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ACUTE APPENDICITIS.*

BY THE LATE

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ACUTE appendicitis is the correct diagnosis in 60 per cent. of those acute abdominal diseases the treatment of which is essentially a surgical problem. Small in size yet large in pathological importance the appendix must necessarily occupy the attention of physician, surgeon, and general practitioner. A great deal has been said, under the stimulus of that monumental worker, the late Sir James Mackenzie, of the importance of the recognition of disease in its early stages. This certainly applies to the appendix, for only by such clinical acumen can we hope to reduce the mortality which appears from the Registrar-General's figures to be on the upgrade rather than the reverse. It might be thought that as so much is known about appendicitis and so much has been written that there is little more to say, and yet we neither know its cause nor how to prevent it. There is evidence that in civilised countries the incidence of appendicitis actually increased from the years 1900 to 1920. Since the latter date there is little proof of any increase in the number of cases, but there is evidence of a rising mortality up to the year 1923. The last returns of the Registrar-General, however, show a better figure for 1924—71 deaths per million as against 74 in 1923. For this reason it behoves us to inquire especially into the question of early diagnosis, for, as far as experience goes, early surgical treatment is the best preventive against a high death-rate. Treatment by removal of an organ is always a crude method. In

the case of the appendix it need not be regretted for we are better without it, for even if it is capable of secretion it is not an essential factor in life and its presence may sometimes be deleterious. To call the appendix the abdominal tonsil does not prove that it is worth having, and to suggest that it aids in lubricating the large intestine credits a small portion of lymphoid tissue with a vast capacity for industry.

As long as the mucous membrane is intact organisms may lie within its lumen and do no harm. Damage to the mucosa appears to determine the onset of acute appendicitis and the progress of the disease is from within outwards. Foreign bodies, such as portions of enamelled vessels, glass from jam jars, and metallic portions of flour mill rollers, have all been held guilty. In some cases it would appear that the lesion is primarily a thrombotic one, and then probably embolic in origin and infective in character. I have seen the result in a few cases of perforation by a piece of wood, by a needle, and by a pin. But swallowing foreign bodies is not a common cause of this disease, and the experiments of Rosenow, which go to show that there is a specific streptococcus responsible for it, have not met with much support from other observers. The most constant feature of gangrenous appendicitis is the presence of a concretion. Speaking quite roughly I should say that at least 50 per cent. of appendices removed in a gangrenous condition contain a concretion. Sometimes, the appendix being perforated, the concretion lies outside it. Such concretions are composed of vegetable matter together with fat and the phosphates and carbonates of lime and magnesium.¹ They represent the products of accumulated secretion of the appendix, and appendicular stasis is, in my opinion, the precursor of acute appendicitis. It may be a part of general constipation, but the concretion differs from a true faecal

* A Fellowship of Medicine Post-graduate Lecture, delivered on Oct. 21st, 1926.

¹ Owen T. Williams: *Biochemical Journal*, 1907, ii., 395.

concretion, particularly in the high proportion of fat and calcium which it contains. A stricture in the proximal part, or adhesions holding it down, predispose the appendix to stasis, and gangrene in its distal portion may easily follow the swelling of a portion of its wall. The pathological history in such cases is simple. The appendix secretes or excretes fatty material either physiologically or as the result of catarrh; it fails to move on and becomes dry and hard, salts, epithelial cells, mucus, and organisms are added to it. Gradually it becomes larger than the appendix can accommodate. Pressure on the mucosa leads to ulceration, and the organisms present invade the wall leading to perforation, gangrene, and invasion of the peritoneum. Sometimes ulceration takes place apart from gross increase in size of the concretion. The absence of a concretion at operation in some cases is due to disintegration of the concretion itself with liquefaction due to organisms and outpouring of mucus. In not a few cases a concretion is tightly wedged in the lumen of the appendix and the organ is entirely gangrenous on the distal side of this.

If there be any scope for the preventive treatment of appendicitis it is in the treatment of constipation, intestinal stasis, or whatever you prefer to call it.

As to the bacteriology of appendicitis there is no evidence that in human beings there is any specific infection. It is true that Rosenow has produced appendicitis in experimental animals by intravenous inoculation with a streptococcus obtained from cases of appendicitis in man, but observations made in early cases do not show that a streptococcal infection precedes others, and cultures from late cases yield any of the organisms common to the intestinal lumen. A streptococcal infection is apt to be a serious one, and further attention is required concerning the importance of the anaerobic organisms—the *Bacillus welchii* in particular. A series of 25 cases examined by Prof. Dudgeon and Mr. Mitchiner² gave the following results when cultures were made from the interior of the appendix within the first 30 hours.

