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CLINICAL LECTURES

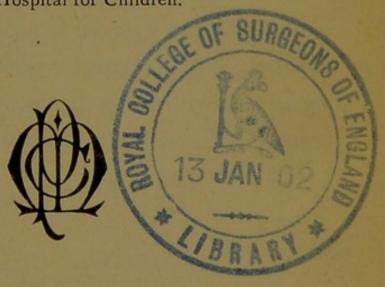
ON THE

VARIOUS FORMS OF INTRA-ABDOMINAL SUPPURATION.

BY

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London

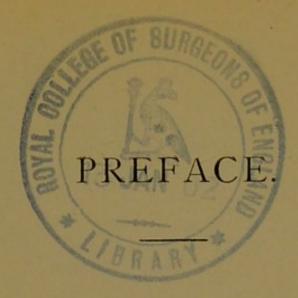
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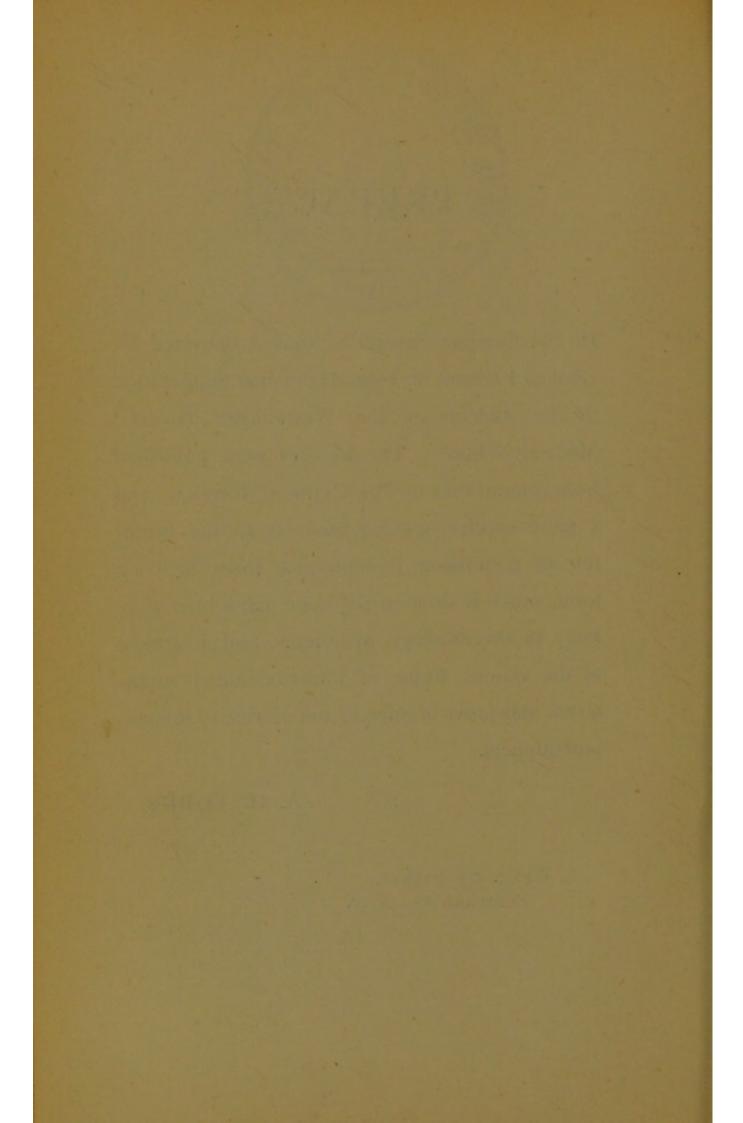
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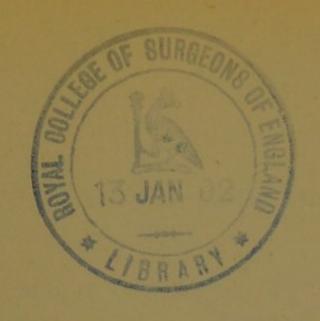


In the Summer Session of 1900 I delivered six Clinical Lectures on Intra-Abdominal Suppuration to the students of the Westminster Hospital Medical School. The lectures were published from time to time in The Clinical Journal, and I must express my indebtedness to the Editor for his permission to reproduce them in book form, which is done in the hope that a brief summary of the ætiology, symptoms, and treatment of the various forms of intra-abdominal suppuration may prove of interest and service to medical practitioners.

A. H. TUBBY.

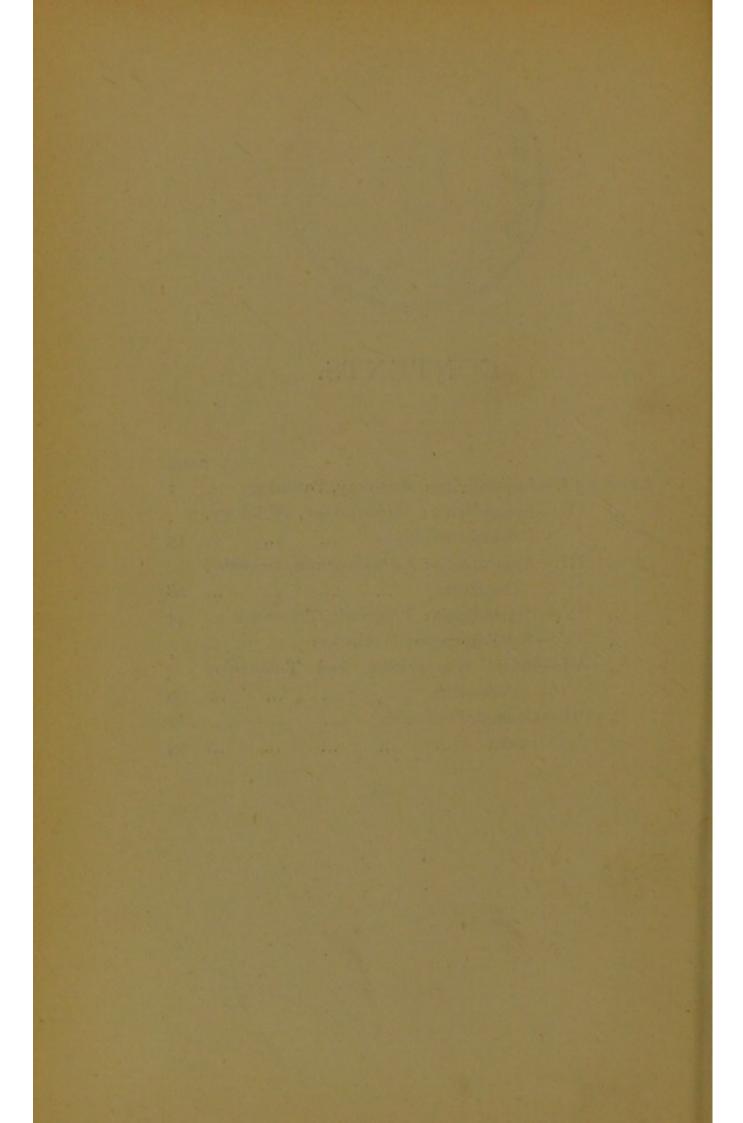
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CONTENTS.

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I.	AGE
logy	I
Etiology,	
	13
	28
ment	44
,	57
bercular	
	69
	82
	93
	logy Etiology, Sequelæ, ment bercular



CLINICAL LECTURES

ON THE

VARIOUS FORMS OF INTRA-ABDOMINAL SUPPURATION.

LECTURE I.

ON APPENDICITIS.

GENTLEMEN,-It seems to me that with the opportunity which now presents itself of delivering several weekly clinical lectures, the best plan to adopt is to choose a subject of width and importance, to deal with it in its various phases, and to illustrate it by cases we have had in our wards during the past year. The subject of the various forms of intra-abdominal suppuration has been therefore chosen. With regard to clinical lectures, they should be of such a character as to be of permanent value for practice, and that this may be so a synopsis of this lecture has been prepared, and copies are now passed round. It is my intention to distribute a synopsis of each succeeding lecture, so that you may take away with you the gist of what has been said, and be enabled to retain a résumé of the subject.

Tubby.

Intra-abdominal suppuration is a wide subject, and you will see that it is divided into the localised and general forms. The most common form of localised suppuration is appendicitis, and we shall devote two or three lectures to that subject. Then we shall pass on to the consideration of subdiaphragmatic abscess, which is as rare as appendicitis is common, and then to perisplenic abscess, which occurs in connection with certain gastric ulcers. Suppuration in the lesser cavity of the peritoneum is a rare but exceedingly interesting form of localised intra-abdominal suppuration, and in the last ten years it has acquired a literature of its own. There are also included certain forms of tubercular peritonitis, because pus is often localised in sacs, and then there are the intra-pelvic forms of suppuration. Finally we shall deal with the general suppurative condition of the peritoneum known as acute general peritonitis. The connection which it is important to enforce between localised and general suppurations is, that they are not necessarily distinct clinically, for most cases of general peritonitis commence in localised forms. Some years ago acute peritonitis was divided into idiopathic and secondary. The idiopathic form of peritonitis was said to supervene in children from cold. We have now come to recognise the fact that no form of acute general peritonitis occurs without there being, as a rule, some localised cause, or else some constitutional condition, such as Bright's disease.

LOCALISED INTRA-ABDOMINAL SUPPURATION.

I. Appendicitis.

Many of you have for some time been seeing numerous cases of this disease, and you will find that the synopsis will roughly focus the salient points. First, as to the nomenclature of appendicitis: there are several other terms which are being used as synonymous. Mr. Treves prefers the term perityphlitis; Küster calls it epityphlitis, while another surgeon styles it epiphyaditis. Appendicitis is not etymologically correct, but on the whole it is a term which is fully justified by use. Almost all inflammations in the right iliac fossa are due to morbid changes in the appendix.

In its clinical phases there is no disease so protean nor so extraordinary in its nature. A case of appendicitis beginning very quietly may, within twenty-four hours, develop so alarmingly that the patient is soon seen to be suffering from acute general peritonitis, and perhaps in thirty-six hours is dead. On the other hand, a case beginning in an intense and acutely painful form may go on for two or three days in such a way as to suggest that it is one of acute general peritonitis almost from the first. Yet you may find that the temperature falls and the pain subsides suddenly, and the patient is well on the road to recovery in six days. Again, some cases begin in a mild way and then become suddenly acute, and the patient dies; others afterwards quieten down and

end in recovery. It is therefore impossible to forecast at the beginning of an attack what the outcome will be, whether the patient will be alive at the end of a week, or the attack will be mild or severe, or the illness will prove to be of long or short duration. But for the purpose of clinical teaching one is obliged to make a classification of appendicitis, although it is a disease in which classification may be regarded as harmful, because one may truly say that it is almost impossible to "pigeon-hole" the various cases met with. Moreover any particular attack may show, at various stages, the characters of several forms.

We shall commence with a description of simple catarrhal appendicitis. It is a catarrhal inflammation of the appendix, and is comparatively mild, but it certainly has very serious outcomes, because recurrent catarrhal appendicitis will bring about changes in the appendix which lead to destructive changes. Then there is the variety known as adhesive appendicitis. This is illustrated by the usual form of appendicitis which you see in the wards. A patient comes in with pain, vomiting, and constipation; you place your hand over the right iliac region and feel a hard lump, which is very painful. It is a solid exudation in the peritoneal cavity in the neighbourhood of the cæcum. The tongue is foul, the bowels constipated, the temperature is raised, and the abdomen is full.

Resolution commences about the sixth to the tenth day, the temperature falls, the bowels act naturally, and the induration gradually disappears. Then you have appendicitis with abscess, which is a sequence of adhesive appendicitis, for a certain portion of the exudation breaks down. Again, there is appendicitis with perforation or gangrene of the appendix—a very serious form. Finally, there are the relapsing and recurrent forms of appendicitis. A distinction should be made between these forms: Relapsing appendicitis means that the patient never is really well between the attacks; that he is always in trouble about his appendix and worrying about it, and his mind is always brought into relation with his appendix. In recurrent appendicitis the patient has an attack of appendicitis and then gets well for a time; but it may be that he is hurried, or takes something indigestible one night, and then he wakes up early in the morning in acute pain and he knows by the symptoms that he is in for another attack of appendicitis. So that one may say that in relapsing appendicitis the patient is never well between the attacks, while in recurrent appendicitis he is.

Before I discuss the disease itself, it is well that I should go over the anatomy of the various parts. The ileo-cæcal region is a region in which development has not taken place to its full extent, but has been partially suppressed. In herbivora, such as rabbits, the cæcum is a

long one, but in man the proximal part of such a cæcum is represented by the cæcum itself, and the distal part is represented by the appendix. So that the appendix is really a structure in which development has remained stationary. You are aware from the history of certain forms of new growths, that if it happens a tissue or structure fails to attain its full development, it is extremely liable to undergo inflammations and degenerations. This is precisely what occurs to the appendix. So that the appendix is not only subject to inflammations, but to malignant growths, although primary carcinoma is rare. As to the appearance presented by the appendix, you know it quite well, but there is one practical point with regard to operating. If you are searching for an appendix to remove it, it sometimes is by no means easy to find, as it is bound down by adhesions, and often tucked away. You should then define the muscular bands on the cæcum, for these are continued straight down on to the appendix. That is the case with one band in particular, the anterior muscular band. So you ought not to make any mistake between a dilated appendix and the ileum. You will be all the more careful if you think what are the consequences of making an error. appendix is entirely covered by peritoneum, so that appendicitis is an intra-peritoneal affection.

