar, or in the aveolar tissue of the pelvis.

Changes in the kidneys and ureters are mechanical and infective. If the tumour compresses the lower end of the ureter the kidney and the upper part of the ureter become dilated from back-pressure. A hydronephrosis or a pyonephrosis is formed according as the urine is sterile or infected. Once cystitis sets in the patient is liable to attacks of ascending pyelonephritis, which may prove fatal. Renal infection is in my experience the most common cause of death after operation.

Symptomatology

It is impossible to distinguish between the symptoms of a benign and a malignant tumour of the bladder in the earlier stages. It is only when the bladder is infected and the growth advanced that distinguishing symptoms appear. The first and most common symptom is an intermittent, painless hæmaturia. As a rule it lasts for two or three days, and then gradually the urine becomes clear, remains so for weeks or even months, when a similar attack occurs. As a rule, during the earlier attacks the blood is fluid ; if clots are found they are small. If the hæmorrhage is profuse, larger clots form, which give rise to pain and difficulty in micturition, and even occasionally to complete retention. In this case they must be washed out through a large catheter, and if this is impossible a suprapubic cystotomy must be performed. The hæmaturia is always terminal ; that is, more blood is present in the last portions of urine passed than in the first, and this test serves to distinguish between a vesical and a renal hæmaturia. The presence of large numbers of epithelial cells from the bladder in pus-free urine is highly suggestive of a neoplasm.

Sooner or later cystitis sets in and entirely changes the clinical picture. There is then marked frequency of micturition both by day and night. The act is always extremely painful, the pain increasing in intensity till it culminates in a particularly painful spasm when the bladder is empty, and a few drops of blood are expelled. The bladder capacity is much reduced. As a rule there is no difficulty in micturition unless clots are passed. In the later stage the urine becomes blood-stained and is very foul. It is not usual to find recognisable portions of the tumour in the urine in malignant tumours, although they are frequently observed in benign growths.

Although hæmaturia is a prominent symptom in most cases of vesical carcinoma, blood is sometimes present only in microscopical quantities. A chronic relapsing cystitis is highly suggestive of malignant disease of the bladder, and cystoscopy should not be unduly delayed in these cases.

In the later stages of cancer of the bladder the patient's general condition rapidly deteriorates. Death is usually due to exhaustion or pyelonephritis. If the growth is malignant from the start the duration is often less than a year, and rarely longer than two years. When a benign growth takes on malignant characters the duration of the disease is increased.

Diagnosis

The diagnosis can only be made by cystoscopy while the patient is still in the operable stage. If the growth is palpable, either on hypogastric palpation or on bimanual examination with

a finger in the rectum and the other hand pressing the abdominal wall downwards, it is inoperable. Occasionally an operable growth can be felt on vaginal examination, but in the male a palpable growth is always inoperable. Early cystoscopy is the only means of reducing the proportion (now over 60 per cent.) of growths inoperable when first seen.

The cystoscope enables one not only to determine the presence of a vesical tumour, but also its position and nature, and in most cases its operability. If long and thin villi are easily set in motion by currents in the fluid contained in the bladder, and the whole growth is moveable, it is almost certainly benign. If the villi are short and thick, the stalk thick and rigid, and the whole growth fixed, it is definitely malignant. Irregular puckering, or nodules, appearing in the mucous membrane surrounding the base of the growth are indicative of a submucous infiltration. It is often exceedingly difficult to detect early malignant changes, and if there is any doubt, it is safer to assume that the growth is malignant.

A malignant tumour involving the internal meatus is usually unsuitable for operation : a growth—one situate on the postero-lateral wall—can be removed as a rule, provided there is sufficient margin of healthy tissue between it and the internal meatus ; resection, and reimplantation of the ureter, does not materially increase the risk. If the growth involves both ureteric orifices, operation is contra-indicated. Large growths can be removed from the vault or anterior wall of the bladder

Nodular growths are much more liable to infiltrate the bladder-wall laterally than the villous type. As a rule, operation is unsatisfactory if the growth is more than 2 in. in diameter at its base.

The cystoscope gives no indication if the growth has spread into neighbouring organs, or is involving the lymphatic glands. The first step in the operation is thus always exploratory.

Operative Measures

The best method of treatment is excision. This involves an extensive resection of the whole thickness of the bladder-wall. The large gap left is closed by a line of continuous sutures passing through the whole thickness of the bladder-wall.

If the growth is situate near the ureteric orifice, the space between the bladder and the lateral wall of the pelvis is first explored. If the glands along the course of the internal iliac artery are enlarged, hard, and matted together, no operation can cure the patient, but if they are only slightly enlarged, and still soft, the operation should be proceeded

with. The ureter should be isolated, and a strip of gauze passed round it for future identification. The bladder is then opened, and the growth encircled by an elliptical incision. Any bleeding points are clamped and tied. The large gap in the bladder wall is then sutured from below upwards by means of a continuous catgut suture ; this procedure is not easy to carry out. The upper end of the ureter is either implanted into the incision, or is brought through a small puncture in the bladder-wall, and sutured in place. Both the bladder and the pelvis are drained. After these large resections the cavity of the bladder appears to be very small, but it soon recovers its normal capacity.

Total cystectomy is rarely performed ; not only is the disposal of the ureters a difficulty, but if the growth is too extensive for excision the lymphatics are already involved, and the operation is followed by a retro-peritoneal recurrence.

Palliative Measures

Even when the lymph glands are involved, a resection may relieve the patient entirely of his bladder symptoms, and he may live the remainder of his life in comparative comfort. If the growth cannot be resected, it may be destroyed by diathermy, applied through a suprapubic opening. Radium seeds should then be implanted round its margin. The disadvantage of this operation is that the sloughs may take a long time to separate, and the suprapubic fistula may have to be kept open for several months. The implantation of radium into the growth may be followed by a diminution in the amount of hæmorrhage and a slight amelioration in the patient's symptoms, but I have never succeeded in causing the complete disappearance of the neoplasm. I have only employed radium in advanced and quite inoperable cases ; it forms a useful adjuvant to diathermy. I have twice seen recurrences in the abdominal wall entirely disappear under deep X-ray therapy, but I have not seen any successes when the growth was actually in the bladder. If deep X-ray therapy is employed, the patient's blood should be examined at frequent intervals ; if the polymorpho-nuclear leucocytes fall to 2000 per cubic millimetre, the treatment must be stopped. A suprapubic cystotomy does little to relieve pain. The chief indication for this operation is severe hæmorrhage with clot retention. A certain amount of relief may be obtained by turning both ureters out on to the skin, so as to deviate the urine.

Medicinal Measures

The pain of advanced vesical carcinoma is intolerable, and can only be relieved by morphia. A suppository of morphia and belladonna should be given every night, and a mixture containing

hexamine and tincture of hyoscyamus taken in the day time. Hexamine is the best urinary antiseptic provided the urine is acid. If it is alkaline the reaction is usually due to the presence of a urea-splitting organism. In this case it cannot be rendered acid by the administration of acid sodium phosphate or other drugs, and either sandal-wood oil, or hexyl-resorcinol should be substituted for hexamine. Most patients cannot stand bladder irrigation ; it usually increases the vesical irritability, but if it can be tolerated it helps to keep down sepsis. Dilute solutions of silver nitrate (about 1 in 10,000) are most efficacious, but if this cannot be tolerated, boric lotion should be substituted for it. Injections of small amounts of antiseptic fluids into the bladder are better tolerated than irrigations. About 5 cubic centimetres of a 20 per cent. solution of gomenol in oil may be injected every other day through a small soft catheter, and left in the bladder. The patient should have a plain easily digested diet. Alcohol, spices, and condiments should be forbidden. Plenty of bland fluids, such as barley-water, Contrexéville or Vittel water, etc., should be taken. It is a mistake to restrict the intake of fluid, for micturition is usually less painful if the urine is dilute.