Aerobic cultures.—*B. coli*, 6; *B. coli* and streptococci, 14; streptococci and *Staphylococcus albus*, 3; *B. coli*, streptococci, and *Staphylococcus albus*, 2.

Anaerobes.—*B. welchii* grown in five cases.

CLINICAL ASPECT.

There are two elements of the greatest importance in the diagnosis of this disease. It is not enough to be sure that the symptoms are due to appendicitis; it is also important to have a clear idea as to the state of the appendix. This in reality makes the question a difficult one, for the appendix is neither constant in its anatomical position nor entirely consistent in the way it may affect the abdomen. Abdominal pain, vomiting, and fever are the three most constant symptoms and usually

they are manifest in this order. The position of the pain, however, varies with that of the appendix. Vomiting is absent in at least 10 per cent. of severe cases, even where the infection has involved the adjacent peritoneum. Fever is the least reliable sign of abdominal disease.

The physical signs are sometimes difficult of interpretation. Of late years a good deal of stress has been laid on the presence of cutaneous hyperæsthesia. If the appendix is distended, unperforated, and not gangrenous, this reflex hyperæsthesia in the right iliac fossa is a valuable sign, but I have personally found it in cases of distension of the cæcum with gas and no inflammation or distension of the appendix, and I do not regard it as a very reliable diagnostic feature. Some people say that it is constant in position whatever the lie of the appendix may be and take it to be a clear guide to treatment of the disease. I cannot give my whole-hearted support to such a policy in diagnosis or treatment.

As regards differential diagnosis a great deal depends on the presence or absence of peritoneal infection. When this is widespread we are helped by the knowledge that appendicitis is the commonest cause of peritonitis. If we remember, as I have already stated, that disease of the appendix is responsible for over 60 per cent. of the cases of the so-called "acute abdomen," it is obvious that less than half the cases should cause much anxiety as to diagnosis. No one, however, can diagnose these cases unless he bears in mind the host of other possibilities, and lesions above the diaphragm and behind the peritoneum must not be forgotten. Patients in an early stage of pneumonia and those with stone in their right kidney have too often been submitted to a thoughtless appendicectomy. Only by a careful consideration of the leading symptoms and signs can we be sure that the appendix is at fault. Early diagnosis is, however, essential if the present mortality is to be lowered, since it is recognised on all hands that early operation, which means appendicectomy, carries the lowest mortality—less than 1 per cent.

The pain caused by appendicitis has rather special characters. It is alleged by some that it never starts in the right iliac fossa, but I cannot agree with this statement. I would rather say that it is rarely felt in the iliac fossa at the onset of the illness. Central abdominal pain with subsequent reference to the right iliac fossa is the rule but there are more than occasional exceptions. Discomfort in the iliac fossa not infrequently precedes the attack of pain, though this itself is usually referred to the umbilicus. Epigastric pain may be the chief complaint of the patient, and when this is combined with tenderness on pressure in the right iliac fossa it is very strong evidence of appendicular disease. Appendix dyspepsia is undoubtedly a real disease and many of these cases remain obscure until acute inflammation shows the need for surgical treatment. Removal of the appendix completely cures the

² British Journal of Surgery, 1923-24, ii., 676.

dyspepsia of such patients. It is not sufficiently recognised that in children with recurrent attacks of appendicitis the pain may often be referred to the upper abdomen.

Certain it is that not all right iliac pain is due to appendicitis, but in acute manifestations of the disease it practically always takes up this position at some stage. Its degree varies considerably with the type of lesion and there are those who seek to differentiate between appendicular obstruction and appendicitis proper. The latter is apt to start as a febrile intestinal disturbance, the former to be afebrile but more painful. Fever, however, is a most uncertain guide to diagnosis of abdominal disease and probably the state of the bowels and of the tongue are more certain indications. The most severe attacks of appendicitis often start with diarrhoea or, at any rate, the bowels act rather frequently. In fulminating appendicitis this onset is quite common. In the majority of cases, however, constipation is present, and if the disease spreads to the peritoneum diarrhoea is of very serious import. Nature's usual response to peritonitis is inhibition of peristalsis and this without doubt tends to limit the area of infection. The condition of the tongue in appendicitis is rarely paid sufficient attention to. It is always dirty but remains moist so long as the disease is limited to the appendix. A dirty, dry tongue is an indication of peritoneal extension.