It is necessary to emphasise a fact which has important clinical bearings, viz. the appendix

may take all manner of abnormal positions. The usual position is for it to hang down in the pelvis. In 51 per cent. of cases it is so placed; but it often happens that the appendix takes a different course. Often it is directed towards the kidney and its tip is just below that organ. There is a patient in Queen Anne Ward who has a perinephritic abscess, and the pus has a fæcal odour, so that there is no doubt the abscess is due to a suppurating appendix which lay below the kidney and originated the suppuration in the neighbouring tissue. The rarer situations are towards the middle line. For instance, the appendix may turn towards the middle line, and lie across the vena cava and the aorta. If the appendix is of undue length it may pass well towards the left side, and in such cases a left-sided appendicitis exists, although, as a rule, appendicitis is a right-sided affection. I dwell upon this point to show that in some cases you may have an appendicular abscess on the left side of the abdomen and not on the right. The appendix has been found below the liver, and even in the sac of a hernia, where it has become inflamed and suppurated. You have often heard of McBurney's point. It is a spot on the anterior abdominal wall which approximately corresponds with the insertion of the appendix into the cæcum. It is almost always situated at the mid point of a line drawn from the umbilicus

to the anterior superior spine of the ilium. More accurately, it is two and a half inches from the anterior superior spine on that line. But the actual position of the appendix depends upon the position of the cæcum, and the position of the cæcum is not so constant as was at one time thought. In some cases the cæcum is high up, and in one instance it was found tucked well up under the liver. In that case the patient had an abscess, which was situated in the right hypochondriac region and well beneath the liver, so that the abscess was a subhepatic one. At the junction of the appendix and the cæcum is a valve, which anatomists call the valve of Gerlach. It is not really a valve, and is not of any value, being of anatomical rather than clinical interest. Messrs, Lockwood and Rolleston have described three fossæ of the peritoneum in that situation. You are asked to remember that there are the ileo-colic, the ileo-cæcal, and the subcæcal; and they of great importance from a clinical and operative point of view. The appendix has a small meso-appendix. is of considerable pathological importance, because it varies much in length. If it be very short and the appendix become inflamed and thickened, it twists upon itself, so that a constriction is produced and cystic dilatation of the tip follows. I have already spoken of the muscular bands of the appendix. The normal length of the appendix is three and a half

inches, but we recently operated upon a case in which it was seven inches long and passed over the external iliac vessels into the pelvis.

A healthy appendix should have no constant contents; it is only when it gets into the habit of retaining its contents that it is liable to inflammation. In passing I may allude to the various contents which are found there. The most common are fæces in various stages of hard-Now one may imagine the following condition of things to occur: -If a patient has a considerable amount of fæcal matter constantly in the cæcum, a certain portion will lodge in the appendix. But if the appendix is quite healthy, when evacuation takes place and peristaltic movements of the large intestines are set going, the appendix expels its fæcal matter and remains empty for a considerable time. If the patient suffers from continued constipation, and these peristaltic movements are neither frequent nor vigorous enough, fæces which get into the appendix remain there, and water is absorbed from them, with the result that there forms what is known as a fæcal concretion or an enterolith. This condition continues until there is a large mass of hard fæcal concretion retained in the appendix. Sometimes in the appendix there have been found various foreign bodies, such as cherrystones, strawberry seeds, oatmeal husks. cases are recorded in which pins were seen in it. In several instances they have been

found in appendicular abscesses; and what is remarkable is that an appendix was found in the sac of the hernia, which was strangulated, and in the end of the appendix was a pin.

Next with regard to the morbid anatomy and pathology of the parts. As to the cæcum, formerly the opinion was held that all the inflammations in this region arose from the cæcum and not the appendix. The modern idea is quite the opposite, namely, that all inflammations in that region, or practically all, are appendicitis, and that the cæcum has nothing whatever to do with it. As is always the case, the truth lies between the two. One may say that most of the inflammations in this region are due to the appendix, and that a few arise from ulcerative changes in the cæcum. Does typhlitis exist? By that I mean inflammation of the cæcum. I think it does, and I could quote you one case of mine in which I had strong reason to believe that typhlitis was present.

Then as to changes in the appendix. In what respects does it become altered? It is a useless pouch, but, as we know, fæcal matter can get into it, and it can not only get into it but stay there. In the appendix there is found a large amount of lymphatic tissue, because the Peyer's patches which you find in the large intestine are continued down into the appendix in the submucosa. Then there is a mucous membrane, with a great amount of absorbing power. Those who have studied the

bacteriology of the appendix have found a very large number of the Bacillus coli communis and occasionally Streptococcus pyogenes aureus, and even Pneumococcus, so that you have in an appendix all the conditions for an inflammatory flare up; there are the foul irritating concretions, a mucous membrane which has an immense absorbing power, a virulent septic bacillus, and beneath the surface of the absorbing mucous membrane there is a submucosa with a large amount of lymphatic tissue, and in the neighbourhood there is a large lymphatic sac of peritoneum.

The appendix undergoes certain definite changes in disease. There is chronic catarrh of the mucous membrane, much the same as occurs in the mucous membrane of the larvnx and nasal passages with an ordinary cold. The submucous tissue becomes thickened, and there are a number of inflammatory cells exuded in the submucous tissue and in the muscular tissue. These inflammatory cells organise and form new fibrous tissue, and that makes a gradually constricting ring round the appendix causing a cystic appendicitis. If this condition goes on throughout the appendix there is actual obliteration of the canal. If a man has a sufficient number of attacks the whole of his canal may become blocked up in this way. It is an extremely rare form, and its occurrence cannot be relied upon. Every now and then you do find, post mortem, cases in which the actual canal

of the appendix has become obliterated, and when it is so a patient is not likely to have further trouble. Lastly, there may be gangrene, either localised or total.

In the next lecture we will pass on to the more interesting grounds of symptoms and diagnosis.

LECTURE II.

APPENDICITIS (continued).

GENTLEMEN, -At the previous lecture the various diseased conditions which are met with in the appendix were spoken of, and then I passed on to describe the several changes which might be met with in the peritoneum, and the statement is true that, "there can be no appendicitis without a certain amount of concurrent peritonitis." In every case of appendicitis there must be some degree of peritonitis with it, varying of course considerably in extent and in virulence, for the appendix is an intra-peritoneal structure. The peritoneum may be affected in different degrees: for instance, there may be adhesive peritonitis, that is to say, simply a pouring out or exudation of plasma which does not break down into pus; or pus may form in the effusion. You thus have a localised abscess which is known ordinarily as a perityphlitic abscess. Or the onset of peritonitis being quite localised, it may spread and become a general inflammation of the whole peritoneal cavity. Indeed, it is not possible in actual clinical experience always to mark off, as it were, a boundary line between adhesive, localised, and general peritonitis, because you will find in some cases the disease begins in adhesive peritonitis.

goes on to localised abscess, and such a localised abscess may burst into the general peritoneal cavity; and so there ensues a general peritonitis. The question is, what is the exciting cause of peritonitis? Undoubtedly the prime cause is the action of certain bacteria, and the bacterium which is most active is the Bacillus coli communis. In all appendicular abscesses and in appendicular peritonitis you find this bacillus present in the effusion. It is astonishing what great virulence this bacterium acquires. It has been found in the secondary abscesses of the liver which follow appendicitis; it has been found also, I believe, in abscess of the brain secondary to suppuration in the abdominal cavity. With regard to the life-history of this particular bacillus: In health the intestine is full of this organism, and it has the power, under certain conditions, of changing its nature, that is to say, from a comparatively mild and beneficent bacillus in health, it becomes an intensely virulent pusforming and suppuration-producing bacillus, as in the case of a diseased appendix. What actually causes the bacillus to change its rôle we do not know precisely, but it certainly does so, and undergoes most virulent changes. With regard to the adhesive peritonitis, which I have mentioned, you generally find the organism associated with every catarrhal form, and even in the solid exudation of appendicitis it has been possible to show, by proper staining methods, the presence of this

particular bacillus. Adhesive peritonitis is a matter of importance, because you will understand that if the amount of exudation is very large, the coils of intestine may be bound down in such a way that they become kinked, and then follow signs of intestinal obstruction. A perityphlitic abscess generally results from a more serious condition of the appendix than adhesive peritonitis. You find with a circumscribed abscess that there are distinct ulcers of the appendix, either with or without a perforation. The abscess may be found in various places, in the right iliac fossa, in the pelvis, round the kidney, underneath the liver, or, as I have said before, on the left side, under certain curious anatomical conditions. These conditions are as follows:-The patient has a large appendix which turns towards the left side and runs across the spine; its tip becomes perforated on the left side of the median line, so that there is a leftsided appendicitis. Still, as a rule, appendicitis begins on the right side. The abscess varies very much in size; it may contain a drachm of pus, or two or three quarts. It may be, as in the case in Henry Hoare Ward, localised to the right iliac fossa, or it may extend as far as the umbilicus or beyond it. The shape of the exudation or abscess may be either round, triangular, or oval. When pus once forms there is always a very dangerous element introduced into the case, namely, the possibility of a patient having

pylephlebitis, or a septic inflammation of the veins of the liver.

With regard to the contents of the abscess, they consist of pus mixed up with a certain amount of fæcal matter, and showing ample evidence of the presence of the Bacillus coli communis. General peritonitis may be either primary or secondary. In the primary form of peritonitis the appendix suddenly sloughs and gives way, and the foul contents are diffused through the whole peritoneal cavity. This is often fatal. The secondary form of peritonitis is that in which a localised perityphlitic abscess situated in the right iliac fossa bursts into the general peritoneal cavity, and secondary infection of the peritoneum takes place.

There is one form of general peritonitis which I must allude to, namely, the most virulent form, a dry peritonitis, in which you find next to no effusion into the peritoneal cavity. Some writers say that this is always fatal.

Touching upon the affections of the appendix, I might allude to actinomycosis and new growths. Actinomycosis has been recorded by Mr. Makins, and it is interesting surgically, but I do not think it need receive our very serious consideration in this course.

The appendix is often the site of new growths, commonly carcinoma, and certainly these new growths are occasionally mistaken for appendicitis, for sometimes suppuration occurs with them.

Regarding the bacteriology of appendicitis, undoubtedly the main agent is the Bacillus coli communis. In health, and so long as the intestinal tract remains absolutely intact, the bacillus appears to be harmless, but if for any reason the wall of any part of the intestinal tract becomes diseased, that is to say, loses its full vitality, then there is a distinct change in bacterial action. The bacillus is at once absorbed, and being taken up into the tissues it sets up acute septic changes, and this absorption is not only into the intestinal wall but into the peritoneal cavity. The bacillus, as I have previously said, may be found in the pleural cavity, setting up there empyema, or in an abscess of the brain, and it is not uncommonly found in pyæmic disease of the liver arising from appendicitis. It is not the only micro-organism present, for you may see also the streptococcus and staphylococcus, and, strangely enough, the diplococci of pneumonia.

We will now leave the pathological side of appendicitis and pass on to the clinical. First, with regard to atiology. It is essentially a disease of young life. I took an opportunity to abstract notes of fifty cases which occurred in the wards of Westminster Hospital, and I found that 8 occurred under ten years of age, 24 between ten and twenty, 11 between twenty and thirty, 3 between thirty and forty, 1 between forty and fifty, 3 between fifty and sixty. The explanation of this is that in young life the secretive activity Tubby.

of the intestine is greater, and its absorptive activity is more, and the lymphatic tissue is very much larger in quantity. Appendicitis is a disease which is four times more common in the male than in the female. I think the explanation of that is that males on account of their hurried conditions of life, eat more rapidly, and often more heartily than females. There is also a difference in the arterial supply in the male as compared with the female. In the male the appendix has only one vessel, but in the female two, the one being the vessel of the mesentery of the appendix, and the second derived from the ovarian artery. And it follows that the greater the blood-supply the less the likelihood of ulceration and of gangrene. In the next place, there is no doubt that appendicitis is distinctly hereditary. One has often wondered why it is, and I think perhaps the explanation is that the retention of fæces, or the entrance of foreign bodies into the appendix, depends very largely upon the size of the aperture by which the appendix communicates with the intestinal canal, and this is an hereditary peculiarity.

The disease is more common in the summer than in the winter or at any other time, and the cause is that people eat in the summer indigestible food, such as lobster, salads, salmon, and on that account are very liable to intestinal fermentation.

A very interesting feature in connection with

the ætiology of appendicitis is the question of injury. You frequently find the patient says he was quite well until he received a blow on the lower part of the abdomen, on the right side, and within a very short time of that his trouble in the appendix came on. The reason is that the patient probably had a cystic or catarrhal appendix which gave rise to no symptoms until he had a blow on it, which caused acute inflammation, resulting in an attack of appendicitis.

Next with regard to foreign bodies: When I was a student we were told that all cases of appendicitis arose from the presence of foreign bodies. That is not true. The usual form of foreign body present is a false one, namely, a fæcal concretion. It is comparatively rare to find a true foreign body, such as a pin, a cherry stone, or a plum stone, and in a large proportion of cases a fæcal concretion is a cause of the appendicitis. They become very hard. Dr. Hawkins, of St. Thomas's, notes a case in which the mass was so hard that when it was thrown on the floor of the post-mortem room it bounded up like a marble. There is no doubt that early observers mistook these hard masses for cherry stones or what not, because fæcal concretions assume various shapes: they are described as being oat-shaped, marble-shaped, cherrystoneshaped, and so on.

The condition of the appendix is, to a degree,

what we make it, and depends on the way in which we treat our digestive tract. People who are gross eaters and hasty feeders, who care nothing for their digestion, are more liable to appendicitis than others. It is very important to examine the teeth. If a patient is unable to masticate his food properly, it stands to reason the food sets up fermentative peristalsis, accompanied by alternating diarrhœa and constipation later on, and so he is very liable to attacks of appendicitis. Bearing on the question of the condition of the digestive apparatus, it is said that the Americans are very rapid eaters, and the men indulge in all manner of subtle liquors, and the women in ices and pea-nuts. Appendicitis is very prevalent indeed in America; so much so that I once saw an American lady who had come over here and she said, "Doctor, I have a habit of appendicitis." It was evident she knew something about appendicitis, and Americans suffer from it greatly. Much of the good work that has been done on the subject is by medical men on the other side. Appendicitis is very prone to occur in commercial travellers and medical men, because the conditions of their life are such that their food is often hastily eaten, and it is often uneven in quantity and quality. There are certain articles of diet which anybody who suffers from appendicitis should avoid with the utmost care, such as lobster, shrimps, and other savoury but indigestible foods.