Results

The operative mortality following resection is about 10 per cent. In my own cases it was nil when the bladder was not infected, and 12 per cent. when infection was present, but as the latter cases greatly exceeded the former, the total mortality was approximately 10 per cent. The late results are surprisingly good. Sir J. Thomson-Walker has found, on following up his cases, that over half of them remained free from recurrence, some for as long as 15 years.

LXIII

THE AMBULATORY TREATMENT OF VARICOSE VEINS

By Reginald T. Payne, M.B., B.S., F.R.C.S.Eng.,

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I.—General Considerations and Technique

The results obtained in the treatment of varicose veins by means of injections show this method to have a permanent place as a therapeutic measure. Many different substances are in current use as intravenous sclerosing agents, but the object of all of these is the production of a phlebitis in the vein wall. This phlebitis is primarily either physical or chemical, depending upon the agent employed. A gradual thrombosis of the vein occurs; this is followed by organisation and eventually fibrosis of the thrombus, leaving a thin fibrous cord in place of a diluted and tortuous vein. The treatment is throughout ambulatory and need in no way interfere with the patient's work or recreations. Considerable discussion has recently centred around questions of technique, notably the nature and amount of the substance injected, the posture of the patient, and the use of a tourniquet. The method is not yet old enough to have become stabilised in detail; but the technique set out below has proved convenient and easily workable. With the exception of patients in whom contra-indications exist, the method is applicable to all cases of varicose veins, even in old patients or in the presence of complications such as dermatitis or ulceration.

The Circulation in Varicose Veins

A considerable body of evidence both clinical and experimental goes to show that there is marked abnormality of the venous circulation in varicose conditions. On the whole, this evidence suggests that in patients with severe varicosity of the internal saphenous vein and in whom the Trendelenburg sign is positive, the blood flow in this vein is directed away from the heart when the patient is in the upright posture, but if the limb

be raised to 45° or higher the flow is either stationary or sluggish towards the heart.

Experimentally, this has been shown by the use of the hæmadromometer and by radiographic studies. That there is similarly a reversal of the blood flow in the skin capillaries of the leg under these conditions has been shown by Magnus, using the skin microscope. In severe varicose states, therefore, the blood coming from the deeper parts of the limbs passes upwards in the femoral vein, reaches the level of the saphenous opening, and a certain amount of it passes into the internal saphenous vein and travels distally along this. From the lower part of the saphenous vein area the blood returns to the deeper system either by way of anastomotic veins, or after having passed through the capillary bed once more, in a reverse direction. Under these conditions certain areas of skin will be supplied with blood which has already once circulated through the capillary bed. These factors of the venous circulation are of fundamental importance in the development of varicose dermatitis and ulceration, in their chronicity and their resistance to purely local treatment.

This theory of the venous circulation is supported by clinical observation of the conditions under which varicose ulcers may be cured. Healing may be attained by adequate rest, by bandaging the affected limb to secure competent valve action of the veins, by surgical extirpation of the diseased veins, or by their intravenous thrombosis. All of these methods lead to the breaking of the vicious circle which permits of venous stagnation and capillary reversal. The varicose ulcer results primarily from malnutrition of certain areas of skin due to the mechanics of the circulation in varicose conditions, and its prophylactic treatment lies in the cure of uncomplicated varices.

The Histology of Thrombosis

The processes occurring in the vein wall and its lumen following intravenous sclerosing injections have been studied experimentally, both in man and in animals, by removing portions of veins at varying intervals afterwards. These studies all show that in response to the irritation of the injected fluid a chemical phlebitis of the vein wall occurs, leading to the production of a firm, adherent thrombus over the affected segment. There is considerable swelling of the wall of the vein and proliferation of its cell elements, and this is rapidly followed by organisation of the thrombus. The fibrosis, however, may take three months to become completed. The thrombosis of the vein occurs in response to the very active changes occurring in the vein wall, and at no stage whatever is the thrombus soft or loosely attached. For these reasons detachment of a portion of the thrombus with all its attendant risks becomes a very remote possibility.

The Quinine-urethane Method

Many different solutions can be employed to produce thrombosis in varicose veins. The one about to be described was introduced by Génévrier, and gives very good results.

Quinine Hydrochloride . . .	4 g.
Urethane	2 g.
Aq. dest.	ad. 30 c.cm.

The solution is made up in small rubber-capped vaccine bottles and is then sterilised by boiling. As some of the quinine salt crystallises out on cooling, the bottles should be allowed to stand in warm water for a few minutes before use to redissolve this.

Technique of Injections

The technique I employ is as follows :

With the patient standing an Esmarch's tourniquet is applied, proximal to the proposed site of injection. The only object in applying the tourniquet is to render the veins prominent during the actual insertion of the needle into the lumen of the vein, and in all cases it should be removed before the injection is given. The patient then lies down and the area of proposed injection is thoroughly cleaned with spirit. The needle of a 5 c.cm. syringe containing the quinine-urethane solution is introduced obliquely through adjacent healthy skin into the lumen of the vein it is desired to thrombose. The plunger is slightly withdrawn to confirm the correct position of the needle, and the tourniquet removed. The injection is then slowly given at the rate of 1 c.cm. in 15 seconds. The object of removing the tourniquet before giving the injection is to have the vein in as collapsed a state as possible during the injection, and to ensure the quinine-urethane solution reaching the vessel walls in a high concentration. The needle is withdrawn and firm digital pressure applied with a sterile swab at the site of injection for about two minutes. A small collodion dressing on wool is then applied and when dry the area is firmly bandaged. The maintenance of digital pressure after injection, followed by bandaging, is designed to lessen the risk of leakage of blood mixed with the injection material into the tissues around the site of puncture. Should this occur local complications may follow. The patient is allowed to proceed home and to carry on with his normal activities. Rest is never enjoined but the patient is always warned of the reactions which follow injection. He returns for further treatment at the end of a week.

Dosage

In using the quinine-urethane method it is always advisable to commence injections with a very small dose. The one usually

employed is ½ c.cm. The object of this is to test, firstly, the local reaction of the veins to the solution; and, secondly, the patient's sensitivity to quinine, though it is exceptional for any general reaction to occur in the doses customarily given. After the first injection larger doses may be used, but never more than a total of 4 c.cm. at any one sitting. The injection may be given in amounts of 1 c.cm. or more at various sites, but as a rule not more than 3 c.cm. should ever be given at one site. In the majority of cases an injection of 1 c.cm. will be found sufficient to thrombose an area of about 2 inches on either side of it. But it should be borne in mind that no two cases react exactly alike, and decisions as to dosage must be influenced by the degree to which thrombosis is produced.

Site of Injection

The first injections should always be made in the most distal part of the affected area and each succeeding injection should be made proximal to it. This enables the operator to distinguish easily veins which are still patent from those which are thrombosed. In the majority of cases, therefore, the injections will begin on the inner side of the lower third of the leg. If, however, the varicose condition involves the inner side of the foot and the region of the internal malleolus, these sites should not be injected at the commencement of the treatment; after the course the veins will probably be found to be much smaller in size and as a rule give rise to no further symptoms. Should it be decided to inject these areas, however, it is as well to bear in mind that the pressure of boots and shoes is likely to cause some discomfort whilst thrombosis is proceeding.

The whole of the saphenous tract may be treated to within 4 inches of the saphenous opening.

LXIV

THE AMBULATORY TREATMENT OF VARICOSE VEINS

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II.—Reactions, Complications and Results

Normal Reactions Following Injection

Immediate Reactions.—Apart from the actual prick of the needle as it penetrates the skin, the process should be quite painless: pain during the course of the injection means that the fluid is finding its way into the subcutaneous tissues, and is an indication for ceasing the treatment at once. After the completion of the injection the patient may experience on getting to the upright posture quite a severe shooting pain in the region of the puncture, which is invariably described as passing distally along the limb. This phenomenon is but rarely observed, and the pain never lasts more than one or two minutes.