DIAGNOSIS.

For the purpose of this lecture I only purpose to discuss this question in so far as one can diagnose the condition of the appendix, but before doing so I should like to say a word as to the proper course to be adopted in those cases where, after all possibilities have been considered, the lungs examined, the urine tested, there is still doubt. An unnecessary appendectomy is a reproach to abdominal surgery, for the abdominal surgeon must be able to diagnose as well as operate. If, then, all our efforts leave us undecided we still have to formulate a plan of treatment for at least 24 hours. This length of time will enable us to judge correctly in 90 per cent. of cases. If there is still doubt I believe operation should be undertaken, but it must be recognised that the operation is an exploratory one. In all the other cases the diagnosis of appendicitis will have been confirmed or abandoned. The best plan is to put the patient in the Fowler position, allow nothing by the mouth, not even water, use no enemata, give no aperient. Relieve the pain only by hot fomentations to the abdomen, and give no morphia or sedatives either by mouth, skin, or rectum. Saline with glucose (5 or 10 per cent.) should be given in half pints every four hours if thirst is complained of.

Such a plan will not greatly prejudice the correct treatment even if the diagnosis of appendicitis should have been made in the first instance. It may be that a few very mild attacks will subside under

this régime and then the true diagnosis may be missed, but such an event is rare. Not sufficient stress is laid upon the difference between the diagnosis of first and subsequent attacks. There is a distinct tendency for appendicitis to recur; therefore a second attack is easier to diagnose than the first. Recurrent pain in the right iliac fossa is at least suggestive of appendicitis whatever opinions may be held with regard to chronic and persistent pain in this situation. Some people deny the existence of chronic appendicitis clinically, although they can hardly do so on pathological grounds. A stricture of the appendix in its proximal part may easily favour gangrene in the distal portion if acute inflammation occurs. The retention of a concretion with all that may result from it often explains the severity of an attack. The previous disease may have passed unrecognised and yet examination of the removed appendix may clearly point to previous attacks.

A word must be said here concerning the misuse of aperients. The lay mind suffers from the delusion that abdominal pain is a call for opening medicine. No doubt this achieves many cures and appendicular colic may sometimes be included in the number, but unless he is sure of the pathological state of the appendix, what qualified practitioner would venture on such treatment? To induce powerful peristalsis in an inflamed, and especially a strictured, appendix is to run a very serious risk of perforation. For the bowel to discharge by the rectum may be the end of an attack of abdominal pain, but an aperient may easily be responsible for infection of the peritoneum. The well-meaning mother in this way may be the unconscious murderer of her child, and it is essential that the public should understand that intestinal discomfort can only be properly treated, in the first instance at least, by intestinal rest. Starvation is the key to such abeyance of peristalsis. Abdominal pain should be understood to indicate abstention from food. Castor oil in appendicitis may be as deadly as a drink of hemlock. If, after the 24 hours of starvation I have recommended, anxiety is felt about the bowels it is best to give intestinal lubricants, such as heavy liquid paraffin, rather than intestinal irritants. Usually Nature may be left to deal with the situation in time, but a glycerine enema may be desirable if there is evidence of faecal arrest as proved by rectal examination. As a practical fact, however, one must admit that some of those cases which give rise to doubts in diagnosis do exhibit palpable masses along the course of the colon. These can be easily moved on by the use of turpentine enemata, and this is the appropriate treatment of such faecal impaction. The relief of abdominal pain is then immediate.

DIAGNOSIS OF PATHOLOGICAL STATE OF APPENDIX.

This is really the crucial test of the abdominal surgeon's capacity. I have never met anyone who has always been right. I have never even met

anyone who says he is always right. We all make mistakes in this guessing competition, and it is this fact which is responsible for such different rules of treatment. The clinical signs and the pathological changes do not invariably follow suit as they do, for example, in strangulated hernia, and the bug-bear of abdominal diagnosis is the abdominal wall. As I have already stated, there are those who claim that they can distinguish appendicular inflammation from appendicular obstruction, and in many cases they may be right, for there are differences such as I have indicated. Nevertheless, much must depend on the day of the disease when the patient is seen, and obstruction is likely to give rise to inflammation. The converse may also be true. Personally I endeavour to distinguish between disease limited to the appendix, to the right iliac fossa, and that which has reached the general peritoneum. The first requires a decision as to whether the appendix is perforated or not. The second is concerned with the diagnosis of appendicular abscess. The third has to do with the later stages of the disease, or more rarely an early stage of a very severe attack. Whatever the symptoms, whatever the pulse-rate, whatever the temperature, these points in differential diagnosis depend on a correct interpretation of physical signs. If there is a visible tumour in the right iliac fossa it nearly always indicates the presence of a localised abscess. If the respiratory excursion of the abdomen is really not impaired the disease must be limited to the appendix. If the abdomen is not appreciably distended and yet it does not move on respiration general peritonitis may be inferred. If abdominal distension is present this diagnosis cannot be made by observation alone.