The symptoms are either premonitory or actual, and we will first of all take the premonitory. A patient who has had one, or two, or three, attacks knows when he is going to have the next attack; there is a sense of general malaise; he has colicky pains in his abdomen, with either constipation for two or three days, or a loose foulsmelling diarrhœa; he has flatulence of a fœtid character, and often voids foul-smelling motions. What is the cause of that disturbance? It is that for some reason or other the absorptive and secretive intestinal powers have become perverted, and he excretes from the intestine a certain amount of foul gas. Those people can generally tell, even if they are apparently in health, when the next attack of appendicitis is coming on.

As to the onset, it is curious in point of time. A patient goes to bed overnight, having eaten a hearty and indigestible meal, and is apparently well when he retires. In the morning, about four o'clock, he wakes up and rouses everybody about him, and they find him doubled up with intense pain, and he is often seen to be collapsed. He refers his pain, not to the appendicular region, but to the whole abdomen, and he says the pain is so bad he cannot describe exactly where it is. I wish to emphasise the fact that in primary cases, and in many recurrent attacks, the hour has been noticed with great regularity. The character of the pain is severe, so much so that the patient may be collapsed, and it is such that it is

mistaken for biliary or renal colic. At first the situation is general, but about the second day the pain becomes localised. The question is, what is the cause of the acute pain and collapse? It is probably due to an implication of certain filaments of the mesenteric plexus in the neighbourhood of the appendix. Some cases, after two or three days, are accompanied by painful micturition, and then you may take it almost certainly that the appendix hangs down into the pelvis, and that the lower part of the ureter and bladder are involved in the appendicular inflammation. The pain is aggravated by purgatives, and there is no doubt that many patients with appendicitis have lost their lives through the untimely administration of purgatives. In fact, one knows of some cases which would certainly have run a benign course if purgatives had not been given, for their administration has led to suppuration, and in many cases to acute and fatal peritonitis. You may ask how can you distinguish between the early stages of what I may call a grievous lesion of the appendix and colic? Well, colic is almost always relieved by pressure, but the pain of appendicitis is aggravated by pressure. Therefore if you have to deal with an acute pain which is increased by pressure, do not give purgatives. Under certain circumstances the pain may disappear temporarily, but only to return, so that you must naturally adopt a waiting attitude.

Another symptom, and one of the earliest, is vomiting. In many patients the sudden pain is accompanied by vomiting. This is more especially the case in children, and it is interesting to note the course that the vomiting takes. If the vomiting be persistent for two or three days, you may begin to suspect very strongly that you are dealing with a very serious case in which pus will form, or acute general peritonitis has occurred. If the vomiting becomes stercoraceous or very offensive, it is certainly a case of acute peritonitis, and should be operated upon at once. Vomiting is less in a recurrent attack than in a primary attack.

Constipation is usually present from the first, and it is undoubtedly due to paralysis of the cæcum and of the large intestine. If there be acute inflammation of any portion of the intestine you will always find that from that point a certain amount of paralysis of the bowel radiates and so constipation sets in. If the constipation remain persistent over three days or more, you are dealing with a form of intestinal obstruction, which I shall speak of presently. Although constipation is the usual rule, occasionally diarrhœa is present instead. When there is persistent vomiting with diarrhœa, it generally means that a severe peritonitis is imminent, or that an appendicular abscess has formed early and very rapidly. The temperature rises quickly to 104° or thereabouts, and remains so for three or four days, and then

may subside. I hope you will bear in mind very carefully what I am going to tell you next: in a case of declared appendicitis the danger is extreme when the temperature is subnormal and the pulse over 100. The moment you see such a case as this you should be aware that you are dealing with a virulent case of appendicitis, a case accompanied by acute general peritonitis. There is no more definite danger-signal than those two combined conditions of pulse and temperature. If you are well aware of this fact you will have no excuse for delaying the calling in of surgical assistance. This rule is absolute and definite. An operation should be done at once to try to save your patient, and you will then have done what is right even if you do not succeed. The question is, how far is the temperature chart a guide to the presence of pus? If the temperature chart remain high for more than six days you may suspect pus, as we do in the patient we have been looking at in Henry Hoare Ward. It is now the eighth day, and the temperature has not fallen, and therefore it is my intention to explore. I do not think I shall find a large amount of pus; but I have a strong suspicion that it is there, and it is probably confined between some coils of intestine. Therefore the right thing is to make an opening into the tumour and leave a drainage-tube in. It often happens that pus makes its way out two or three days afterwards. You may suspect pus when the temperature has subsided, and after two or three days it suddenly rises again.

Now I like to distinguish between symptoms and signs. The symptoms are those which the patient complains of, the signs are what you see for yourselves. The most common sign is rigidity of the abdomen. As a rule, at first the whole abdomen is distended and somewhat rigid or tympanitic. Later on, at the second or third day, there is local rigidity and tenderness. If the rigidity should remain general it means acute general peritonitis. After two or three days a tumour may be felt. Tenderness is always present, and is best marked at McBurney's spot, two and a half inches internal to the anterior superior spine. The reason for that being the site of greatest pain is that it is the spot where the appendix arises from the cæcum. The shape and size of the tumour varies very much, but you may have appendicitis without any tumour at all. If a long appendix hangs down in the pelvis, the swelling is situated in the true pelvis and you cannot feel it except per rectum. As to the composition of the tumour itself, it consists of intestines, peritoneum, exudation, and, possibly, pus. Therefore the tumour will not always be uniformly dull, for if you happen to percuss over a portion where there is intestine there is a tympanitic note; yet if the tympanitic note should remain persistent it means that there is gas in the abscess cavity. The facial aspect of the

patient is distressed; there is a foul tongue and considerable thirst. If pus is formed and not evacuated the patient wastes and the urine contains indican or indoxy-sulphuric acid. It has been pointed out that in acute appendicitis with formation of pus there is an excessive number of leucocytes in the blood, and this condition is not found in typhoid fever. Therefore, by some authorities, leucocytosis has been relied upon as a sign of appendicitis as contrasted with typhoid.

Clinically, simple or catarrhal appendicitis is the mildest form. There is some constitutional disturbance, a temperature of about 100°, quick pulse, the bowels are confined, some local tenderness, and the attack ends in a few days. But the patient from time to time has reminders of what I may call the precarious condition of his appendix; in other words he has recurrent attacks.

A more severe condition is adhesive appendicitis with resolution. It is similar to the catarrhal appendicitis, but the attack is more serious and lasts longer, that is to say, from six to twelve days. In other cases a circumscribed abscess forms. It may ensue upon the simple catarrhal form, but more often upon ulceration of the appendix; or there may be acute necrosis or the bursting of a cyst, and the latter is more likely to occur if purgatives are given. Lastly, there are cases of appendicitis with acute general peritonitis from the first.

The diagnosis of pus is all-important. It is

no good to wait for fluctuation. If you do, your patient will probably die in the interval. The fact that the patient has no rigors is no guide, but pus may be suspected under the following conditions, which I beg you to carefully note. First, if there be early diarrhoea and much early vomiting. Secondly, if the symptoms do not subside in six days. Thirdly, if the symptoms subside partially and then increase between the seventh and tenth days. Fourthly, if there be a very large tumour present early in the illness; because, with a large amount of adhesive inflammation there is more liability for a portion of it to break down. Fifthly, you may suspect pus if the mass do not subside after the tenth day. Sixthly, pus is probably present if there be a second rise of temperature between the sixth and twelfth days. And lastly, you may suspect it if the general condition be bad. All these conditions point to pus, and if it be suspected it should be looked for, and it is sufficient justification for operating in appendicitis that pus may be present. It may be so from the first without fever; and decomposing pus in the abscess cavity may cause the tumour to be resonant. There is grave danger in leaving the abscess unopened. A case came before me in which operation had been delayed until the abscess burst and a fæcal fistula formed. A fæcal fistula, however, is one of the least of the evils that patients may suffer from if fluctuation be waited for

LECTURE III.

APPENDICITIS (continued).

GENTLEMEN, -In the second lecture we spoke of the diagnosis of pus, and we have now to consider the advent of general purulent peritonitis. It is not at all an uncommon event for acute general peritonitis to occur as the result of appendicitis; in fact, one may say that in childhood the most common cause of general peritonitis is appendi-As a rule, it is associated with perforation of the appendix, with gangrene, or the bursting of a cyst,-that is, with the more acute forms of appendicitis, and not the less, such as the catarrhal form. Again, it may happen that an appendicitis case is apparently doing fairly well, and then an intra-abdominal abscess or localised appendicular abscess suddenly bursts into the general peritoneal cavity, and foul pus is let loose, so that there ensues an acute general peritonitis of an especially virulent character.

An interesting variety of appendicitis is the recurrent. The distinction between recurrent and relapsing appendicitis has already been made in the previous lecture.

As an example of recurrent appendicitis I may allude to the case I saw this morning of a little girl whose appendix I removed last summer. She

had had five attacks, but she had been fairly well in the intervals. After operating I found a striking state of affairs. When I opened the appendix, an ulcer of the appendix was seen, and the floor of it was formed by the peritoneum only, so that she was within measurable distance of very grave danger. Her case was recurrent appendicitis. Relapsing appendicitis is that in which the patient is never well between the attacks, but passes on from one attack to the other, without being in health at all between the attacks. It is very interesting to note the frequency with which these cases recur. If five persons have each had one attack of appendicitis, the probability is that one out of the five will have further attacks; that is to say, the frequency of recurrences is one in five. This is a very important thing to bear in mind when considering the question of operation and removal of the appendix, and you may be certain that one of five will have relapses.

The symptoms of recurrent attacks are similar to those of other forms, because it stands to reason that the recurrent attack may take on any one of the forms which are met with in primary attacks; that is to say, it may be catarrhal, phlegmonous, suppurative, or the acute form of general peritonitis. It is important to know how you can ascertain whether a patient has an appendix which is in such a condition that you fear a recurrence, and Edebohls has found a sign; he

has shown that, given certain favourable conditions, it is possible to palpate the diseased appendix. He directs that the patient should lie on his back, with his knees raised, his head well up, his mouth open, and should take a deep breath; then you should feel very carefully the outer margin of the right rectus and sink the fingers in deeply towards the iliac crest. In many cases you will feel a thickened cord running along a line between the anterior superior spine and the umbilicus. If you roll that cord under the finger you can make tolerably certain it is a thickened appendix. Of course there are certain fallacies to be avoided; and one of them is that it may be the thickened tendinous cord of the psoas minor you feel. Another is that it may be the contracted muscular fibres of the internal oblique; or it may be an indurated omentum, or enlarged glands. But as a rule it is not difficult to ascertain the presence of this thickened appendix.

Appendicitis in childhood is very frequent indeed, far more so in childhood and adolescence than in the adult. In children it is very commonly mistaken for some other disease, e.g. for dyspepsia or bladder trouble, and it may happen, as is often the case, that the appendix is hanging down in the pelvis and the child has symptoms of incontinence or difficulty of urination. It is these symptoms which lead to the idea that it is bladder trouble. Unfortunately the condition is

sometimes aggravated by purgatives. Often, if there be pain in the right iliac region, the conclusion is hastily arrived at that the child has been over-eating, and purgatives are accordingly promptly given, with the result that the child soon has an acute general peritonitis. If you can exclude other conditions you may be safe in saying you are dealing with acute appendicitis. It often happens that vomiting is absent in children, and the signs of the disease are by no means so distinct; but there is one satisfactory fact about appendicitis in childhood, namely, that the worst cases in children recover more readily than they do in adults.

I next propose to deal with the complications, sequelæ, and diagnosis of appendicitis. Amongst the complications the most common is intestinal obstruction. I said the cardinal symptoms of appendicitis are pain, constipation, and vomiting. It therefore follows that in all cases of appendicitis there is always a very mild degree of intestinal obstruction,—not true intestinal obstruction. but rather a condition of impaction of the bowel contents. In a considerable number of cases it happens that the intestinal obstruction assumes a more severe form. For instance, there may be absolute obstruction. What is the cause of it? You will understand that there being an inflammation of the right iliac fossa extending upwards towards the kidney, and downwards towards the pelvis, a large number of coils of

bowel must become adherent, and these coils become kinked, so that there is a definite physical obstruction to the passage of the bowel contents, and the bowel itself may be bound down in a large inflammatory mass, hence the intestinal obstruction. I can remember very well ten years ago being called down to a suburb near London to see a little child. The history was that in the afternoon of two days previously, the weather being very hot, he had gone downstairs and drunk a large quantity of cold water, and then had been seized with acute iliac pain. When I saw him the whole abdomen was blown up, and it was apparently a case of virulent peritonitis. But bearing in mind former experiences of acute appendicitis in children, I opened the abdomen in the right iliac region, and was fortunate enough to evacuate a large abscess. It was an intensely septic case. For a time all went well; but eight days afterwards I was called again to see the child, and found that he had symptoms of intestinal obstruction. I felt it was no good to make a second exploration of the iliac region, so I made an incision in the middle line and examined the condition of the intestines. What had happened was that inflammation had spread, and the intestines were bound up in one great solid mass of adhesions. It was evident that the intestines were being slowly contracted by these bands of adhesion, and one could not hope to get any good result, so I formed an artificial

anus, but the child died two days afterwards, and the only benefit of the second operation was that he died in little pain instead of in agony.

Other complications are pylephlebitis, that is inflammation, septic or otherwise, of the radicles of the portal vein, hepatic abscess, and pyæmia. A good many cases have these complications. The radicles of the portal vein are often blocked up by large numbers of septic emboli which have come there from the mesenteric vein, and then abscesses are formed, not the usual single abscess of dysentery, but the multiple abscesses of pyæmia; and there is no doubt, as I have mentioned, the cause is a septic thrombosis of the radicles of the superior mesenteric vein from a necrotic or gangrenous appendix. Now you can never be quite certain, even when you have opened the abdominal cavity itself, on feeling the appendix what its exact condition is. It often happens that an appendix which is apparently healthy to the touch, when it is removed and slit open is found to have in its walls a septic ulcer; and it is curious to note that not always is the lesion apparent on the surface; you must make a section through the appendix itself in various directions to find it. You will sometimes see beneath the mucous membrane a localised abscess in the submucosa. Therefore you must never allow yourself to be deceived by an apparently healthy appendix, but you should take care to remove it and make

sections of it in various directions. A case I remember was where the abdomen was opened, the appendix looked for and found. It was thought to be quite healthy, was accordingly dropped back into the pelvis, and the wound closed. The patient died of hepatic abscess and pyæmia, and at the post-mortem the appendix was examined, and a localised necrotic patch was discovered between the mucous membrane and the peritoneum.