Delayed Reactions.—The nature of these should always be explained to the patient before commencing treatment. Within about 12 hours of the injection the segment of vein becomes a little swollen and is tender to the touch; it may ache slightly, the pain usually persisting for about three days, after which it diminishes. In addition to this local aching pain some patients experience pain of more severe type on getting out of bed first thing in the morning, and sometimes on rising from the sitting to the erect position. This pain may last from seven to ten minutes and then pass off, and is apparently due to the alteration of venous pressure in the dilated veins following the change of position and affecting the vessel walls in the region of the thrombus. Some patients experience a similar pain on blowing the nose, coughing or straining, and others describe a "jumping" pain at the site of injection. This reaction of swelling and aching in the vein is always likely to be more severe where this overlies a bony surface such as the tibia, or in any situation where the bony contours do not permit the vein to sink back into the soft tissues. Occasionally slight redness of the skin over the injected

segment may be seen, but this is unusual. Some patients, particularly those with a rather thick layer of subcutaneous fat, will show a slight degree of bruising along the line of the thrombosed vein. As this is always linear in distribution it appears unlikely that it is due to leakage of blood from the site of puncture. This bruising always clears up, but may take six weeks or more to do so. After about the fourth day the thrombosed vein commences gradually to decrease in size, and continues to do so for about three months. Local tenderness usually disappears within a fortnight.

General Quinine Reactions.—Constitutional effects due to the quinine in the injection are described, but rarely observed. The drug may be tasted a few minutes after the injection has been given ; the patient may suffer from tinnitus or headache, or in susceptible subjects a rash may appear. Injections should never be given to women during menstruation since griping hypogastric pain may be experienced.

Abnormal Reactions

Blood Blisters.—These are occasionally seen, and are due to leakage of blood mixed with quinine-urethane into the subcutaneous tissues at the site of injection. They are usually about ½ inch in diameter and dry up in about three weeks. They can be avoided by digital pressure for a short time after the injection, followed by firm bandaging over the collodion dressing for about 24 hours.

Eschars.—These also are occasionally seen, and they are produced in the same way as the blood blisters, but the local damage is more severe, and they may take five or six weeks to heal. They may also be avoided by pressure and bandaging described above. Similar eschars may be developed at a point some inches remote from the site of injection, and these are mostly due to the fact that an extremely thinned and atrophic vein wall and skin are unable to react to the chemical phlebitis. Injections should never be given directly into regions where the skin is atrophic and the vein wall obviously very thin. It is a striking fact that after thrombosis has occurred these thinned and atrophic areas of skin show remarkable properties of recovery of their elasticity and suppleness.

Sodium Salicylate Method

Of the many other solutions employed as intravenous sclerosing agents sodium salicylate appears at present to be the only one used at all extensively in this country. The solution is a sterile one of chemically pure sodium salicylate, made up in 20, 30, and 40 per cent. strengths. As the salt is not precipitated on standing

there is no necessity to warm before using, but specimens should remain colourless; those showing discoloration after being kept some time should not be used, since they may give rise to untoward effects.

In essentials the technique employed is the same as that described under the quinine-urethane method, but there are certain points of detail to which attention must be paid. It is usual to commence with 2 c.cm. of the 20 per cent. solution, which should be sufficient to thrombose about 4 inches of vein. The extent of thrombosis produced by each injection must be the guide as to the strength and amount of solution injected at subsequent sittings. If the 20 per cent. solution produces the requisite amount of thrombosis, succeeding injections may be confined to this strength. If thrombosis is not produced, or if it is of very small extent, 2 or 3 c.cm. of the 30 or 40 per cent. solution should be tried until the desired result is obtained. More than 4 c.cm. of the 40 per cent. solution should never be given at one sitting. As, however, the veins appear to develop a remarkable degree of tolerance to sodium salicylate it is important to work up as rapidly as possible to the strength found necessary to produce the required thrombosis.

During the course of the injection many patients experience a cramp-like pain in the muscles of the calf, which persists for a few minutes. The local reactions following the injections are in the main similar to those described under the quinine-urethane method. My own experience leads me to believe that with the salicylate method patients get more pain immediately following the injection, but less reactionary pain. Furthermore, the extent of thrombosis is liable to much greater variations—it may be absent, and it may be excessive. But in cases which respond to this form of treatment the results are excellent.

Pulmonary Embolism

The fear of pulmonary emboli has long deterred surgeons in this country from the employment of a method which seems at first sight to invite this disaster. That the danger of embolus is not a very real one is shown by the fact that in the cases treated by Linser (6000), Nobl (2960), and Sicard and Gaugier ("many thousands"), no single case of embolus has been observed.

In the literature of the subject I am only acquainted with four cases of death from pulmonary embolus. In some of these the technique employed was open to severe criticism, and in one case the patient had been operated on for fistula in ano. No fatality of this nature has been recorded after the use of quinine-urethane or sodium salicylate.

As a post-operative complication the risk of pulmonary embolus is about one in a thousand after a major operation, with a very much greater risk after operations on varicose veins.

As a risk following injection treatment it is extremely remote, as the figures quoted above clearly show, and its interest becomes almost academic.

The reason for the absence of emboli doubtless lies in the adherent nature of the thrombi. The fact that the blood flow in varicose veins is distally directed may play some part, but this is probably only of secondary importance.

Varicose Ulcers

The general principles to be observed in dealing with varicose veins complicated by ulcers do not differ from those outlined above. Large varices are invariably present in the region of ulcers, and are much more easily palpated than seen. Especial attention must be directed to these, but small doses should always be employed on account of the lowered tissue vitality. Once a week the ulcer and its surroundings should be cleaned with ether and all debris removed. The ulcer may then be dressed with Unna's paste or with gauze soaked in the following lotion: prepared calamine and oxide of zinc, grs. 30 of each; dilute solution subacetate of lead and glycerine, dr. 1 of each; lime water to 1 oz. The patient is instructed to repeat this dressing on alternate days after gently cleaning the ulcer with water.

Results and Contra-indications

Cure should be attained in every uncomplicated case. Three months after the injections are complete the fibrosed veins should either be impalpable or present only as fine fibrous cords in the subcutaneous tissues. Symptoms due to the veins diminish almost from the commencement of treatment, and crêpe bandages and elastic stockings should be given up as early as possible. In the ulcer cases healing is a gradual but steady process. The time taken for this to occur will depend upon the size of the ulcer and the extent of the varices. Complete healing should occur in 80 per cent. of the cases either before or soon after thrombosis is complete. In the remaining 20 per cent. of cases this process is delayed either on account of underlying bone infection or the presence of some other serious constitutional disease. Clinically it will be observed that the intolerable pain which ulcer cases suffer is lessened, or entirely absent after the first few injections.

The quinine-urethane method should never be used during pregnancy, though possibly some other sclerosing agent could be employed. The following conditions are contra-indications to all forms of injection treatment, and with the exception of the first are contra-indications to any surgical procedure: (1) Recent phlebitis in the saphenous vein area: (2) old deep

thrombosis with compensatory dilatation of superficial veins ; and (3) cardiovascular renal diseases.

It is undesirable to begin any injection treatment without having made a general examination of the patient, and it is advisable to become master of the practical details of one recognised injection method before trying others. The methods which have proved successful in my hands have been set out here.

LXV

THE TREATMENT OF TIC

(HABIT SPASM)

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A tic may be defined as " a coördinated purposive act, provoked in the first instance by some external cause or by an idea " and perpetuated as a repetitive involuntary movement. The same term has recently also been applied to certain coördinated involuntary movements which are found in persons suffering from organic diseases of the nervous system—for example, epidemic encephalitis. In spite of superficial similarities these two forms of involuntary movement are ætiologically as distinct as the hemiplegia produced by hysteria and that resulting from cerebral hæmorrhage, and the word tic is employed in this article in its older and established usage of a derangement of neural function occurring in the absence of organic nervous disease. Involuntary movements of organic origin which may be confused with tic include some of the very varied disorders of motility which may follow epidemic encephalitis, especially the so-called postencephalitic " tics," myoclonic movements, conjugate ocular spasms, and the slow rhythmical movements known as bradykinesias. Other conditions which must be considered in making the diagnosis include muscular spasm due to focal epilepsy, and extrapyramidal syndromes such as chorea, athetosis, and torsion spasm.