The weapon of precision for diagnosis is the warm hand placed flat upon the abdomen. The last area to be examined is the right iliac fossa. Palpation should start in the left iliac fossa and be continued round the abdomen finishing on the right side. Particular attention must be paid to comparison between the rectus muscles and the right and left flanks. If tenderness and rigidity are present in the left flank it is strong evidence of general peritonitis. If there is no true rigidity of the right lower rectus and yet there is definite tenderness on deep pressure it is almost certain that the disease is limited to the appendix. In most of these cases there is also some cutaneous hyperæsthesia, best elicited by pinching up the skin of the right iliac fossa. The appendicular condition most likely to give rise to this physical sign is a state of inflammation with distension. When the appendix is gangrenous it is often absent and as a guide to treatment I think far too much has been made of cutaneous hyperæsthesia. The inflamed appendix apart from omentum and inflammatory exudate can seldom be palpated, but on two or three occasions I have felt it like a thick lead pencil beneath the skin, and operation revealed it in a most superficial position. This is only possible in the total absence of rigidity of the rectus and therefore in an early phase of the disease. In one

of these cases certainly there was no cutaneous hyperæsthesia. The mucosa was gangrenous. No considerable mass in the right iliac fossa, not much rigidity of the lower right rectus, but quite definite tenderness on deep palpation and a normal abdomen elsewhere, will justify the diagnosis of inflammation limited to the appendix. A word must, however, be said with regard to the pelvic appendix. Here the abdominal physical signs are sometimes said to be entirely absent but in my experience that is not the case. They are reduced to slight lower abdominal distension with hypogastric tenderness. This last sign I have never known to be entirely absent. Inquiry will usually lead to an admission of frequency of micturition and often of defæcation—but not true diarrhœa. Rectal examination provides the key to the diagnosis, and, in the male, definite tenderness in the right half of the pelvis reveals the nature of the disease. This is rarely limited to the appendix and the mass felt is usually appendix + adhesions + exudate. In the female the diagnosis is far more difficult, and both tubal pregnancy and tubal inflammation may be mistaken for an inflamed appendix. A careful consideration of the history and examination for vaginal discharge may give the clue to the true state of affairs, but in some cases accurate differential diagnosis is impossible.

A mass in the right iliac fossa may easily be rendered impalpable by rigidity of the overlying rectus. For this reason it is sometimes necessary to defer the decision as to whether the disease has spread beyond the appendix until the muscles are relaxed under anæsthesia. If any considerable mass is then felt it is clearly not the inflamed appendix alone.

The discovery of an appendicular mass or tumour raises the question as to the presence of pus. A visible, palpable tumour nearly always means pus. A palpable mass in a case with a history of over five days usually indicates the presence of an abscess. A good deal can be decided by percussion. If there is absolute dullness it usually means that pus is present and that the abscess wall lies close beneath the peritoneum. Fluctuation and œdema of the skin are very late signs and we rarely see them nowadays. A leucocyte count may be helpful, and anything over 15,000 white cells per cubic millimetre is a strong indication of the presence of pus. There are cases where the presence or absence of pus can only be determined by operation and to this question I shall return in dealing with treatment.

General peritonitis with its anxious facies and its hopelessly bad prognosis is not very common in appendix cases. This is due to more competent diagnosis and the general appreciation of the value of early surgery. This knowledge is shared by the public as well as the medical profession, and sometimes it is the patient rather than the doctor who desires immediate operation.

If there is rigidity in the left flank, with impaired respiratory movement and dullness on percussion,

some degree of general peritonitis is to be inferred. The tongue is dry and the pulse rapid. The temperature is often raised but not necessarily so.

TREATMENT.