Another complication is pleurisy or empyema, which is usually right-sided; and it is interesting that in most of these cases of abscesses in the pleural cavity associated with appendicitis you find ample evidences of the Bacillus coli communis in the pus. I have mentioned also in a previous lecture that in a cerebral abscess associated with pyæmia from appendicitis you find the Bacillus coli communis. Appendicitis is the most common cause of subdiaphragmatic abscess. Thrombosis of the right iliac vein and cedema of the leg are seen in appendicitis; and some people are disposed to think that these arise from septic plugging, but I do not think it is so; it is usually due to weakness. An interesting and fatal result arising from it is pulmonary embolism.

In operating for appendicitis, hæmorrhage occurs, and it is usually venous, being due to softening of the veins from septic infiltration of their walls. It usually comes from the deep circumflex iliac vein, or from the common iliac vein. When it comes from the former it is easily controlled, as in the case we had last week; but if it is from one of the iliac veins it is a very difficult matter indeed to arrest it. Therefore it may be readily understood that hæmorrhage from the deep circumflex iliac vein is of no danger; but if it be from the internal or external or common, it is very grievous and dangerous, and a complication which is frequently fatal.

Perforation of the cæcum—that is to say, an ulcerative or necrotic process of the appendix spreading to the cæcum and causing its perforation—is met with. Many appendicular inflammations spread to the psoas and iliacus muscles producing myositis, and there is flexion of the thigh, which is an important point in diagnosis, because it frequently occurs in children with appendicitis, and hence may give rise to the idea that you are dealing with a case of hip-joint If an attack of appendicitis occur during pregnancy it makes the prognosis much more grave, and for this reason,—that the cases tend to assume rapidly a severe form. appendicitis associated with pregnancy the proportion of acute general peritonitis is much greater than in cases not so associated. And not only so, but appendicitis induces abortion and miscarriage, and therefore in that way adds to the gravity of the case.

A frequent complication of appendicitis is intestinal fistula, which may discharge itself either externally or internally. The cause of the fistula may be imperfect ligature of the appendix while removing it, or a perforation in the cæcum, the opening of which remains patent and fæces come through; or the cæcum may be gangrenous in spots, so that you see it is very easy for fæces to make their way out from the intestine. The position which the fistula assumes varies. Sometimes it is abdominal, or it opens in the gluteal region, or in the thigh, at the outer aspect. You can, as a rule, recognise it by the smell of the fæces and the foul pus. In the patient in Queen Anne Ward there is a fæcal fistula in the loin, which is due to the pointing of a perinephritic appendicular abscess with discharge of fæcal pus.

Metastatic parotitis occurs in the course of some attacks. I do not know whether you are acquainted with this affection, but it may happen in the course of acute abdominal inflammations there is suppuration of the parotid glands after enlargement of them. It is distinguished from mumps by the fact that in the latter the parotid glands are enlarged but do not suppurate. You will meet this curious complication of metastatic parotitis in about five of one hundred cases of appendicitis. I remember reading the details of the illness of General Garfield, President of the United States, and being very much struck by the onset of this complication. You will remember he was shot in the back. He struggled on for many weeks and finally died. In the last week or two of his life he had an acute attack of metastatic parotitis. He died very suddenly after very acute pain, and post-mortem examination showed that the bullet which entered his back had bruised the inferior mesenteric artery, and the cause of death was hæmorrhage from the inferior mesenteric artery into the general peritoneal cavity. For thirteen weeks he had had a discharging sinus in the back, leading down to the artery.

We now come to diagnosis. If the disease follow the text-book description the diagnosis is fairly easy; and so is the recognition of all diseases. Text-books are written as catalogues, but do not teach you the habit of diagnosis. It is important to bear in mind that there are, in most attacks of appendicitis, certain cardinal symptoms. These are a sudden onset, rapid rise of temperature, quick pulse, acute pain, vomiting, nausea, constipation, local tenderness, and swelling. But, as I shall show you presently, the disease is not always so typical, because the position of the pain may vary very much. It depends on the length of the appendix. If it be so long that it hangs down in the pelvis there is pelvic pain; or if it travel about and point toward the kidneys, the pain is renal; and if the appendix lie across the middle line the pain is on the left side. Moreover, if there is a long appendix, one part of it may be diseased and the other not. That also determines the position of the pain. There are

some very severe cases of acute appendicitis in which there is no pain whatever. The explanation is rather striking. In these cases the appendix has been found to be absolutely gangrenous, -that is to say, the appendix and its nerves are dead. Mr. Treves records the case of a man who looked very ill, but said he did not feel so. He was lying in bed, and said, "I have no pain at all," and freely slapped the right iliac fossa. He died in four or five hours, and at the postmortem examination it was found that he had a gangrenous appendix. Sometimes it happens that the localised abdominal swelling is absent. For instance, when an appendix hangs in the pelvis, swelling can only be felt per rectum. As a rule, right iliac tenderness is fairly common in men and women, but in the latter it has not the same diagnostic significance because it may be due to a right-sided ovaritis or salpingitis.

Now we come to questions which must present themselves to anybody treating appendicitis. Is it possible at the beginning of an attack to be sure of what kind of attack you are dealing with? One may say absolutely that no one can be sure during the first twenty-four hours. You may know that you have before you either catarrhal phlegmonous, or suppurative appendicitis, or acute peritonitis, but you cannot be sure of the exact form. Some attacks begin very acutely and subside equally rapidly; others go on for a time and increase in intensity, and then subside;

others increase in intensity and do not subside at all, but pass on to acute peritonitis. Yet it may be said that the character of the attack is fairly certain by the third or fourth day. However certain you may be that the attack you are dealing with is of a mild type, peritonitis may set in and the patient die in twenty-four hours. "There is no disease so protean in its nature and so uncertain as appendicitis." Secondly, will an appendix perforate? You can hazard an opinion on this point generally on the third or fourth day. If the frequency of the pulse is out of all proportion to the fever, if the pain is severe and lasting, if there is a large swelling rapidly formed, and if there is continuous vomiting, you are dealing not with an ordinary case of catarrhal appendicitis, but with one of perforative appendicitis; and you know that either a cyst has burst or that a necrosed or ulcerated patch has given way, and the contents of a septic appendix have made their way into the abdominal cavity. It may be that the contents will become localised, or that the contents will become diffused all over the abdomen. Can pus be diagnosed? In a previous lecture I gave you seven or eight points upon which you should rely for the diagnosis of pus. Can you tell when acute peritonitis is setting in? You may look upon every case of appendicitis as a potential case of acute peritonitis. You must watch your cases carefully for signs of pus, and be prepared to open the abdomen at any moment. The only

course in a case which is not going satisfactorily is to call in a surgeon to operate at once. In fact, I do not think appendicitis should be regarded in the first place as a medical disease; it is to all intents and purposes a surgical disease, but the position of the surgeon in regard to it is rather unfortunate. He has to wait until the physician thinks it is right to send for him, and then he is called in to operate at once. My contention is that the man who has to operate is the man who knows when to operate. In these abdominal cases it is a matter of hours, not days.

We now come to the differential diagnosis. It is necessary to diagnose appendicitis first of all from acute intestinal obstruction. Acute intestinal obstruction may be due to bands and many other causes. In acute obstruction of the small intestine, in which it is suddenly nipped by a band, there is always at the onset of the obstruction greater collapse, the pain is more severe in the umbilical region, and is not localised subsequently to the right iliac fossa. Again, constipation is absolute from the first. The abdomen becomes distended earlier than in appendicitis, and it often happens that the temperature is lowered rather than raised. One may say as a broad rule that appendicitis is more often mistaken for intestinal obstruction than intestinal obstruction is mistaken for it. Most cases presenting acute abdominal symptoms are appendicular rather than obstructive, with one exception,

namely, volvulus. Volvulus, which is a twist of the intestine, especially of the large, comes on with acute fulminating symptoms. Very often you can clear up the diagnosis by examining the rectum. I would say, as a golden rule, in every case of abdominal mischief examine per rectum.

Another condition is intussusception. It occurs frequently in children. It has a rapid and sudden onset; it is usually in the right iliac fossa, and a swelling is found. So it very often happens that it is difficult to diagnose between appendicitis and intussusception. But in intussusception the rise in temperature is, as a rule, very slight, and very often it is not raised at all, but is lowered. Further, in intussusception the pain is not constant, but is intermittent, and is relieved by pressure. In the next place, in intussusception the character of the tumour is perfectly well marked. It is sausage-shaped, it moves from the right iliac fossa towards the hepatic flexure of the colon. Further, if you keep your hand carefully on such a tumour you feel the tumour harden suddenly when the patient is in pain. In intussusception there is a discharge of blood and mucus from the bowel. Of course if it is a clear, straightforward case one ought not to mistake intussusception for appendicitis. In treatment, if there is doubt, operation is called for.

Then you must distinguish appendicitis from renal and biliary colic. Why should they be mistaken? Because, as I have insisted, the ap-

pendix may take the direction of the kidney or the liver, and its end may suppurate or slough, and abscess form in the neighbourhood of the kidney and liver, the pain from which simulates very closely renal or biliary colic.

Appendicitis is mistaken for perforating gastric ulcer; and for this reason, that in both affections the onset is very sudden, with pain, and there is a certain amount of vomiting. But in perforating gastric ulcer you will note that the pain and distension are greater at the upper part of the abdomen, and the liver dulness has, in most cases, disappeared, owing to there being air in the abdominal cavity; and you can obtain from the patient a fairly typical history of dyspepsia and hæmatemesis. The most important sign of gastric ulcer is the disappearance of the liver dulness.

Then there is malignant disease of the cæcum which may be mistaken for appendicitis, but as a rule the diagnosis of this condition is not difficult unless the growth has perforated the cæcum, and pus has formed around as the result of extravasation of fæces.

Typhoid fever is often confused with appendicitis. If the typhoid fever be typical, and the appendicitis likewise, there should be no mistake, but neither disease is in any sense constant; in fact both diseases present many phases; so that one may say it is easy for a mistake to occur. But treatment in the early stages is the same, namely, rest in bed, abstention from solid food

and purgatives. Therefore if you watch the case and be on your guard you cannot very well bring your patient to much harm. There is one point which might help you, namely, Widal's reaction of the blood in typhoid fever. Another point is that in appendicitis with pus there is excessive leucocytosis of the blood; whereas such does not occur in typhoid fever.

Membranous colitis may be mistaken for appendicitis because of the pain; but in membranous colitis there are discharges from the rectum, casts from the colon, and blood in the stools, which do not occur in appendicitis.

Tubercular peritonitis is sometimes taken for appendicitis, especially if it be on the right side and pus forms in an indurated mass of tubercular omentum in the iliac fossa.

Certain affections of the pelvic viscera and peritoneum are confused with appendicitis; that is to say, a right-sided ovaritis or a right pyosal-pinx may be thought to be appendicitis. Or a lumbar and a perinephritic abscess may simulate it, and so may hip-joint disease. In the latter there is contraction of the psoas muscle and of the iliacus.

LECTURE IV.

APPENDICITIS (continued).

GENTLEMEN, -To-day we have to deal with the subject of PROGNOSIS. And the important point is to realise that appendicitis is not a disease which is dominated by statistics; that is to say, you cannot lay down certain absolute rules about any kind of case by reference to statistics. All that one can say is that you may obtain certain broad results if you take a sufficient number of reliable figures. By doing so you may be able to eliminate the untrustworthy ones to some extent. Physicians claim that 80 per cent. of the cases get well without operation, and I think I may say that the interpretation is that 80 per cent. of the cases which pass through the medical wards get well at the time. Of course there is a great fallacy in that statement, and in this way: - A patient comes in with appendicitis, and recovers, under medical care, of his attack of appendicitis, and goes out of the hospital. He may remove to some other part of the country, and he has a recurrent attack. This, of course, vitiates the original statistics; or he may get an acute attack, for which he is operated upon in a surgical ward, and either recovers or dies.

So we may say that the estimate of 80 per cent. of patients getting well without operation is not altogether reliable. Some physicians are inclined to think that appendicitis is, on the whole, a comparatively mild disease; but it is not so, as you will agree when you come to hear what surgeons have to say about it. Surgeons give a report of it which is pessimistic; and, of course, they are influenced by what they see, because the surgeon is often called in just at the end of a very severe illness, when the patient is in extremis, and is asked to operate. If he is a wise surgeon he will not consent to do so, feeling that by so doing he cannot do the patient any good at that stage. I affirm that the medical statistics on the subject cannot be reliable unless the entire life-history of the patient is traced out—that is, unless it is recorded how many subsequent attacks occurred, and whether the patient did or did not die subsequently of appendicitis. Surgeons have been so much impressed by the virulent nature of the disease, that in America there is a tendency to operate upon appendicitis in any stage, that is upon all inflamed appendices. It is quite certain that it is not right to operate upon all such appendices, nor is it right to leave them all untouched. Again the question of judgment comes in.