Ætiology

Experience has shown the following working hypothesis to be of practical value in treatment :

> There is much to be said for regarding a tic as a conditioned reflex—that is, as a motor response which, through a process of association, has come to be linked with an inappropriate stimulus. At first the movement which later becomes a tic is purposive, being still the response to an appropriate stimulus. For example, a child blinks because it has conjunctivitis or twists its head because its collar is tight. Why does the

movement continue after the stimulus has ceased to exist? The explanation is that the movement has now become the motor response to a new stimulus which has become capable of evoking it through association with the original one and which continues to be operative though the latter has come to an end. This association is a mental process which relates the movement to new elements in the patient's environment. For example, a child's innocent and physiologically justifiable sniff or wriggle may evoke admonitions or punishment from its father or the irritated protest of its mother that "it gets on her nerves." The movement may thus become associated in the child with mixed feelings of fear, resentment, and a sense of its power to exasperate, all of which are directed towards the parent. The parent's reproof and the child's emotional reaction to it become linked with the original stimulus and acquire the power to elicit the same response. Thus the parental eye becomes a conditioned stimulus which now by itself is capable of evoking the movement. Later the movement may be called forth by any circumstances which produce in the child the corresponding state of mind, especially by anyone who stands to the child in a relationship somewhat similar to that of the parent—for example, the school-teacher. Suggestion also plays an important rôle in strengthening and establishing the pathological reaction, often operating in the well-meaning comments of relations or neighbours that "the poor child can't help it." Once established, the tic tends to strengthen in the patient, who is powerless to control it, those very feelings of inadequacy or self-pity which are usually associated with its evocation, and so to set up a vicious circle.

One more ætiological factor remains to be mentioned. The tic as a link in a causal chain is related not only to the past but to the future, and has reactions which reverberate indefinitely between the patient and his environment. He is apt to exploit his disorder as a defence against the very circumstances which elicited it, using it perhaps as a scourge to a repressive parent, a claim upon the pity of friends or a refuge from social obligations.

Psychotherapy

The foregoing considerations lead us to the conclusion that no treatment of tic is likely to be successful which is not primarily psychotherapeutic. A lengthy analytic investigation designed to expose the patient's faulty emotional adjustments and to re-educate him is at present limited to the few, but fortunately much can be done without prolonged investigation, especially in early cases, by those conversant with the principles involved. Such short cuts may be theoretically unjustifiable but they have the double pragmatic sanction of necessity and success. The practitioner should recognise that the movements are a symptom

of a faulty mental adjustment, and should endeavour to find an answer to the following three questions : (1) What is the stimulus —i.e. the factor in the patient's environment, which evokes the movement ? (2) What is the emotional state with which it is associated ? (3) What psychological end does the disability serve ? Inquiry along these lines, if conducted with sympathy and tact, may lay bare feelings of inadequacy, embarrassment or shame which go to the root of the symptom and indicate the lines along which the readjustment of the individual must take place.

Conscious Re-education

Conscious re-education consists of the practice by the patient of exercises involving : (1) muscular relaxation and immobility, and (2) orderly movement of the affected parts of the musculature. The physiological basis of this mode of treatment probably consists in the fact that both voluntary relaxation and orderly movement of affected muscles involve at the level of the cerebral cortex inhibition of the pathological conditioned reflex which constitutes the tic.

1. For the practice of muscular relaxation the patient should be placed in the position in which the tic is least troublesome, which will usually be lying down. He is first instructed to practise a general relaxation of all his muscles, and later his attention is directed to the affected part of the body and he practises immobility of the affected muscles for periods of gradually increasing length.

2. He next practises exercises which involve orderly movement of the affected part, and which can easily be devised to meet the requirements of each case. Thus a patient suffering from a blinking tic is made to open and close the eyes slowly to order. Tics involving the lower part of the face are treated by opening and closing the mouth, protruding and withdrawing the tongue, retracting and pursing the lips, etc. Spasmodic torticollis requires movements of rotation and flexion of the neck. These re-educative exercises are first carried out under the supervision of the physician and the patient is then instructed to practise them alone several times a day in front of a mirror. A child naturally requires adult supervision for this purpose. Reading aloud is a useful exercise for patients with any form of facial tic, also Swedish remedial exercises. No exercises should be carried to the point of fatigue.

Hypnotic Suggestion and Re-education

The usefulness of suggestion in treatment is limited by the fact that it does little to correct the patient's mental maladjustment. When used alone, therefore, suggestion is unlikely to

produce a permanent cure, at least in adults, though it may afford striking temporary relief. The most effective way of employing it is in the hypnotic state. The patient is hypnotised and often, until the process becomes familiar to him, he exhibits an intensification of his involuntary movements during the early stages. The first suggestion given is of complete muscular relaxation and cessation of the movements. As soon as this is achieved the patient's attention is directed to the fact that he has succeeded in controlling the tic. At the first two or three treatments it is wise to be content with reaching this point and concluding with general suggestions of recovery. The next step is to begin hypnotic re-education, which consists in causing the hypnotised patient to carry out the re-educative exercises which have been described in the previous section, at the same time emphasising to him his capacity to do this successfully. By means of hypnotic suggestion the process of re-education may be shortened and the rapid improvement of which the patient is conscious during his waking life is of considerable psychological value.

Direct suggestions of improvement made to the fully conscious patient are of less therapeutic value, except perhaps in children, but indirectly suggestion assists the curative powers of other measures.

Surgical Treatment

Apart from theoretical objections to the surgical treatment of tic there are few tics in the treatment of which surgical measures are practicable, and spasmodic torticollis is now almost the only one which brings the patient into the surgeon's hands. Surgery can at best be only palliative and cannot hope to achieve a radical cure ; moreover, since tic is a disorder of movement and not of individual muscles, it is insufficient to put out of action only the muscles which have hitherto been involved. As J. M. T. Finney and W. Hughson say, " not infrequently, when one muscle or group of muscles—those primarily involved—are put out of commission by the operation, the affection immediately manifests itself in an adjacent set of muscles or may even involve the opposite side." However, if the operation carried out is sufficiently extensive to immobilise the affected part the suggestion of cure may be so strong that the movements do not recur when function returns.

Many surgical measures have been employed in spasmodic torticollis since Minnius, in 1641, first treated the condition by open section of the sternomastoid. The greatest prospect of success would appear to be offered by the operation practised by Finney and Hughson which involves bilateral resection of the spinal accessory, suboccipital, great occipital, and third cervical nerves, and which they claim yielded complete cure in 12 and improvement in a further 16 out of 32 patients operated upon. Operations for the relief of facial tic cannot be recommended.

Other Therapeutic Measures

All available means should be employed to maintain the general health at a high level, since tics are always more troublesome when the patient is fatigued or "run down." Sedative drugs are useful adjuvants to other modes of treatment. The bromides are of help both in children and adults, and possess the physiological justification that Pavlov has shown that they strengthen the inhibitory processes of the cerebral cortex. Adequate sleep must be ensured to the patient, if necessary by the exhibition of soporific drugs. Bromides are usually sufficient for this purpose in childhood, but adults may require medinal grs. 7½, or luminal gr. 1 at bedtime. Nothing is to be expected of massage, electricity, or orthopædic appliances. In the rare cases in which the original stimulus to the movement is still present when the patient comes under observation, it will require appropriate treatment. Conjunctivitis, refractive errors, dental caries, enlarged tonsils and adenoids may thus need to be dealt with.

Special Points in Children.—The whole household must unite in a conspiracy to take no notice of the child's movements, except as may be necessary to carry out the prescribed treatment, and all forms of punishment and reproof must be prohibited. If no improvement results the child should be sent to relatives in another town for a time, or admitted to a suitable hospital. In some children an attack of chorea appears to form the starting-point for tics ; this sequel is to be avoided by thorough treatment and prolonged convalescence after the attack. Imitative tics are especially prone to occur in children, and the presence of a near relative suffering from a similar disorder is a strong reason for treating the child away from home. Lastly, it is impossible to over-stress the importance of early treatment since tic in childhood is eminently curable, while in adults it is apt to be one of the most intractable of functional nervous disorders.