I suppose that until such time as satisfactory prevention, or a curative serum, for appendicular disease is invented, the treatment of acute appendicitis will continue to be a subject of controversy. That each case must be dealt with on its merits is a truism, equally applicable to other diseases. Yet certain principles have been well established and the first is that operation, and by that I mean appendicectomy, within 30 hours of the onset of an acute attack has no higher mortality than appendicectomy in the quiescent period for recurrent cases, or those where only one attack has been experienced. Since this is so the simple rule for treatment is appendicectomy, provided the diagnosis is made early enough. The disease at this period is nearly always limited to the appendix, perforation is rare, and even when the organ is gangrenous the abdomen can be safely closed without drainage, and the prognosis is very satisfactory. But not all cases of appendicitis are seen at this early period; the patient may have delayed in the hope that symptoms would abate, or an amateur physician may have tried to treat the case. Furthermore, the onset of the disease is not always abrupt and the day of the illness may be obscure. What, then, should be the attitude of the doctor in charge of a case where the disease is certainly two days old? Much depends on an interpretation of the physical signs, and for this reason I have paid especial attention to diagnosis of the state of the appendix and the peritoneum. Personally I do not think one should be influenced too strongly by the supposed length of history for this is often an uncertain factor. More emphasis should be laid on the question of limitation of the infection. If, after full consideration of all the points, one arrives at the conclusion that the disease is limited to the appendix, immediate appendicectomy will yield the best results.

The real difficulty in laying down rules for the treatment of acute appendicitis concerns those cases when the history is longer than 30 hours and it is probable that the disease has spread beyond the appendix. The name of "perityphlitis" is quite a good one for such cases, although it is old-fashioned. There are those who consider that the presence of cutaneous hyperæsthesia is a safe guide to a policy of delay, but this is by no means infallible and such a policy can only be carried out with the minimum of risk in a hospital or nursing home. In addition it is inapplicable in the case of young children and old people. All depends on the diagnosis of the state of the peritoneum. Is there unlimited perityphlitis, is there an inflammatory mass limited by adhesions, is pus present? My own view is that most of these cases should be operated on as soon as the diagnosis is made, but the

purpose of the operation should not necessarily be appendicectomy. We should aim at the relief of intraperitoneal tension and thus lessen the risks of peritoneal absorption and spread of paralytic or inflammatory obstruction. When the so-called "delayed treatment" is practised, and this means physiological rest until all the symptoms have been in abeyance for ten days and then appendicectomy, there may still be a mortality. It will not be due to failure of surgical technique but to a failure to appreciate the true state of affairs before operation. A consideration of recent figures from the statistics of St. Thomas's Hospital may help to make this point clear. During the years 1919 to 1923 214 cases were treated on delayed lines. Of these 143 were handled with no mortality and this reflects credit on both the medical and surgical sides of the hospital. In 71 cases, however, it was thought that the symptoms would subside and a simple appendicectomy be carried out. These hopes were not justified and, on account of persistent fever, pain, vomiting or some such manifestations, operation was done as an urgent measure. Of these cases no fewer than nine died, giving the high mortality of 14 per cent. The causes of death were general peritonitis, subphrenic abscess, and small bowel obstruction—three cases under each of these headings. In one case out of three, then, surgery was resorted to as an emergency and these operations carried an unduly high mortality. If in all these cases the policy of delay had been persisted in there is no doubt that some survivals would have been registered. If all of them had been treated by operation at sight there would still have been deaths to record. I venture to think that in the latter case there would have been only one cause of death—namely, general peritonitis. It is undiagnosed peritonitis which accounts for the mortality of appendicitis more than anything else, and I am afraid general peritonitis, from whatever cause, is always likely to have a high mortality. For this reason I urge the relief of intraperitoneal tension, by physiological rest in suitable cases, by surgery in others.

The case of appendicitis with an inflammatory lump is the most difficult to treat correctly. If the mass is shut off from the general peritoneum it matters very little whether it contains pus or not. If it is not so shut off by adhesions, will time cause this to be achieved or is there danger of general peritonitis or small intestine obstruction? One must repeat that each case must be judged on its merits, but I believe that if the condition of the patient is good the quickest way to health is by immediate operation. If the mass is dull on percussion pus is likely to be present and to lie close beneath the abdominal wall. If the abscess can be opened without traversing the peritoneal cavity I think the usual surgical rule of giving exit to pus, in order to get rid of an infected foreign body, should certainly be followed. There are those who seek to wait for the absorption of pus and there is no doubt that such absorption does take place in the

peritoneal cavity. Such a procedure, however, exposes the patient to greater risks than does the incision of an abscess. The moment for such operation should only be decided by the surgeon who will do the operation, and if he waits a day or two to allow pus time to become more accessible he oftentimes shows his wisdom. Even in those cases where pus is expected and not found I still believe the operation of *coeliostomy*, by which I mean rubber drainage through the abdominal wall down to an inflammatory mass, has much to recommend it. A mass so treated usually discharges pus from the third day onwards and with this external vent there is much less danger to the peritoneal cavity. If the peritoneum is entered before the mass is reached then gauze packing should be employed to shut off the main cavity before the rubber is inserted. This gauze may be removed at the end of the operation.