The points which ought to be considered under the heading of prognosis are as follows:—(1) How many cases recover under medical treatment alone, and does surgical interference increase the mortality? That, you see at once, opens up a very broad field. If surgical interference increases the mortality, the physician is justified; if it decreases the mortality, there is much to be said for surgical interference. As I have said, it is stated by physicians that 80 per cent. of the patients recover from the attack under medical treatment alone, and surgeons claim that of the remaining 20 per cent. one half may be saved by opening the abscess; and a small proportion of the remaining half, or 10 per cent., that is those with perforation and diffuse peritonitis, recover after operation. The American surgeons say that of 10 per cent. with diffuse peritonitis 3 per cent. will recover if operated upon; but I think that is rather too high an estimate. The ultimate outcome of statistics is that the medical mortality of 20 per cent. is reduced to something under 10 per cent. by surgery. (2) Upon what conditions does success of surgical treatment depend, and what are the results? That is to say, what conditions, in a given case, if the surgeon be called in at the proper time, will conduce to the patient's recovery. The conditions one has to take into consideration are, first of all, the state of the parts affected, as to whether the appendix is gangrenous, perforated, or whether there is acute peritonitis present. I do not think I need enlarge after what has been previously said, except to say that the gangrenous cases come on very rapidly, and run a very severe course; and so do perforative cases, while acute peritonitis makes its appearance very early. But some other factors must be taken into consideration, namely, the period of the illness at which operation is undertaken, and how soon after the onset of the virulent attack; for every day makes a very great difference in this respect. I might have given you statistics showing that a certain number of such patients recover if operated upon in the second day of the attack, a small number if operated on on the fourth day, and practically none if operation be not attempted until the fifth day. Then the ability of the operator is a factor, and this no one can measure except the man himself and his critics. There is also required a thorough knowledge of the technique of abdominal surgery. All these points must be taken into consideration in estimating the prognosis of a particular case. For instance, a skilful surgeon will get a better result with a given case than a surgeon who is less skilled.

The conclusions which are warranted by the facts are as follows:—(a) If operation is necessary, the sooner it is done the better, and the greater are the chances of recovery. (b) The basis of the decision should be the character of the attack, and not the number of days or hours of the illness. Do not say, "This is the fourth day or the fifth day, and therefore it should be operated upon;" take the general condition of the patient and the state of the temperature and pulse, and decide upon these grounds. (c) If the case is such that you seriously think an operation may be necessary,

I would advise that the operation be done at once, because, in all probability in such a case as that, operation will have to be done eventually, and nothing but harm can come of delay. Therefore I think that if, in your opinion, a case is probably one for operation, the probability settles the matter, and it is high time to call in a surgeon. The risks of abdominal section are not great, and the good results to be gained are very considerable.

- (3) The next point in prognosis is, How many cases relapse? The probability of relapse in cases treated medically is 30 per cent., and that, you will see, seriously detracts from the 80 per cent. of cases said to recover. When a large number of cases are traced, at least 30 per cent. of them are found to relapse. You will often be asked about this point by your patients, and you should be well informed thereon.
- (4) Can better results be obtained than at present by treating all cases surgically as soon as the case is diagnosed? That is to say, would you take out every diseased appendix that is brought before your notice. Progressive surgeons say "Yes;" conservative surgeons say "No." The judicious surgeon will not dogmatise, but he will consider the facts of each case. In America so much have some surgeons become impressed with the virulent nature of appendicitis that I believe they remove every appendix, however slightly it may be inflamed. The swing of the pendulum is noticeable in the tendency to remove all appendices, many

unnecessarily, and is a contrast to the state of opinion some years back.

Let us now consider TREATMENT. In these cases of appendicitis the surgeon should be the "operating physician." As I said in a previous lecture, all cases of appendicitis, in my opinion, should be brought at once to the surgical wards, and be treated by the man who may have to operate; and surely the man who operates is he who best knows when to operate. Consider what may happen at a distance in the country. You may have a case, and half a day may be consumed in sending for a surgeon, and during that time the abscess bursts into the general peritoneal cavity and produces peritonitis; and in that case, when help arrives the case may be hopeless. Therefore I do not think it is good to regard these cases as medical first and surgical afterwards; it is too much in the nature of "high specialism."

With regard to the medical treatment, the first necessity is absolute rest in bed. As those who have suffered know, the slightest movement aggravates the pain immensely and increases the amount of effusion. If the patient move about he may rupture an abscess or a cystic appendix, and the contents may be diffused over the abdomen, so causing acute general peritonitis.

The next point is the relief of pain. This is effected by fomentations and full doses of tincture of opium or morphia. As to what full doses are, I believe 15 minims of tincture of opium is a full

dose for an adult, or one third to half of a grain of morphia. You should give the opium once every four to six hours until the pain is relieved. If vomiting be present no food should be given by the mouth. When the vomiting has ceased you can give small quantities of fluid in the ordinary way-e. g. hot beef-tea or barley-water, or toast and water, but no iced drinks should be given; and the prevalence of appendicitis in America may be due to the pernicious habit of taking iced drinks. The question of purgatives is all-important. If the onset be acute, purgatives must be strictly avoided. But if the patient has had four or five previous attacks, and the present one from which he is suffering is apparently very mild or slight, you may give a purgative in the form of one grain of calomelnot more. If that one grain produces no effect, do not give any more purgatives or enemata, but wait. If you are in doubt, always err on the safe side of preferring constipation to purgation. You are in the main right in not trying to produce an evacuation in a supposed case of appendicitis. When the appendicitis has passed its acute stage, and the bowels reassert themselves, about the fifth or sixth day, you may order a glycerine enema. Solid food should not be given until the tongue is clean and the temperature has fallen. When the case looks healthier you may give small quantities of toast and peptonised milk, and cream and fish, and later on fowl and meat.

For the relief of the local swelling and pain

some surgeons advise the use of leeches. The only objections I have to leeches are: First of all, they are horrid things to apply to children, who get very frightened; and, secondly, the idea is prevalent in some quarters that by applying them you may diminish the amount of effusion by drawing off blood-plasma; and, thirdly, leeches have been gratuitously applied when pus is present, which is foolish. Either fomentations sprinkled with opium or alcoholic solution of menthol gives relief.

When the bowels have started to act freely again it is advisable to keep the patient's intestinal canal as antiseptic as possible. For that purpose salol 10 grains, β -naphthol 5 grains, or salicylate of sodium 20 grains can be given, but only when the bowels are acting freely. It is very important to impress upon these patients that they are not to get about too early, and when they resume ordinary life they must have a pad and bandage over the right iliac region, tightly applied.

With regard to the prevention of further attacks, for many months, and even years, after the attack the patient should regulate his diet, since indiscretion in the matter of diet often means a relapse. The articles of diet these patients should be especially told to avoid are shell-fish, lobster, and crab; and they should also avoid all fruits with small seeds in them, and not eat cheese, pork, veal, nor salad. It is of very great importance to impress upon the patients the necessity of keeping the teeth in order, because there is no doubt that the

onset of other attacks has been cut short by having the teeth properly regulated. Patients should take simple meals, and rest for half an hour afterwards, keep the bowels open, and avoid cold and excessive exercise.

With regard to operative interference, you may have to operate for appendicitis under three conditions:—(1) localised abscess; (2) diffuse peritonitis; (3) relapsing or recurrent appendicitis.

First of all as to operation for localised abscess. The size and position of the abscess vary considerably. In the case which was operated on last week I incised two inches from the anterior superior spine; and when I operate presently on the case you have seen, the centre of the incision will be made somewhat above the anterior superior spine and more towards the back, because it seems that the child has a peri-renal abscess. The abscess may be either a large and superficial one, or it may be a small and deep one. When you divide the transversalis fascia, if the abscess is in the ordinary position you recognise it by the opacity of the peritoneum. If there be a large abscess present, at the end of the first week you find pus in one of two places, either in the retro-peritoneal tissue in the iliac fossa, or behind the anterior abdominal wall, bounded in front by the transversalis fascia. It is very important when you open these abscesses not to plunge a director or trocar into them suddenly, because it often happens that an abscess is in the midst of a number of coils of intestine, and if you push your director suddenly into the region you may wound coils of intestine and set up a fæcal fistula. The opening through the peritoneum must always be made in the opaque area of the peritoneum, and care must be taken not to incise across the boundary line of adhesions limiting the abscess. Many deaths are due to neglect of this precaution.

The usual method of treating these cases is to make the incision through the abdominal wall layer after layer, cutting through all the fibres in the line of the incision. But a large number of these operations for appendicitis are found to be followed by hernia. In fact, no less than 85 per cent. of the cases of appendicitis, according to statistics, show weakness of the abdominal wall or distinct ventral hernia after operation. The method advised is to make an incision three or four inches long over McBurney's point, then go down to the fibres of the external oblique, and instead of cutting straight across them, split them in the direction of the fibres and pull them apart. Then you come across the internal oblique and tranversalis muscles and divide them parallel to the fibres. In that case you cut no muscle-fibres at all; all you will have done is to separate them. You will readily appreciate the value of this as regards firm healing and support to the abdominal wall afterwards. The operation takes much longer and is more difficult, for the reason that when you get down to the abscess or appendix you will be working at the bottom of a deep pit; yet you must be encouraged by the fact that the patient will afterwards have a good abdominal wall.

Before the peritoneum is opened clearly make out the position of the abscess; carefully open it and evacuate the pus. Do not try to define the deep limits of the abscess. If you do you may break down adhesions, for they are often of the thinness of wet brown paper; and remember it is very easy to put your finger through one of them and into the general peritoneal cavity with disastrous results.

Another way in which pus is let into the general peritoneal cavity, is that the incision through the parietal peritoneum is made across the boundary line of the abscess, so the general cavity becomes infected by pus which flows into it.

Should the appendix be sought for? Not unless it present itself, then it may be removed. Some surgeons always seek for the appendix under the impression that the opening of an abscess such as this is an incomplete operation. But I think in the cases in which the appendix is sought for and removed the mortality is somewhat higher than it would be otherwise. My advice is, let the appendix take care of itself, and, if necessary, remove it later.

If, however, it be decided to remove the appendix, it is very important indeed that you should

treat the stump properly. The way in which an appendix is amputated is as follows:—Place a ligature on the appendix near the cæcum and make an incision round the appendix, about one inch from the cæcum and just through the peritoneum. Then draw up the peritoneum nearly as far as the cæcum, and cut through the submucous and mucous coats. Therefore, there is now a sleeve of peritoneum. You then, with a sharp spoon, scrape out the mucosa and submucosa of the appendix, and take care to disinfect it with pure carbolic acid. And then draw the sleeve of peritoneum over the stump and suture it, and the operation is complete.

When you operate for acute peritonitis you do it in the same way as for abdominal section, but it is very important to obtain thorough drainage, therefore always put a glass drainage-tube in the pelvis; and if the case is severe put a glass drainage-tube through either flank.

For recurrent appendicitis the line of incision is made with its centre over McBurney's point, midway between the umbilicus and the anterior superior spine. The various layers of the abdominal wall are separated by the method I have indicated, that is to say, parallel to the muscular fibres to prevent ventral hernia; and you should treat the stump of the appendix in the way mentioned above. As a rule, if the operation is well and carefully done no drainage is necessary, and the wound will heal up uninterruptedly, so that the

patient is often able to go out of the hospital well in a fortnight.

At the next lecture I shall deal with the interesting subject of subdiaphragmatic abscess.

LECTURE V.

ON SUBDIAPHRAGMATIC ABSCESS.

GENTLEMEN,—We now turn to another form of intra-abdominal suppuration, a form somewhat rare, yet met with in clinical work from time to time, and, it may be added, sometimes unexpectedly. I refer to subdiaphragmatic abscess. It is only within the last few years that any connected account of it has appeared in the various journals and text-books. By subdiaphragmatic abscess is meant one which is found between the diaphragm and the neighbouring abdominal viscera; that is to say the pus may be between the diaphragm and the liver, between the diaphragm and the spleen, or it may be posterior to the liver, bounded by the liver in front, the diaphragm above and behind, and the reflexion of the peritoneum below. The causes of these abscesses are fairly clearly established. They are, perforation of the stomach or the duodenum from a chronic ulcer, abscess of the spleen bursting internally, suppuration in connection with the pancreas, liver, and kidney, and most frequently a tracking abscess from the appendix. In order to make the subject of subdiaphragmatic abscess plain to you, I shall take gastric ulcer as an example.

Gastric ulcer is of two kinds, the acute and the chronic. The distinction between the two is, that an acute gastric ulcer is the kind which forms quickly, is small in size, and likely to perforate extremely suddenly, or to give rise to rapid and violent hæmorrhage; in fact one may say that acute gastric ulcer is a rapidly eroding form of disease. As a rule an acute ulcer is small, and its margins are punched out, so that if it perforates it makes a big hole in the gastric peritoneum. A chronic ulcer is rather a different matter. It is, as a rule, a large ulcer with shelving sides and edges, having a funnel-shaped appearance. You will find the mucous membrane more eroded than the muscular coat, and if the peritoneum be exposed the muscular coat will be found to be more eroded than the subperitoneal tissue. At the bottom of the ulcer there may be either a thin layer of muscle or it may be only peritoneum. A chronic inflammatory process is going on, and as a result of it adhesive inflammation of the neighbouring peritoneum ensues, so that an attempt is made to raise a protective barrier against extravasation of the gastric contents. Sometimes when this barrier is completely formed, perforation of the stomach does occur, and then you find that the contents of the stomach are extravasated over a small local area, and as a result an abscess forms. The position of it must necessarily depend upon the site of the ulcer. Many of them are on the anterior and some on the posterior surface of the stomach, although opinions differ with regard to this point. If there be an ulcer on the anterior surface of the stomach it may be followed by an anterior subdiaphragmatic abscess; if there be one on the posterior surface there may be the posterior variety.

A chronic ulcer gives rise to a localised peritonitis or localised abscess, and the form of abscess which occurs is called subdiaphragmatic, but some people call it perigastric. This is not a good term, because pus in that situation may be due to splenic and pancreatic causes. The term subdiaphragmatic or subphrenic abscess, however, sufficiently indicates the condition. It is found that perforation of the stomach from ulcer occurs in 15 to 18 per cent. of all cases, and is relatively more common in males than in females. As a result of perforation of the viscus, some of the gastric contents become diffused into the neighbouring tissues and set up suppuration, which varies very much in amount. It also varies in the direction it takes. and in the extent, which depends on the presence or absence of encapsulation, for many of these cases fortunately become limited. A chronic ulcer may form an adhesion to the liver, the spleen, the pancreas, and the abdominal wall, which then form the walls of the abscess. On account of the peculiar disposition of the peritoneal folds the abscess is limited in its extent, and as these

patients are frequently recumbent, a typical subdiaphragmatic abscess is formed.