LXVI

THE TREATMENT OF ONYCHIA

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The term "onychia" is usually defined as an inflammation of the matrix of the nail, but in practice it is used rather more loosely to include inflammations of the nail bed and also of the nail folds, though for the latter the term perionychia is often used. It is however often difficult, clinically, to separate inflammations of the nail matrix and bed, and hence the term onychia is often employed to cover inflammations of all these structures.

Inflammations of the nail may result from physical or chemical injury, from local infection by bacteria or fungi, or may be a part of some general inflammatory eruption, such as syphilis, eczema, or psoriasis. With this last group we are not concerned in this article.

Physical injuries to the nail may be traumatic—crushing, bruising, and the like; due to heat or cold—burns and frostbite; or to harmful radiations, as in X-ray and radium dermatitis.

Chemical injury to the nails is frequently seen in industrial workers; it is almost invariably secondary to dermatitis of the fingers, but not infrequently this inflammation spreads over the nail folds and involves the matrix, usually producing a chronic type of onychia with mal-growth of the nail, so that this latter becomes rough, thickened, and furrowed. The treatment consists of removing the cause and dealing with the associated dermatitis with soothing and protective applications, the nails requiring no special treatment.

It is, however, to the infective types of onychia that our attention is specially directed; of these there are two groups: pyogenic onychia and mycotic onychia.

Pyogenic Onychia

Pyogenic onychia is a common affection, and may be due to infection either with streptococci or staphylococci. The former is not infrequently seen in children in association with impetigo contagiosa, while in adults staphylococcal infection seems more

frequent. In adults the infection is more common in women than in men, and this doubtless is due to their more frequent use of manicure instruments and also possibly to the fact that they have their hands constantly in water. Several types are seen, of which the following are the most frequent :

1. *The Acute Suppurative Type* usually affects a single nail, is associated with much swelling of the nail fold, and frequently involves the matrix, so that the nail is sooner or later shed. The swelling is confined to the nail fold and the tissues immediately surrounding it and does not involve the ball of the finger. There is often a good deal of pain and tenderness localised to this area and to the root of the nail. Pus can be squeezed out from under the nail fold. As the nail separates granulations make their appearance under the root of the nail. In the early stages it is advisable to soak the finger two or three times a day in a 1 in 4000 solution of potassium permanganate and to dress it with 1 in 4000 perchloride of mercury fomentations. Many cases will subside with this treatment alone. In some cases Bier's cupping may also be applied. If there is evidence of involvement of the matrix it is better to remove the nail at once. This is indicated when the pain is not relieved by fomentations or baths, or when pus can be squeezed out by pressure on the base of the nail as distinguished from pressure on the nail fold. Incision of the nail fold is better avoided ; it is rarely necessary for drainage and may increase the area of infection.

2. *The Recurrent Suppurative Type.*—In this variety several nails are frequently affected, and the symptoms are less severe, but tend to clear up for a time and then recur. The matrix is not usually much involved, but slight irregularities of the nail growth may occur, indicating slight involvement of this structure. In these cases evulsion of the nail is rarely necessary or even successful, recurrences tending to occur even after several removals. It is most important to protect the nail fold from injury, and a weak antiseptic dressing, such as 1 in 4000 perchloride of mercury, should be worn till the inflammation has subsided ; then, for several months, a light cotton finger-stall should be worn as a protection and the hands should be kept out of strong soapy or alkaline solutions. Bier's cupping is also useful in resistant cases. Dr. A. C. Roxburgh [1] has had success with a method suggested by Dr. H. G. Adamson of inserting a small pledget of cotton-wool soaked in pure carbolic acid under the nail fold twice a week. It is in this type of case that an autogenous vaccine may be tried, though the results are not uniformly successful.

3. *Chronic Non-suppurative Type.* — This variety, which usually attacks many fingers and causes much deformity of the nails, can be very successfully treated by X-rays. It is essential, however, to give only small doses. One-third of a Sabouraud

[1] *Clinical Journal*, Jan. 27th, 1926, p. 41.

pastille dose given once a week for four weeks is the maximum that should be given at one time. This usually clears up the condition, but if it does not the treatment should be abandoned. If recurrence takes place, the doses can be repeated after an interval of two months. I have not found X-rays of much value in the suppurative cases. If X-rays are not available, the nail folds and roots of the nails may be painted twice daily with 1 in 1000 flavine in liquid paraffin and light cotton finger-stalls worn. It is of extreme importance in these cases, as in the last type, to avoid all injury, however slight, to the nails and their surroundings. In all these types of case ointment should be avoided.

4. *Septic Infection of the Nail Bed.*—Occasionally septic infection of the nail bed occurs, as, for example, when a splinter is pushed in under the free end or lateral margins of the nail. When this happens a small abscess may develop under the nail, and is indicated by the presence of severe pain under the nail and of tenderness usually localised to a relatively small area. After a day or so a small yellowish spot appears, and this increases in size, the symptoms meanwhile becoming intensified. In these cases all that is necessary is to cut away the portion of the nail over the small abscess so as to allow free drainage and to foment with 1 in 4000 perchloride of mercury dressings.

Mycotic Onychia

Ringworm fungi and favus not infrequently attack the nails and produce a variety of lesions. The organisms of thrush and other monilia may also produce onychia. Infection commonly takes place from the free edge, leading to a gradual separation of the nail from its bed, but it may also commence under the nail fold and at the lateral margins. A certain diagnosis can only be made when the fungus can be demonstrated in scrapings. The condition is difficult to treat, and it is usually necessary to remove the nail. This can be done either by evulsion or by softening the nail with liquor potassæ, carefully applied to the nail surface and scraping the softened nail away gradually. When this is done dressings of Whitfield's ointment (5 per cent. benzoic acid and 3 per cent. salicylic acid) should be applied. Norman Walker's method is very efficient ; it consists in applying Fehling's solution on a piece of lint cut accurately to fit the nail, after having applied an ointment to the surrounding skin. A rubber finger-stall is then fitted and left in position for 12–24 hours. When it is removed, the nail can be scraped away and a mild antiseptic ointment applied, or weak mercurial fomentations if there is much inflammatory reaction. Thereafter, iodine ointment, or Whitfield's ointment, can be used till the nail regrows.

If only the distal portion of the nail bed is involved it may suffice to cut away only that portion of the nail which overlies the affected area, and then instil two or three times daily tincture

of iodine or 1 in 1000 perchloride of mercury in 90 per cent. alcohol.

G. M. McKee has used X-rays with some success in ringworm of the nails, though he is unable to explain its mode of action. The application of X-rays in this connexion, however, is rather complicated and any overdosage may produce permanent damage. Those who desire to use this method should study the somewhat elaborate technique laid down by McKee in his book (*X-rays and Radium in the Treatment of Diseases of the Skin*, second edition, 1927).

LXVII

THE SURGICAL TREATMENT OF CHRONIC INFECTIONS OF THE SEMINAL VESICLES

By Frank Kidd, M.Chir. Camb.,
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Chronic infections of the seminal vesicles are responsible for a considerable amount of ill-health, causing as they do persistent urethritis with unfitness for marriage, sterility, crippling arthritis, myositis, relapsing cystitis with rigors, epididymitis, and many other complications of "subinfection" or "intermittent bacteriæmia." Local urethral treatment, diathermy, vesicular massage, intravenous injections of neosalvarsan, or protein shock therapy will often bring about a cure. But many cases remain where cure can be hastened or can only be attained by lavage of one or both seminal vesicles by way of the vas. The operation of vasostomy or vasotomy, devised by Belfield,[1] of Chicago, in 1905, since modified by him and others in many important particulars, and performed by him on more than 1100 patients, should be more widely known and practised in this country, since recent improvements in technique have done away with complications which at first proved troublesome and caused the operation to be viewed with disfavour.