Appendix abscesses may be reached through any incision over a dull spot having regard to the structure of the abdominal wall. If the incision is outside the rectus sheath a gridiron incision will serve best. Incisions internal to the *linea semilunaris* are best deepened by displacement of the rectus muscle. An abscess should be drained by a tube which reaches to the bottom of the cavity; for drainage in other cases corrugated rubber is to be preferred to a tube. Tubes may exert injurious pressure on the wall of adjacent bowel and for this reason they should not be left *in situ* many days. They may be replaced by corrugated rubber after the third day.

I have already said that appendicitis should be treated by appendicectomy, and after the drainage of an inflammatory lump, or a localised abscess, the appendix should be removed. The optimum time in my experience is six weeks after the drainage wound has soundly healed. Infection will then have died down and adhesions will have been absorbed unless they are fibrous; in that case they will probably be permanent.

To sum up; with regard to the treatment of cases where the disease has spread beyond the appendix itself, if a policy of delay is to be carried out it can only safely be done under hospital conditions and it should only be done by the surgeon who will have to operate. It is for him to choose the moment for surgical intervention. Appendicitis is no longer a medical disease and the treatment of it is the province of the surgeon.

Finally, we have to consider the treatment of appendicitis complicated by general peritonitis. By this expression I mean a peritoneal infection which has no obvious limitation, and this is absent either because of the rapid spread of infection or owing to the failure of the defences of the patient's peritoneum. The omentum is often successful in walling off an inflamed appendix, but it cannot be too clearly recognised that general peritonitis does

not always mean a late stage of the disease. I analysed recently a series of 187 cases at St. Thomas's with respect to the day of the disease—all primarily appendicular—in which general peritonitis was encountered at operation. Ten per cent. of these patients had been ill for not more than 24 hours, 46 per cent. for two days, and 21 per cent. were operated upon on the third day of illness. The rest had had symptoms for from four to seven days. The mortality in this series was 29 per cent., a very high figure, and one which, taken with the ascertained length of history, goes to show that even early diagnosis will not eliminate the mortality from acute appendicitis. There seems abundant reason to believe, however, that more modern methods of treatment, combating intestinal intoxication combined with early appendicectomy and drainage, will have an effect in the sensible reduction of the mortality of general peritonitis. Twenty years ago the death-rate from appendicitis with general peritonitis was over 70 per cent. To-day these cases are more rarely seen and their mortality is very much lower. This, I think, is largely attributable to the principle of early diagnosis and prompt operation.

A "wait and see" policy does not commend itself to me in general peritonitis, and I believe its presence is a clear indication for rapid appendicectomy and drainage. It is most important that these patients should not be submitted to a lengthy operation, and the lowering of the mortality has been partly due to the abolition of chloroform in toxæmic patients and to the increasing use of gas and oxygen. I have seen a few, a very few, patients with appendicular peritonitis, who were judged too ill to be operated upon, recover after rest and starvation. I have seen others develop a localised abscess. Nevertheless I think until further information is gained as to the cause of toxæmia in general peritonitis, immediate operation is the safest line in treatment. As to drainage, there are those who shut up the abdominal incision in every case. They will inevitably encounter suppuration, at least in the abdominal wall, in a certain proportion of their cases, and I think pelvic and subphrenic abscesses are more frequent than when drainage is used at the primary operation. Whether the peritoneal cavity itself should, or can, be drained is a controversial matter. My own preference is for drainage of the pelvis, and the adoption of the Fowler position, whenever, after appendicectomy, it seems impossible to leave a clean peritoneum. In other cases where one knows that the appendix has perforated, where the seat of operation is obviously contaminated, closure of the peritoneum with drainage of the more superficial part of the abdominal wall, usually the rectus sheath, is the best practice. The peritoneum has bactericidal properties, otherwise it would suffer more than it does. The rectus sheath may harbour infection; it can only repel it with difficulty. Relief of tension is half the battle in the resistance of infection.