If subphrenic abscess is due to perforation of the anterior wall of the stomach, the walls of the abscess are formed anteriorly by the abdominal wall and diaphragm, and posteriorly by the gastro-hepatic omentum, above by the diaphragm, below by the stomach, laterally by the adhesions of the liver to the diaphragm. It is of very large extent, and it envelops the anterior part of the liver in such a way that the anterior margin of the liver projects forwards into the abscess cavity or it may be limited to one side of the liver or the other. If it is right-sided it is bounded on the left by the suspensory ligament of the liver, and if it is left-sided it is bounded on the right side by the same ligament. Thus you have an anterior subdiaphragmatic abscess in three forms, namely, one, embracing the whole anterior part of the liver, the second only the right lobe, the third the left lobe.

Again, an ulcer may perforate the posterior wall of the stomach, and then it fills the lesser cavity of the peritoneum. The same kind of abscess arises from perforation of the duodenum. Suppuration once formed in the lesser cavity of the peritoneum may extend up behind the liver, and is therefore bounded in front by the liver and the gastro-hepatic omentum, and behind by the posterior parietal layer of peritoneum. When there is suppuration in the smaller cavity of the peritoneum

the foramen of Winslow is often blocked by adhesions.

There is another variety which is post-peritoneal or extra-peritoneal. This arises from suppuration, either about the kidney, from a colic fistula, or suppuration in a diseased appendix, which tracks up behind the peritoneum towards the liver, and then gives rise to a form of subdiaphragmatic abscess, which is entirely outside the peritoneal cavity.

It is very important that you should be able to recognise the forms, so that you may be au fait with the symptoms.

With regard to the symptoms, firstly, the onset of subdiaphragmatic abscess is generally acute, and in this way the patient has a somewhat sudden attack of pain, which is due to extravasation, then there is subsequent formation of pus, and the patient becomes extremely ill within a day or two. More rarely the onset is slow and insidious. It is important to remember this, and I remember very well a case when I was clinical assistant to the late Dr. Moxon at Guy's. The patient was a girl with gastric ulcer, and showed no signs of improvement. She seemed to be ill, but curiously and insidiously ill, and we could not find any symptoms to account for her weakness and progressive emaciation and rise of temperature. By one or two superficial and hasty observers she was suspected of malingering, and this view was expressed to Dr. Moxon, much to his indignation. The cause of her illness was not found out until the post-mortem examination, and it was then seen that there was posterior perforation of the stomach, and a subdiaphragmatic abscess which extended between the liver and the diaphragm and also wrapped round the spleen. But there were no definite signs during life, and the diagnosis was always doubtful.

The pain is often very acute, and is in the upper part of the abdomen, but subsequently it becomes well diffused, and vomiting is well marked. In these cases there is a considerable amount of dyspnœa, and this dyspnoea, with a combination of abdominal symptoms such as I have described, should put you on your guard. One cause of it is an implication of the muscular tissue of the diaphragm, so that there is myositis and a difficulty in breathing. Dyspnœa co-exists for another reason; inflammation of the pleura and empyema often result, and some of these abscesses burst through the diaphragm into the pleural cavity, and then the case becomes more grave. Pyopneumothorax is not uncommon. Many of these patients have a persistent cough. Therefore, if you have a combination of severe abdominal signs with acute chest symptoms, you are right in suspecting some lesion above and below the diaphragm and in immediate relation to it.

Next with regard to the signs. I draw this distinction between symptoms and signs. Symptoms are what the patient complains of; signs are what you notice by clinical examination.

Symptoms may be said to be subjective, while signs are objective.

There is often bulging or swelling of the upper part of the abdomen. If the abscess is of the variety which envelops the anterior part of the liver, bulging is marked in the epigastrium. If it is on both sides of the liver, the bulging is sym metrical; if it is of the variety affecting one side or the other of the liver, then the affected side is bulging. If the abscess is of the second variety the bulging is rather lower, and extends well below the umbilicus. If it be the third variety of abscess, unless it is extremely large, there is absolutely no bulging of the abdominal wall at all. Thus the bulging, when it is present, is a very valuable sign indeed. At the same time you have to look carefully for it. The larger these abscesses grow, the more the widening of the sternal angle becomes, and the greater the bulging of the lower ribs.

On palpating, if the abscess is sufficiently large, you may be able to feel that there is a collection of fluid without a thrill. The presence of the thrill is typical of hydatid of the liver. The way in which the thrill may be obtained is by placing three fingers on the swelling and tapping the middle one, when you may feel a fine tremor in the others. If you have once felt such a thrill you will never forget it, for it is quite characteristic. The cause of the thrill is that the fluid is of low density and under very considerable pressure. There is no

thrill in subdiaphragmatic abscess, because, as a rule, the fluid is thick, and the tension is not so great.

There is a very important sign in the anterior form, namely, a line of induration moving with the parietes. This is, perhaps, the most characteristic sign. The induration may be felt crossing the abdomen an inch or two below the anterior margin of the liver, and taken in conjunction with the other symptoms and signs is the most convincing of all. As to the origin of this line of induration, there is a spot where the extension of the abscess downwards is limited by the great omentum, which becomes inflamed and puckered, and so a broad line of induration forms across the The late Mr. Greig Smith, whose experience in abdominal surgery was very great, regarded this sign as of more value than all others. He believed that if you find this line present, and can exclude tubercular peritonitis, you may safely diagnose subdiaphragmatic abscess.

In the posterior intra-peritoneal variety of abscess the induration is lower down in the abdomen, and the line of pus is lower. In the extra-peritoneal variety there is no line of induration at all.

The edge of the liver is displaced downwards, for it is easier for pus to displace the mobile liver downwards than to push the muscular diaphragm upwards; indeed, the diaphragm will slough rather than yield. In subdiaphragmatic abscess you may feel the edge of the liver below the margin of the

ribs, and it is surrounded by a layer of fluid, which is pus.

We will now deal with percussion. In the first variety, when the patient is supine the liver dulness is lost when there is a mixture of pus and air in the abscess. There is no liver dulness, despite the fact that the anterior margin can be easily felt, and it is depressed. The other conditions in which the liver dulness is masked are when there is acute perforation of the stomach with air in the peritoneal cavity, and if there be excessive dilatation of the intestines which override the anterior edge of the liver. If the abscess extend only over part of the upper surface of the liver, the lower edge can still be felt, and the liver is tilted somewhat. I wish you carefully to note that if there is a left-sided subdiaphragmatic abscess the heart's apex-beat is displaced outwards slightly, and the whole cardiac area is often resonant. That is a very interesting phenomenon. What is the cause? I presume it is that when you strike over the cardiac area you get reflected waves from the neighbouring resonant area.

In the extra-peritoneal form, unless the collection reaches the surface the percussion-note is useless as an aid, for the seat of trouble is too deep.

We now come to the question of diagnosis. It is important to differentiate subphrenic or sub-diaphragmatic abscess from hydatid of the liver. Hydatid of the liver is a condition usually with a very long history, and there has been a swelling

there for a long time; and, unless it suppurates, hydatid of the liver is quite painless. Then in hydatid cysts you will sometimes feel a thrill, while on percussion the liver area is dull, and there is no general illness. On those grounds I think you can make the diagnosis. Sometimes, however, a hydatid suppurates, and if so the swelling remains dull, unless, as sometimes happens, it bursts into the thoracic cavity. It is important to diagnose subdiaphragmatic abscess from pancreatic cyst. In the latter case there is an absence of any gastric history such as pain, indigestion, and so on, and there are no febrile symptoms. An important sign of a pancreatic cyst is the variability of resonance over it.

Now as to treatment. It is quite clear that the only means of any avail are operative, viz. evacuation of the pus. The objects are twofoldevacuation of pus and anticipation of the extension of pus into the thoracic cavity. It is very curious to note that these abscesses rarely burst into the peritoneal cavity, but almost always by preference into the thoracic cavity. Why it is so is difficult to say, but one may hazard this speculation: that it is more natural for the peritoneum to throw out a protective barrier by means of adhesions around the margin of the abscess than it is for the diaphragm to withstand the increased pressure. The more pus there is in the peritoneum the more inflammatory adhesion there is, and the greater quantity of pus the more likely is the abscess to

burst through the diaphragm into the pleura. If you operate on the case, and if the cause be gastric ulcer, you must not attempt to close the ulcer at all; as a rule it is situated too deeply. Any such procedure would need a prolonged operation, and these patients are not in a condition to withstand it. Besides, you may be sure that the walls of a chronic ulcer are in such a state of friability that it would be almost impossible for the sutures to hold, and even if you do get them to hold at the time of operation, they will probably break away later.

In doubtful cases the incision should be made in the middle line, because that is the spot which is most generally useful. If you are sure you are dealing with an anterior subdiaphragmatic abscess, the incision should be made in the abdominal wall over the most prominent part of the bulging, and always above the line of induration, when there is such. Remember you must not let pus into the general peritoneal cavity. So the incision is made either in the middle line or over the most prominent part of the bulging. Take care that you stop short at a spot where the dulness ceases. It is not very difficult to evacuate pus in the anterior variety of abscess. If there be a collection behind the liver, it may happen that the chest cavity has to be opened in order to enable you to reach the abscess. In doing so it is important you should prevent a general infection of the pleural cavity. Therefore resect the ribs, the eighth, ninth, or tenth in the mid-axillary region, and then attach the diaphragm to the edge of the incision before you perforate it. By so doing the pleural cavity can be cut off, and pus safely evacuated. A large drainage-tube is required for a considerable time.

There are other routes for opening an abscess from behind, namely, an incision below the costal margins to the outside of the kidney, tracking into the abscess from there; or it may be opened from the front, and then you make an anterior incision, turn up the stomach, and with the finger tear through the gastro-colic omentum, and after packing the abdomen with iodoform gauze around your track, drain. It is very important after opening an abscess of this kind to irrigate well with sterilised water, and provide good drainage.

There is one point which ought to be mentioned. In many of these cases there is a domeshaped dulness on the posterior aspect of the chest. This generally extends upwards in such a way that the highest part of the dome is on the lateral aspect of the chest; and there is between the dome-shaped dulness and the spine a long thin layer of resonant air-containing lung. This feature is more commonly met with in hydatids than subphrenic abscess.

This lecture deals with a very intricate subject, which you are sure to meet in your clinical experience from time to time; and I hope I have succeeded in focussing a difficult subject clearly.

LECTURE VI.

ON PELVIC SUPPURATION AND TUBERCULAR PERITONITIS.

Gentlemen,—To-day I propose to speak of suppuration in the lower part of the pelvis; and last week, you will remember, we discussed the presence of pus in the upper portion of the abdomen in the form of subdiaphragmatic abscess.

Among the conditions which are met with in the pelvis are cellulitis, peritonitis, and suppurating hamatocele. These subjects trench on gynæcological work; at the same time they are diseases which every surgeon should be able to diagnose, and any surgeon may be called upon to treat. The inflammatory state known as pelvic peritonitis is of two varieties, non-suppurative and suppurative. With regard to the non-suppurative, it does not come within the scope of these lectures. But as to the suppurative form I shall speak of that somewhat fully. One of the chief causes of purulent pelvic peritonitis met with is pyosalpinx, or a diseased condition of the uterine appendages, especially of the Fallopian tubes. There is, in the first place, inflammation of the

tubes followed by occlusion and the formation of pus, whence inflammation of either the nonsuppurative or suppurative variety spreads to the peritoneum, or pus may escape from the tube and infect the peritoneum directly. So there are in order the conditions of salpingitis, pyosalpinx, and infection of the pelvic peritoneum. When pus appears, the walls of the abscess are formed by the neighbouring structures i. e. the pelvic viscera, the rectum, intestines, uterus, bladder, and by the adhesions which spring up between the peritoneum and the viscera. In the centre of such a cavity there is the diseased ovary or diseased tube. It is a fortunate circumstance that pus forming in this way so often remains localised in the pelvis; were it to spread it would give rise to a general peritonitis.

Another disease met with in the pelvis is pelvic cellulitis, otherwise known as parametritis, and it forms a very large proportion of the cases which are admitted under the care of the obstetric physicians into our wards. Cellulitis is an inflammation and suppuration in the subperitoneal tissue around the viscera, especially the cervix uteri, vagina, and between the folds of the broad ligament. In order that you may understand how this pelvic cellulitis arises, you should remember that the lymphatics from the cervix uteri and the body of the uterus pass into the subperitoneal cellular tissue, and the septic emboli from the inflamed viscus become lodged

in the neighbouring tissues and infect them, causing exudation, thickening, and pus in the cellular tissue. Cellulitis may be limited entirely to the pelvis, or it may spread along the subperitoneal tissue for a great distance. For instance some abscesses in the lumbar region are due to the septic condition of the uterus, or an abscess beneath the diaphragm occasionally originates in a septic condition of the cervix uteri. In order to understand how that happens, you may take a parallel case, namely, a wound of the hand with lymphangitis running up the hand and arm, and you will find there will be a place in the course of the lymphatics at which suppuration has broken out, and further on another focus of suppuration. This is what happens in the case of the wandering abscess arising from pelvic cellulitis. As the inflammation spreads through the lymphatics, the lymphatic glands in the pelvis and along the spine are involved, and they may break down and suppurate freely. As a rule the abscesses do not burst into the general peritoneal cavity, but in rare cases such an event has taken place, and then acute peritonitis has been produced.