The operation has been criticised chiefly on the ground that if it is not properly carried out it may lead to a stricture of the vas with consequent sterility. Quite apart from the fact that most of the patients who need the operation are already sterile as the result of the disease of the vesicle, it is now known that stricture of the vas should not follow the operation when performed according to the latest technique; and, indeed, it is likely to render fertile many persons who without it would be condemned to permanent sterility. It appears, from numerous observations and experiments, that colloid silver, or other chemical, when injected into the lumen of the seminal tract does not injure in any way the epithelial lining of that tract. On the other hand, if colloid silver or other chemical be permitted to leak into the interstitial tissues around the vas, funiculitis may be produced, and in some cases lead to a stricture of the vas at the site of the incision. Such a condition can be remedied by the perfected operation of vasectomy

[1] *Jour. Amer. Med. Assoc.*, 1905, xlv., 1277.

with end-to-end suture. But with the new technique of vasotomy this necessity is not likely to arise. For instance, Dr. Clinton Smith, of Kansas City, reported 100 consecutive cases in which he was able to test the sperm at long intervals after the operation. In 98 of the cases living sperm was found. The chances, then, of sterility seem remote.

All who have had extensive experience of this operation are now pretty well agreed that attempts to leave a cannula in the vas for repeated washings should be given up. It was these attempts that led to reflux of the chemical injected and to subsequent stricture formation. It was found that stricture might result whatever chemical antiseptic was used for the injection. It was not the nature of the antiseptic, but it was the reflux of the antiseptic into the interstitial tissues that caused the stricture. Since colloid silver is found in practice to be the most efficient antiseptic, it should be used in preference to any other so far suggested, such as acriflavine.

The operation should not be carried out in the out-patient department. Patients should be confined to bed for two or three days at least, preferably four to five days.

Technique of Vasotomy

The operation can be carried out under local or general anæsthesia. If a local anæsthetic is preferred, it is administered as follows. Pick up the cord at the top of the scrotum and inject into its substance 5 c.cm. of 1 per cent. novocain-adrenalin solution. Choose the site of the skin incision near the top of the scrotum and inject along this with a fine needle some 10 c.cm. of ½ per cent. novocain-adrenalin solution.

The vas should be isolated beneath the scrotal skin with the gloved fingers or a special clamp and a small incision be made directly down until the coverings of the vas are exposed. The vas is caught by a pair of sharp-toothed Volkman's forceps and held up in the left hand. With a few touches with a sharp knife the outer coatings of the vas are cleared until the flat handle of a scalpel can be gently insinuated between the vas and the other structures of the cord. This is thrust through so as to keep the vas well out of the wound, after which any bleeding points that need attention should be securely ligatured. The vas must be well cleared of the surrounding tissue sheaths, an important point. With a fine-pointed tenotome a tiny opening is now made in a longitudinal direction through the wall of the vas so as to expose the lumen. This can soon be learnt by practice and is the most delicate part of the operation. A fine stiff length of silkworm-gut is now threaded into the vas and will usually pass easily for some 10 in. towards the vesicle. In some cases inflammatory strictures of the vas or inspissated pus will prevent the passage of this gut, in which case it may be thought advisable to desist from injecting the vas. If the lumen is patent a thin

sling of gauze is inserted under the handle of the scalpel to steady it and catch any drops of escaping fluid. A blunted needle (gauge 20) attached to a well-fitting syringe filled with 10 c.cm. of 5 per cent. colloid silver is insinuated into the lumen of the vas, great care being taken not to rub up the mucous membrane with the point of the syringe. Those who have had little practice are advised to inject sterile water to see if the passage is clear before resorting to the main injection. Five c.cm. of 5 per cent. colloid silver are then slowly injected and should flow easily away to fill the vesicle and ampulla. If 5 c.cm. flow in quite easily, a further 5 c.cm. may be injected. After a pause the syringe is removed and the opening in the vas most carefully closed with one or two 00 catgut sutures. These sutures should only take up the outer coat of the vas and should effectually prevent all reflux of the chemical injected. The vas is then dropped back into place and the skin united with a catgut stitch.

The patient should be confined to bed for at least three or four days to prevent complications, as a little fever is not unusual. The colloid silver may not appear in the urine for many days after the injection. In such cases the effect is always curative. Cures of the infected vesicle will be obtained in the majority of the cases by one injection. If a cure is not attained, then the vas can be exposed a second time a week or ten days later, and the injection repeated at a site a little higher up. In this way risk of stricture and sterility is avoided and the desired result is obtained.

Indications for the Operation

The agreed indications for the operation are as follows: In all cases of non-tuberculous seminal vesiculitis without intense perivesiculitis refractory to non-surgical treatment due to the gonococcus, colon bacillus, streptococcus, and other pyogenic bacteria: (*a*) causing a chronic urethral discharge; (*b*) aspermia or necrospermia with sterility; (*c*) bacteruria and rigors; (*d*) arthritis or myositis; (*e*) attacks of recurrent epididymitis; (*f*) chronic cystitis following prostatectomy.

The diagnosis is established especially by careful rectal palpation of the vesicles with the trained and expert finger, the presence of necrospermia and pus in a condom specimen of the sperm, persistent relapsing swellings of the epididymis, and bacteriological investigations of the spermatic fluid. Experience can alone decide as to whether the operation must be carried out on one or both sides in any particular case. It is not always necessary to operate on both sides.

Vasotomy in Gonorrhœa

Recently vasotomy has been advocated for all cases of acute gonorrhœa. I have been so impressed by the immediate and rapid cure of cases of chronic vesiculitis where no other treatment

has been employed, except a single lavage of one or both vesicles, that I am quite prepared to believe that lavage of the vesicles on one or two occasions might rapidly cure recent acute gonorrhœa. Kenneth Walker's experiments on animals and certain clinical features of urethritis are suggestive in this connexion. The results of experience can alone decide such a question. The operation of vasotomy has come to stay. It must remain an operation to be practised only by those who are willing to give up some time to learning accurately the technique, and should not be condemned by those who have had no experience of it or who refuse to follow the minute steps necessary for success. I have had many striking results with it in a series of extremely difficult cases.[1] I cannot too strongly call for its consideration by those who are in charge of venereal disease clinics and military and naval hospitals.

[1] *The Lancet*, 1923, ii. 213.

LXVIII

THE TREATMENT OF MIGRAINE

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Migraine may be defined as a periodically recurring nervous disturbance of which the essential element is headache. But in its classical form it presents a much more complex syndrome ; the headache is usually unilateral, and in at least half the cases is preceded by symptoms indicating disorder in localised portions of the cerebral cortex of the side on which the headache is situated ; the headache is accompanied by nausea, and after a number of hours vomiting occurs, and this ushers in the last stage of the attack which typically comes to an end in sleep. This symptom-complex is frequently accompanied by a slight mental change and most commonly this takes the form of irritability and depression. The symptoms of localised cerebral disturbance are usually of a sensory nature ; hemianopia is the commonest, and with it often go scintillating spectra in the dim half of the field ; next in frequency come paræsthesiæ in one side of the face and tongue and in the corresponding hand and arm, while auditory disturbances, vertigo, and slight aphasia are not very uncommon. Motor disturbances in migraine are extremely rare, and apart from vague ephemeral pareses of the fingers the only kind of paralysis that is encountered is a palsy of one or more of the oculo-motor nerves. The occurrence of such a palsy during a migraine attack constitutes the so-called ophthalmoplegic migraine. It is only in very rare cases that this complication occurs, but when it does the patients may suffer from it with many of their attacks ; the paralysis lasts a few days or even weeks, and diminishes gradually only to be renewed with the next paroxysm. Another atypical form of migraine results from a variation in the quality and perhaps also in the site of the pain, so that instead of being a unilateral headache it becomes a neuralgia in the cheek or temple.

Ætiology

Migraine is often hereditary ; in a large number of cases it comes on at or before puberty, and in 80–90 per cent. of cases it has begun by the time the subject has reached the age of 25.