There is no doubt that the most common cause of cellulitis is connected with delivery of a child, especially if it be followed by puerperal fever, and you may find both pelvic peritonitis and pelvic cellulitis co-existing. Should the cervix or the body of the uterus become infected with

septic organisms there are produced multiple septic emboli, i.e. masses of septic organisms scattered through the uterus and its lymphatics and thence into all parts of the subperitoneal tissue. The course that the pus takes must depend very largely upon the position which the patient assumes, and also the position in which the abscess starts. If it begins in the pelvis between the layers of the broad ligament, and the patient lies recumbent, much of the pus gravitates towards the back of the pelvis, and will be found around the rectum. If it be not evacuated it works its way up behind the posterior parietal peritoneum and may be found around the kidney. Indeed the burrowing may be very extensive, and pelvic abscesses may point anywhere. If left alone they commonly burst at the posterior wall of the vagina, but they also point in the rectum or in the bladder. In not a small number of cases they have come forward through the cellular tissue in the iliac fossa and opened above Poupart's ligament, and in that case the amount of pus must be very considerable. These cases are of particular interest because of their great gravity; and they often baffle the surgeon. Suppuration lasts a very long time. The deaths which ensue are due to persistent pyrexia, or to exhaustion or general weakness with lardaceous disease from the long-continued discharge of pus. Therefore, suppurative pelvic cellulitis must always be a very formidable disease to treat. As

it has been previously stated, the origin of pelvic cellulitis is frequently septic midwifery.

Another cause is the use of septic instruments when operating upon the cervix in the ordinary course of gynæcological practice; and yet another is the use of some pessary. There is a particularly evil form of pessary called the stem pessary, which is inserted into the uterine cavity, and it has been frequently known to give rise to serious pelvic cellulitis and peritonitis.

Localised pus in the pelvis is sometimes due to a suppurating pelvic hæmatocele. Blood is discharged either into the Fallopian tube or else bursts the Fallopian tube and discharges itself into the pouch of Douglas. In most cases this blood is absorbed. But occasionally it happens that instead of so doing it breaks down. So long as the blood is found between the layers of the broad ligament the affection is extra-peritoneal, and it is the extra-peritoneal collections which are likely to suppurate. If the blood is poured into the peritoneal cavity it is very rare for it to break down.

What are the symptoms of the purulent forms of pelvic peritonitis, cellulitis, and pelvic hæmatocele? There are certain general symptoms which are well marked, viz. the usual symptoms of pent-up pus. The temperature is that of fever, and it may rise to 105°, with rigors. The local signs and symptoms are often very

obscure, and they require skill to detect and differentiate between them. The most important local sign is elicited by digital examination, and it is necessary that one should examine both the vagina and the rectum. A bimanual examination should be made, because it is only by so doing that you can appreciate the fact that there is increased thickness of tissue around the uterus and in the floor of the pelvis.

The first point you notice is induration, especially in the floor of the pelvis and on the sides. Secondly, you will observe that in the case of pelvic cellulitis the thickening is generally onesided, and in pelvic peritonitis it is generally symmetrical. The pouch of Douglas is unusually full, and the pelvic floor is pushed down. The uterus no longer occupies its normal position; it is displaced forwards, or backwards, or laterally, and when you attempt to move the uterus it is absolutely fixed, as if a mass of plaster of Paris had been poured into the pelvis. It is very important in these cases to make your examination under an anæsthetic, because the parts are very tender, and the patient is in a condition in which she is quite unable to bear any prolonged digital examination. If you find there is pus, it is better to evacuate it at once and not to submit her to a second anæsthetic.

With regard to the treatment, preventive and early, I must refer you to the works on gynæcology. From the surgeon's point of view it is well

to note that signs of intestinal obstruction occur frequently in the course of a case, for in pelvic peritonitis the intestines are matted and fixed, and sometimes kinked. When you operate for the evacuation of pus you have to consider two points: first of all, the condition of the patient. Can she bear a prolonged operation? Then, from what point can the pus most easily be evacuated? The condition of the patient is often a very serious one and, owing to the fact that there is considerable pyrexia, the patient is very weak and unable to bear a prolonged operation. It is very inadvisable in these cases to attempt to remove the uterine appendages, or to do anything more than evacuate the pus-which should be done as quickly as possible-and put the patient back to bed. You should make up your mind which is the most accessible point from which the pus can be reached and cleared out. In coming to a decision on that point you must give weight to the position which the patient is likely to lie in after the operation. For instance, if there is pus low down in the pelvis it will perhaps be very unwise to attempt to drain such an abscess through the anterior abdominal wall, because that position is against proper drainage. You should open such an abscess low down in the pelvis through the posterior vaginal wall. In order to reach pus which is situated deep down in the pelvis by an anterior abdominal incision, it follows that you must somewhere go

through the healthy peritoneum, and if you do that you run the risk of infecting it. I know some surgeons advocate this line, but I am inclined to think it is adding further risk where such should not be taken. On the other hand, if you are not sure where the pus can best be reached, the rule you follow is to make the usual median incision below the umbilicus and search carefully; for the central position is the most useful. If you open the abscess by passing through the general peritoneal cavity, you will find that the wall of the abscess is bounded by adherent intestine, and you must evacuate the pus without injuring it. Therefore the rule is to search for the pus with an aspirating needle at a spot on the abscess wall where there is no intestine attached; after having found it, you push the aspirating needle in and evacuate the pus. Of course, as you do so, it is a matter of the most vital importance that you should not allow pus to escape into the general peritoneal cavity. The plan you should adopt is to find a suitable spot on the abscess wall where you intend to put the aspirating needle in, and then draw the intestines aside and protect them with sponges or with strips of iodoform gauze; so that there is an abdominal wound the floor of which is formed by the abscess wall on which you propose to operate, and the sides by layers of iodoform gauze protecting the intestines. A long aspirating needle should be used, and attached

to it there should be a long india-rubber tube for the pus to flow through. Some surgeons when they have found the abscess try to draw it to the surface. Having evacuated all the pus possible by the aspirating needle, you should enlarge your aperture into the abscess and irrigate the cavity, and dry it well afterwards, and then stuff it with iodoform gauze. If the diseased appendages present themselves and be found lying loose in the abscess cavity there is nothing against your removing them; but you should not prolong the operation in an attempt to find them. One other point I ask you to particularly remember is, do not break down intestinal adhesions. These adhesions are acting a conservative part; there is no necessity to interfere with them. One of the least evil results which follow interference is a rather serious hæmorrhage. As the inflammatory condition subsides in the abdominal cavity these adhesions will be absorbed.

We now pass to the subject of peritonitis in general. It may be either a general infection of the peritoneal cavity, or it may be a localised infection. The varieties of peritonitis which are met with are tubercular, simple, septic, and specific. By simple peritonitis is meant such as follows injuries or blows; by septic peritonitis, that which ensues on some septic cause; and specific peritonitis is such as is seen in the course of acute Bright's disease, acute rheumatism, and syphilis.

To-day a few remarks will be made upon Tubercular peritonitis. This disease presents three types:—(1) ascitic; (2) fibrous; (3) caseating. In the ascitic form the fluid is either localised or diffused, and with it there may be tubercular caseating foci in the peritoneum. In the ascitic form you find grey granulations of tubercle on the recently infected peritoneum, and a considerable amount of clear fluid. In the fibrous variety there is a good deal of new tissue binding various organs together, and in the new connective-tissue there are large tubercular nodules, which are either recent or undergoing caseation; but as a rule, in the fibrous form no fluid is poured out into the general cavity. What is the relationship of the fibrous to the other forms? There is no doubt that the formation of fibrous tissue is an attempt at healing on the part of the tubercular peritoneum, just as in the case of a tubercular joint, when it recovers without operation, you find that the tubercular material has been transformed into fibrous tissue; or as in a lung with a tuberculous focus, at the postmortem examination you find radiating from the caseating focus bands of fibrous tissue due to cicatrisation. It may be that the fibrous form is a more advanced form of the ascitic, in which an attempt has been made to get rid of the tubercle by causing the granulations to undergo fibrillation. In the caseating variety, which may originate or follow one of the other forms, the

tubercles are large masses which have undergone caseous degeneration. You see between the coils of intestine large caseous masses, and often abscesses in the thickened adherent omentum.

As to the symptoms and diagnosis. It is not very difficult to make a diagnosis of tubercular peritonitis, especially if you frequent the wards of a children's hospital, where most of the cases are seen. You make your diagnosis by the history of the patient, that is to say, you inquire if the patient has tubercular affection elsewhere; by the age, for it generally affects young people, and you must take care to exclude other causes, such as Bright's disease, and so on. You know of the slow progress of the disease, the wasting; and what is more important, you can feel in the abdomen hard masses, and can feel the omentum lying transversely as a huge indurated mass over the front of the abdomen. Then, occasionally, the patient is brought in with symptoms of intestinal obstruction.

The treatment of this affection is either medical or surgical. With regard to the medical treatment, what used to be done in the old days, and was sometimes effectual, was that the patient was put to bed and given some sedative medicine to alleviate the pain, and a preparation known as oleate of mercury was rubbed over the abdomen. Under this treatment the patient sometimes became better for a time.

About twelve or fourteen years ago some ob-

servers noticed that if they opened the abdominal cavity of a case of tubercular peritonitis under the idea that it was something else, the patient got well, very much to their surprise. It is not possible to say certainly why that is so. Of course all sorts of explanations have been hazarded. One is that the tubercle bacillus is anaërobic, and that when the abdomen is opened and the bacillus exposed to the air it dies. That is not quite true; the tubercle bacillus does not always die readily in the lung when it is exposed to fresh air. Another idea is that the traumatism of searching about in the abdominal cavity sets. up a new action, so that the disease undergoes cicatrisation. I do not think that is probable either, but we must leave the matter there. It is said by some observers that 70 per cent. of these cases treated by operation are cured. In my own experience that is too high; 40 per cent. I think would be within the limit. When you open such an abdomen you may find caseating masses of pus. You should evacuate the pus, clear out all the infected material as far as possible, thoroughly irrigate, and then stuff the cavities with iodoform gauze, which should be left in for twenty-four hours, drainage being provided by a wide rubber tube. It is important not to leave the gauze in for longer than twenty-four hours; if it is left the granulations grow into the interstices of the gauze, and the removal is followed by a gush of hæmorrhage. The reason for putting in a wide rubber drain is that several abscesses often communicate by narrow openings, and the pus wells from one to another. In these cases after operation there is a strong probability of intestinal fistula forming, and this unhappy event occurs very often, and the patient's condition is accordingly very miserable. But, as in the treatment of all tubercular affections, it is a matter of vital importance to get the patient away from the hospital into the fresh air as soon as possible. A large number of these patients so treated recover, and they may remain well for six, eight, or ten years.

LECTURE VII.

ON GENERAL PERITONITIS.

Gentlemen,—To-day's is the last of our series of lectures on abdominal suppuration, and the most severe form has been reserved until now, not only because it is so, but because the other local conditions which have been dwelt on are often the causes of acute septic and diffuse peritonitis.

Peritonitis is a disease decidedly difficult of classification, and the most inclusive table of its varieties is that set forth by the late Mr. Greig Smith, in his work on 'Abdominal Surgery.' He there speaks of three main kinds of peritonitissimple, septic, and specific. The simple form may be either localised or diffuse, and arises from operation, from injuries to the abdominal wall, from intestinal strangulation, and from the extravasation of aseptic fluids. The septic variety of peritonitis may, again, be either localised or diffuse, and arises from the introduction of pusforming bacilli, from the intestine, from the female genital organs, or it may be traced directly to operation. In tubercular peritonitis pus is found, and is probably due to mixed infection. By the term specific peritonitis is meant the gouty, syphilitic, and albuminuric forms. It is important to grasp these facts, that a simple and traumatic peritonitis may develop into a septic type, and a localised inflammation may always become generalised.

In septic peritonitis, what are the pathogenic micro-organisms? The most usual form is the Bacillus coli communis, and almost always associated with it, are the Staphylococcus pyogenes aureus and albus. It has been fully shown that in the case of the appendix the Bacillus coli communis can diffuse through the walls of the diseased or damaged intestinal tract and set up an acute septic peritonitis.

This point cannot be too strongly insisted on, namely, that all classifications are only aids to memory, and should not be too much dwelt upon from a clinical point of view, because it is impossible to differentiate precisely, and at all times, one form from another, e.g. a patient may have simple peritonitis in one part of the abdominal cavity and suppurative in another part. But for the sake of description we are compelled to classify them rigidly. One of the first things you will have to learn in practice is that the tables of varieties cannot be applied to all cases. We have now to consider the questions, How do patients die of peritonitis? and Why is it that peritonitis is such a fatal disease? Patients die in one of three ways. Peritonitis may be fatal from want of phagocytosis, when there is not sufficient for-

mation of leucocytes and plasma-cells to form on the peritoneal surface a barrier against the septic products, which are therefore rapidly absorbed and poison the patient. Peritonitis may, on the other hand, be fatal, not on account of the absence of phagocytosis, but because of the large number of leucocytes and plasma-cells which are poured out, and die in their effort to deal with the virulent material, and so produce a large amount of pus. There is also the nervous. element as a cause of death in acute peritonitis. From the peritoneum strong reflex actions are readily set up. If a few drops of very septicfluid from the stomach after a meal, or the contents of a suppurating gall-bladder are effused into the peritoneal cavity, the patient becomes collapsed and shortly presents the appearance of a man who has received a violent blow in the epigastric region, or taken a deadly poison.

As to the signs and symptoms; I propose to exclude those of specific peritonitis, that is to say, the gouty, syphilitic, alcoholic, and those due to Bright's disease, etc., and to speak of those proper to the septic form. There is no one certain sign of peritonitis. Many, like them of old, always seek for a sign, and especially cardinal signs, yet there are very few diseases which have such. It is the judgment of the relative value of signs at any given moment that makes the diagnostician. If called to the bedside of a man who is presenting the symptoms of pro-

found abdominal collapse, the trained diagnostician will probably be able to say that general peritonitis is present, but he is often unable to determine its cause at once. Mr. Treves has well summed up the appearance of the patient with acute peritonitis, and describes it as that of a poisoned man, in fact, as if he had had a large dose of arsenic. He lies collapsed, with a feeble pulse, sighing respiration, drawn pallid features, perspiration on the face, flexed limbs, and is totally unable to move. You will see the picture of the poisoned man more intensified towards the close of the illness than at the beginning.