Many sufferers have their own convictions in regard to its causation, but these views are very divergent, and it must be admitted that we simply do not know the cause or nature of this ailment. There is, however, almost a consensus of opinion that it arises in some way from a functional disorder of the vegetative nervous system ; this view accounts for the close association between the onset of attacks and disorders of the alimentary canal, while the pallor of most of the patients during their attacks certainly indicates that the vaso-motor system is involved. If this theory is correct the action on the cerebral cortex whereby the sensory symptoms are produced must be a very indirect one, since the cortical blood-vessels are devoid of vaso-motor nerves. Another theory is that the foramen of Munro on one side becomes blocked and that the cerebral symptoms are a consequence of the distension of the hemisphere that results from the continued secretion of cerebro-spinal fluid into the closed lateral ventricle. Some writers, notably F. G. Crookshank, have regarded migraine as a psycho-neurosis, but this suggestion has not found wide acceptance, and it seems inadequate to account for such a symptom as ophthalmoplegia.

Diagnosis

The sensory accompaniments distinguish migraine from other forms of headache, and if they are absent its unilateral distribution and the paroxysmal nature and definite course of the attack usually make its nature apparent. The headache of cerebral tumour or intracranial syphilis is almost always more general, and the patient rarely has such intervals of absolute freedom A commencing occipital lobe tumour may give rise to attacks of headache with hemianopia and scintillations, but the sudden onset and abrupt cessation of these attacks is unlike the course of migraine, and eventually a convulsive seizure or the onset of papillœdema may make the diagnosis clear. Similar symptoms may occur in certain cases of epilepsy, and here, as in cases of tumour, the occurrence of a fit may show that the ailment is not migraine. The onset of an ocular paralysis in a case of supposed migraine calls for the most careful revision of the diagnosis and a thorough examination of the nervous system, for ophthalmoplegic migraine is a rare condition and the causes of headaches with opthalmoplegia are many ; migrainous neuralgia is commonly mistaken for tic douloureux, but it is not brought on by washing the face, nor by eating or talking ; moreover, the pain is less intense and has a less precise distribution ; migrainous neuralgia is accompanied by nausea and occurs in subjects who have previously suffered from more typical migraine.

Treatment between the Attacks

The more specific treatment involves : (1) the use of drugs acting on the vegetative nervous system, (2) general nervous

sedatives, and (3) the correction of ocular refractive errors; general measures are also of great importance.

Of the drugs which act on the vegetative nervous system those most in vogue are nitroglycerine and thyroid; calcium lactate has also been credited with good results. Nitroglycerine is best given in the form of liquor trinitrini, of which doses of ½–1 minim are to be taken in acid solution three times a day; it may also be given in the chocolate tablets (each = gr. 1/100), half a tablet or a whole tablet being taken thrice daily. The administration of these doses is to be continued over long periods except during the actual migraine attacks when it should be stopped. Nitroglycerine was extensively used by Gowers, and is still the most widely efficacious remedy; some patients obtain complete relief from it alone. Thyroid, unless there is any indication of thyroid deficiency, is sufficiently exhibited in a dose of grs. 2 of the dry extract taken at bed-time; it probably acts as a general metabolic stimulant. Of the drugs regarded as general nervous sedatives luminal is undoubtedly the best; gr. 1–1½ at night or gr. 1 night and morning, is sufficient. It is best given in tablet because it has a low solubility, and because the soluble compound (with sodium) is not nearly so efficacious. With the less severe types of migraine great reduction in the frequency and severity of the attacks may be obtained from luminal and thyroid without recourse to liquor trinitrini. The bromides are also in frequent use and are often combined with salicylates.

The degree to which ocular trouble can be held responsible for migraine is a matter of controversy, but there is no dispute that the sufferers are mostly educated people who read a considerable amount and in whom consequently any astigmatism, heterophoria, or muscle imbalance is likely to be the source of a particular fatigue. It is therefore essential that at the very outset of treatment such conditions should be carefully tested for and, as far as possible, compensated. Gross refractive errors play less part in practice, since among such patients they have nearly always received attention at an early age.

General Measures

The frequency of attacks is so much affected by the patient's general health that no possible adverse influence can be neglected. The condition of the bowel is naturally the first care. Any tendency to constipation must be effectively treated, and even though constipation be not present benefit is derived from a morning saline. A minute dose of magnesium (or potassium) sulphate, not sufficient in quantity to produce any unpleasant action on the bowel, is perhaps the most efficacious, but one of the more palatable effervescent salines may often be substituted. Even a glass of water taken regularly in the morning is helpful. One of the mildly aperient spa waters may be drunk in quantity before meals throughout the day, and in severe cases a course of

treatment at a spa is to be recommended. When an attack is thought to be imminent a prompt measure is indicated, such as an effective dose of calomel or a Seidlitz powder. Late hours stuffy rooms, and fatigue are to be avoided, and sufficient exercise and fresh air must be obtained. The tonic effect of a holiday may procure an unworted period of freedom ; many patients find that unless they have a game of golf regularly at the week-end their headaches increase in frequency and severity, and probably in such cases the exhilaration of the game and its surroundings count at least as much as the exercise. In women anæmia and dysmenorrhœa require careful attention, for the migrainous subject rarely endures a painful menstrual period without an attack. Local infection in the tonsils or in the appendix should be thoroughly treated, and any obstructive trouble in the nose rectified.

The *diet* should be plain ; very many patients regard factors in their food as a precipitating cause of their headaches and are aware of the particular circumstances that induce their attacks. It may be an excess of sugar, or an excess of protein, or purin-containing dishes or condiments or alcohol, or almost any single article of food ; such causes vary widely from patient to patient, and consequently it is necessary to treat each case individually. In general, the experience of one patient in regard to diet meets with very restricted success when applied to the treatment of another. The limitation of diet is a measure to be applied in moderation, and only one kind of restriction should be enforced at a time ; unless the patient's experience gives some other indication the abolition of sweetmeats should be the first to be tried. In considering the influence of such restrictions it must be remembered that the placing of a veto on any single article of diet has the effect of making the patient more careful in regard to his diet as a whole, and consequently benefit may ensue which is not a specific result of the prescribed limitation.

In short, in dealing with migraine, the rule is to review minutely with each patient his diet, conditions of work, and general mode of life, and to endeavour to discover and correct any circumstances by which headache is likely to be induced.

The Attack

The attack of migraine, once established, is difficult to dispel. If there are prodromal symptoms which the patient recognises the attack may in some cases be aborted or greatly reduced in severity by a dose of calomel or a Seidlitz powder and full doses of aspirin, or one of its congeners, every 2–3 hours. In addition to official remedies there are many analgesics, mostly of the coal-tar group, on the market (e.g. veramon, arcanol, migranin, analgit). Most of them are of value and a patient may find a particular combination which suits him better than the others. These palliatives enable many patients to continue work during the

attacks. One of the features of migraine is a peculiar irritability of the sensory systems and all who suffer from the more severe forms go to bed and endeavour to shut out light and noise and to have absolute rest. Some ask only to be left alone, and certainly the first rule is not to disturb the patient with much treatment. The analgesics mentioned may bring a little relief; some patients take strong coffee in addition, some like a compress on the forehead. Little can be done to hasten the climax of the nausea, but when this is reached and vomiting is achieved, sleep usually follows without difficulty. Occasionally chloral or veronal may be required, and in rare cases morphia is used to induce sleep and to enable the patient to retain nourishment in a long-lasting attack.

LXIX

THE TREATMENT OF ACUTE AND CHRONIC LARYNGITIS

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Acute laryngitis is usually the result of an acute infection of the upper respiratory tract, a "cold," tonsillitis, influenza, or, in children especially, one of the exanthemata, notably measles. It is sometimes traumatic, due to inhalation of dust, irritating gases or fumes, or the accidental swallowing of caustic or very hot fluids; this latter accident occurs when children drink from a kettle.

Acute Laryngitis in Adults

The treatment of acute laryngitis in adults presents a somewhat different problem from the treatment of a similar condition in infants. The adult patient should be kept in an even temperature, preferably in bed, and should be encouraged to drink large quantities of warm fluids. He may be given drugs to promote perspiration and to ensure rest—for example, aspirin grs. x, Dover's powder grs. viii at night. Inhalations of steam impregnated with tinct. benzoin. co., pine oil, or eucalyptus oil, every three or four hours for a quarter of an hour will be most useful. Abstinence from alcohol and smoking should be enjoined. Rest of the voice is important. Should cough be a prominent symptom a mixture containing small doses of heroin may be given. The attack usually subsides in a few days; the voice becomes normal, cough and secretion disappear. In rare cases œdema of the tissues over the arytenoid cartilages and of the aryepiglottic folds occurs. This results in dyspnœa of variable degree; it may be so severe as to demand tracheotomy. Should such a complication occur it is well to give antistreptococcal serum (25 c.cm.) subcutaneously, and a further dose the next day. Scarification of the œdematous areas has been advocated.

Acute Laryngitis in Infants

Owing to the relatively small glottis, acute laryngitis in infants is apt to be more serious than in adults. Inspiratory

obstruction is especially to be feared. It is essential to exclude diphtheria as the cause in a case of acute laryngitis. Diphtheria of the larynx is almost invariably accompanied by diphtheria of the pharynx, and will show itself by the presence of the typical greyish-white membrane on the tonsils and on the anterior pillars of the fauces or uvula ; in all cases of doubt swabs should be taken from the pharynx. If the clinical examination give rise even to suspicion of diphtheria, the case must be given the appropriate dose of antidiphtheritic serum—for a child of 6, 8000 units, for a child of 12, 10,000 units—without waiting for the bacteriological report.

The general principles of the treatment outlined above must be adhered to for catarrhal laryngitis. Rest in bed in an even temperature is important, and since the child may not be able to inhale, a steam kettle should be used. Perhaps the most useful drug for children is chloral. It is of value mainly in ensuring rest, physical and mental, and in allaying the alarm that stridor produces ; often merely keeping a child drowsy will enable tracheotomy to be avoided. Inhalation of oxygen through a nasal tube will be helpful. On the other hand, tracheotomy must not be too long postponed, since the child's heart will not tolerate too long the strain of dyspnœa ; the patient's colour, the amount of " sucking-in," and the pulse must be considered in deciding on the necessity for tracheotomy or intubation.

Another disease that may be mistaken for laryngitis is laryngismus stridulus ; this condition is one seen in rickety children, often associated with adenoids ; attacks come on suddenly, generally at night, when the child wakes in distress with inspiratory crowing. The history of previous attacks, the absence of local pharyngeal signs of inflammation, and the type of child will help in arriving at a diagnosis. Retropharyngeal abscess, especially if low down at the level of the epiglottis, gives rise to dyspnœa ; inspection with a good light from a forehead mirror, or better, palpation with the finger, will reveal a swelling of the pharyngeal wall and decide the diagnosis.

Recurrent Cases

Should acute catarrhal laryngitis recur, predisposing factors must be sought in the upper respiratory tract and, if possible, removed. Any cause of nasal obstruction, especially a deflected septum, large middle turbinals or adenoids should be excluded ; also foci of infection, suppuration in the accessory nasal sinuses, and inflamed adenoids or tonsils.

Chronic Laryngitis

Chronic laryngitis may be the result of attacks of acute laryngitis ; in this case it is all the more important to search for, and remove the predisposing causes enumerated above. Treat-

ment of the condition itself is partly general and partly local. Rest of the voice is essential. Faulty methods of voice production in singers or speakers should be corrected, and abstinence from alcohol and tobacco enjoined. A mixture containing potassium iodide grs. iii, pot. nitrate grs. x, oxymel ʒii, tinct. camph. co. ℥xxx, and extract. ipecacuanhæ liq. ℥i is useful. Locally, in established cases, painting the cords with a solution of zinc chloride (grs. xv or grs. xx to ʒi) daily might be tried. In all cases of chronic laryngitis it is essential to exclude the possibility of tubercle by expert examination of the chest and sputum.

Syphilis as a cause must be excluded by a Wassermann test.

Atrophic Rhinitis.—There are one or two varieties of chronic laryngitis which call for special treatment—for example, that due to or secondary to atrophic rhinitis. Even vigorous treatment of the nose, set out below, may fail to cure the laryngeal disease, but should be patiently undertaken; the nose is to be syringed twice daily by means of a Higginson's syringe with a pint of normal saline, to which is added ʒss of carbolic acid 1 in 20—this will wash away crusts and keep the nasal passages clean.

Singer's nodules consist of small projections from the edges of the vocal cords at the junction of the anterior and middle thirds. Over-use or mis-use of the voice may be the cause, and must therefore be corrected. Failing this the nodes may be touched with the galvano-cautery; this can be done by means of a specially shaped cautery point after painting the larynx with cocaine.

Pachydermia laryngis is a very resistant form of chronic laryngitis, in which there are projections in the posterior commissure or posterior parts of the cords. Removal of these projections has been practised in various ways with poor result. Recently, however, a degree of success has been obtained by the judicious use of diathermy (Kisch); under chloroform anæsthesia two or three punctures are made into the projections with a fine diathermy needle, and very considerable improvement has followed.

Tuberculous laryngitis is always a serious complication of phthisis, and the prognosis grave. Strict silence over a period up to three months will cure slight cases, when combined with general open-air treatment. More serious advanced cases may be arrested by the same means. Should the lung affection clear up local treatment of laryngeal swellings by galvano-cautery puncture under local anæsthesia is very useful. Advanced cases, in which pain is the prominent symptom, must be treated symptomatically by means of local insufflation of orthoform and anæsthesia.

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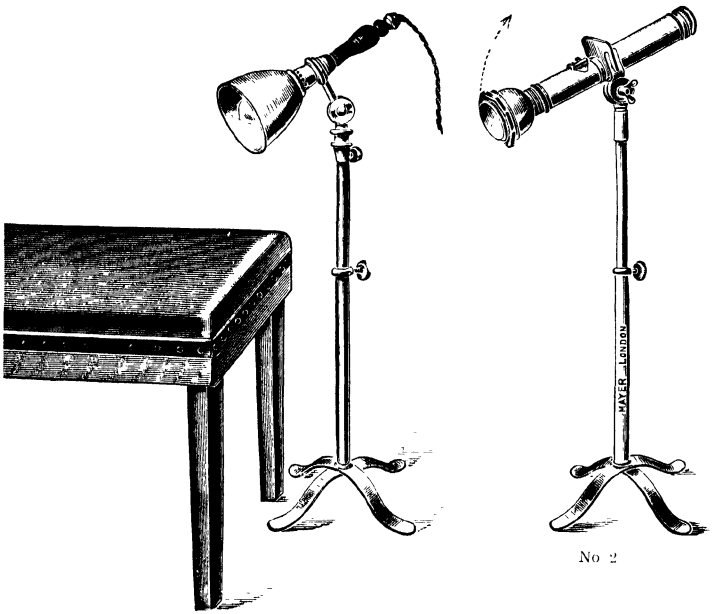
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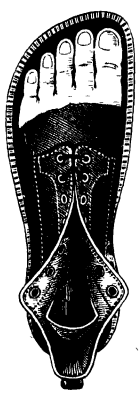
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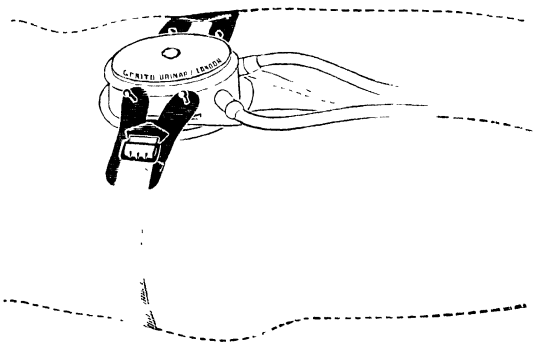
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