We may take the signs in their order of occurrence. Vomiting is a fairly constant symptom, but it is of a peculiar character. It is not so profuse as in strangulation of the bowel, when the man belches up large quantities of intestinal contents. The man with peritonitis has eructations of gas, and then a little fluid comes, but there is no sudden gush of vomit. Tympanites may be well marked, and it is often so in those cases in which the condition has existed for some time. But in the very worst cases there is no tympanites at all, and it is important to be aware of this. What are the causes of tympanites? It is partly due to a paralysis of the bowel. You will ask at once, why it is a man has paralysis of the bowel in acute general peritonitis? It is mainly on account of the poisoning of the nerveendings in the muscle, which therefore fails to

contract, and the gas in the intestines causes rapid distension of the intestinal walls. Tympanites also partly arises from mere mechanical obstruction. For instance, if a portion of the intestine is bound down by a band, such as occurs in acute intestinal obstruction, you will find that the intestine becomes rapidly distended, because the intestinal gas cannot pass away.

Pain is often present, but as a symptom is of uncertain value. The most severe cases often have no pain towards the end, and some few of them do not have any pain at all. I have, in a previous lecture, quoted a case reported by Mr. Treves, in which the patient, although very ill from appendicitis, smacked the region of the iliac fossa and declared he felt no pain there. As a rule, when perforation of a hollow viscus occurs, the pain is for a time intense. It is worst about the umbilicus, but after a time it becomes somewhat localised at the site of commencing peritonitis, and early in the illness there is considerable local rigidity of the abdominal muscles.

Constipation is generally present in peritonitis, although exceptionally diarrhoea is present. If the latter should be the case at the beginning of acute general peritonitis, the disease is almost always of the virulent type, and it is extremely likely to become suppurative. Constipation may be produced by opiates, and diarrhoea by purgatives. Pyrexia is a most variable symptom. All

As I have remarked, if there be a rapid pulse, a subnormal temperature, and a history of abdominal trouble, you must be on your guard, for you may know that you are in for one of the worst types of cases, in which prompt action is absolutely necessary.

The general systemic symptoms are well known, such as a low muttering delirium, rapid and wiry pulse, and feeble heart. The face is drawn, the extremities are cold, and there are extreme thirst and great diminution of urine.

The question of prognosis depends, first of all, on the cause, that is to say, if a hollow viscus is perforated the peritonitis is more likely to be fatal than when the peritonitis arises from another cause. Then it also depends upon how soon after the onset of the attack the patient is seen by a surgeon, and how soon an operation is done. It has been clearly shown that a large percentage of cases of gastric ulcer recover if they are operated on within the first twenty-four hours. I had a very successful case some time ago in one of the suburbs of London, in which perforation occurred at 3 a.m. on a Friday; the medical man in attendance was a very acute man, and suspected that perforation of the stomach had occurred. At 5 p.m. he detected that the liver dulness had disappeared. On operating at 10 p.m. the position of the ulcer could be felt on the anterior surface of the stomach, and it was of the size

of a five-shilling piece. It had five doubtful spots on it, and from one of these spots gastric contents were issuing, and the other four looked as if they were on the point of perforating. It was not possible to invert the floor of the ulcer on account of its size, so a piece of omentum was grafted on, and the patient recovered, practically without a bad symptom. Another case was in Percy Ward. It was that of a girl who had had perforation for three days. I operated upon her and grafted omentum in the same way. She went on apparently well until the twenty-third day, and then she died of hæmorrhage from another ulcer which had not been detected at the time of the operation. One may say in all cases of suspected perforation of a hollow viscus, operate at once and quickly. Slowness in operation means failure.

The only treatment is to open the abdomen, preferably in the middle line, and be guided by the escape of fluid or gas. If the fluid be fæcal, examine the ileo-cæcal region, because it may come from the appendix or from perforation of the cæcum or obstruction of the colon, giving rise to sloughing of the cæcum and exudation of fæcal matter. If nothing be found here and the cæcum be distended, examine the sigmoid and rectum, thereby excluding mechanical obstruction. Finally, examine the stomach and duodenum. There is nothing more difficult than to find a perforating ulcer on the posterior surface of the

duodenum. If the perforation has been found, and the surgeon has been able to close it (I do not think you will fully realise what that statement means until you have had some experience in trying to do so), there are other matters to attend to. You should relieve the distended and paralysed intestines. Then get the septic fluid out of the abdomen, and finally obtain good drainage.

To relieve the paralysed intestine, if the contents are gaseous, or mainly so, you may make multiple punctures of the intestine, using a small needle, so that the opening closes at once as soon as the gas has escaped. If the distension is due to fluid you should put in a fine trocar. When it is removed close the opening by careful suture. If there are large coils of distended intestine you should draw them outside, and make a small incision into the intestine to evacuate the contents, and then close the opening. But if, in the course of your operation, you meet a gangrenous patch of intestine, and there is no time for resection, your best way is to empty the intestine and then insert a Paul's tube. If you find the peritonitis is chiefly of the plastic variety, with but little pus, you evacuate what pus is present and take the greatest care not to disturb the adhesions, because that would mean shock in the first place, and hæmorrhage later. Therefore, in plastic peritonitis do not do more than is necessary at the time. With regard to the septic foci,

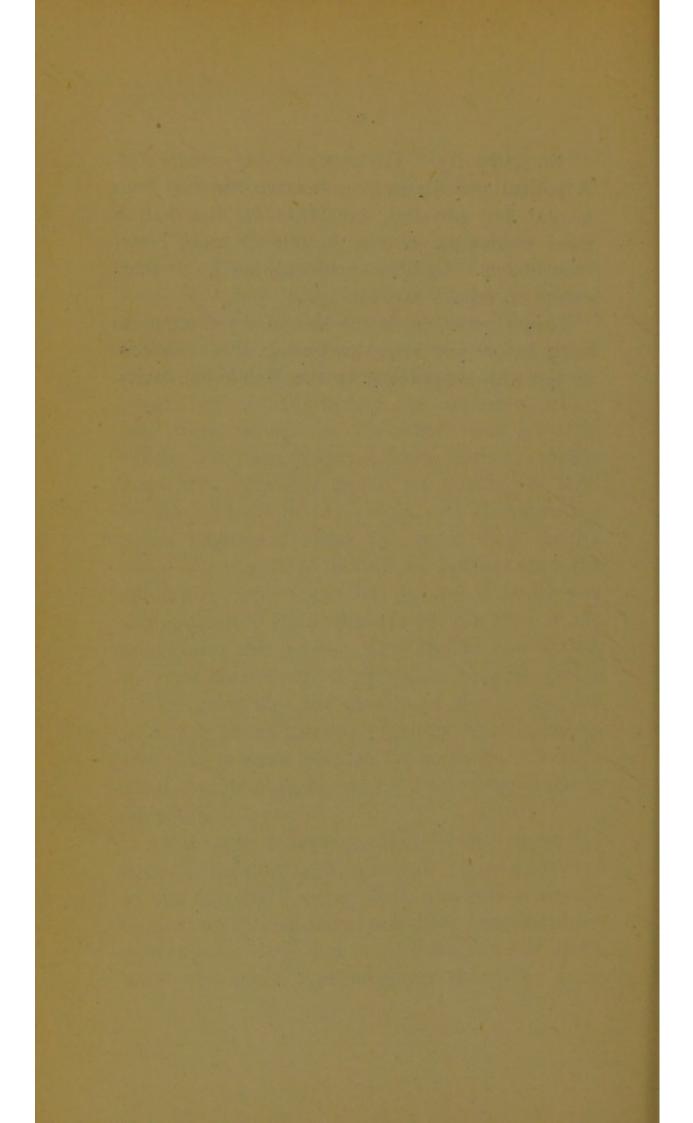
if they are localised you drain very carefully after you have irrigated the septic cavities, and then put in a drainage-tube.

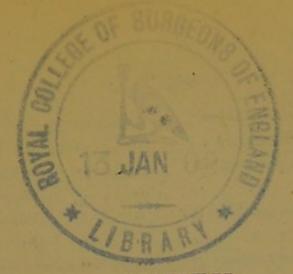
As to irrigation, it is not done with a fire hose or a glass syringe, but with hydrostatic pressure. The source of pressure should not be more than twelve to eighteen inches above the abdominal cavity. You merely want sufficient force for the fluid to find its way into the various interstices, but not to rupture the adhesions which may have formed or do other local damage. When you have irrigated, take care to sponge away the remaining fluid. As a rule the fluid residue collects in the pelvis, and therefore the pelvis requires draining by means of a Keith's tube. If you have reason to believe that the amount of septic fluid left behind is small, you may put in a gauze drain over the top of the pubes into the pelvis. This should not be left in more than twenty-four hours, because granulations grow into the meshes of the gauze, and pulling it out is extremely painful to the patient, and may produce profuse hæmorrhage. A glass drain is preferable, because it does not give rise to irritation.

As to after-treatment, there is one measure I have the greatest faith in myself. It was initiated by the late Mr. Lawson Tait, who was a man of original mind, and one who had the courage of his convictions. It is that in all these cases of abdominal operations a saline purge should be given

on the third day. The result is very remarkable. A patient may be in considerable distress, both mental and physical, but after he has had a good evacuation of the bowels he gets better immediately. Opiates should always be avoided except to relieve excessive pain.

This, Gentlemen, is the end of my attempt to bring before you some interesting affections connected with suppuration in the abdominal cavity.





INDEX.

					PAGE
Abscess, circumscribed					15
in appendicitis				•••	5
perityphlitic	-1				13, 15
subdiaphragmatic					57
subphrenic					60
Actinomycosis					16
Adhesions, intestinal					77,90
Adhesive appendicitis					4, 26
peritonitis					13, 14
After-treatment in peri	tonitis				90
Appendicitis					3
abscess in					5
acute peritonitis in	n, oper	ation f	or		55
ætiology					17
anatomy of parts					5
bacteriology					17
catarrhal			******		4
childhood and			***		30
classification					4
clinical phases					3
complications of					31
constipation					23
diagnosis					4, 37
diet					20, 51

App	endicitis (cont	inued)—				PAGE
	differential di	agnos	is				40
	examination p	er rec	etum				25
	heredity						18
	hernia after o	perati	on for				53
	injury as a ca	use				2	19
	intestinal obs	truction	on in				31, 40
	leeches, use o	f	1				51
	left-sided						7
	leucocytosis						26, 43
	localised abso	ess, o	peration	for			52
	McBurney's p	oint					- 53, 55
	nomenclature						3
	operation					4	5 et seq.
	pain						3, 21, 22
	pain, position	of					37
	perforation in						5
	period of year	r					18
	peritonitis, co	oncuri	rent		•••		13
	,, ge	neral	purulen	t			28
	prognosis						44
	pulse						24
	purgatives						31,50
	pus						39
	", diagnosis	s of					26, 27
	pyæmic disea	ase of	liver				17
	recurrent, op	eratio	n for				55
	relapse						48
	relief of pain						49,50
	right-sided						7
	sex in				•••		18
	simple catarr	hal					4
	surgical disea	ase			***		40
	symptoms						21,37
	teeth						20
	temperature				***	***	3, 23, 24

Appendicitis (contin	ued)-	-				PAGE
						21
treatment						49
tumour						25
volvulus						41
vomiting						23
Appendix, abnorma	l posit	ions	of			7
apparently hea						34
bacilli in						II
catarrh of						II
changes in						10, 11
contents of						9
description of						6
foreign bodies	in				9	, 18, 19
gangrene of						12
how to find						6
length of						8
morbid anaton	ny of					10
muscular band	ls of					. 8
position of						8
removal of						54
Bacillus coli comn	nunis			11, 14	, 16, 17	, 34, 83
Bacillus tuberculos	sis					80
Cæcum						6, 10
malignant dis	ease of	f				42
position of						8
Carcinoma						16
Catarrh of append	ix					II
Catarrhal appendi	citis					4, 26
Cellulitis						70
evacuation of	pus				74	t et seg.
pelvic						69, 70
symptoms						73
Circumscribed abs	cess					15

					PAGE
Colic					22
1 1111					. 41
Complications of appendic	itis				31
deep circumflex iliac		oughin	g of		34
empyema					34
hæmorrhage from ilia	c vein			*****	34
intestinal fistula					35
,, obstruction					31, 40
metatastic parotitis					36
myositis					35
perforation of cæcum					35
pleurisy					34
pregnancy					35
pulmonary embolism					34
pylephlebitis					33
thrombosis					34
Constipation in appendic	itis				23
in peritonitis					86
Cystic appendicitis					11
D: : .f andiaitie					37
Diagnosis of appendicitis					86
Diarrhœa in peritonitis					51
Diet in appendicitis	nnendi	icitis			49
Differential diagnosis of a		icitis	***		41
biliary colic		· ·			42
cæcum, malignant di					43
colitis, membranous					42
gastric ulcer, perfora		•••			40
intestinal obstruction		***			41
intussusception					43
ovaritis, right-sided					+3
peritonitis, tubercula	-	-			43
pyosalpinx, right	***				41
renal colic	***	1000	1000	1 1000000	

Differential diagnosis of	appen	dicitis	(contin	ued)	PAGE
typhoid fever					42
volvulus					41
Diplococci					17
Douglas, pouch of					73, 74
Dyspnœa					62
Edebohls' method of pal	pation				29
Enterolith					9
Epiphyaditis					3
Epityphlitis					3
Exacuation of pus				74	et seq.
Examination per rectum					38, 41
D. I					
Fæcal concretions					9
Fistula, intestinal					35, 81
Fossæ of peritoneum		•••			8
Gangrene of appendix				5	, 12, 38
Gastric ulcer					58, 87
Greig Smith					64, 82
Hawkins, F. S					10
Hæmatocele					60 72
Heredity of appendicitis	***				69, 73
Hydatid of liver					
riyuana or nver					63, 65
Ileo-cæcal region					5
Induration					64, 74
Intestinal adhesions					77, 90
fistula					35, 81
obstruction					75, 86
Intussusception					41
Keith's tube					00
Küster	-		100	***	90
Tubby.			***		3
· accy.				7	

				PAGE
Lawson Tait				. 90
Leeches, use of, in appendicitis				51
Leucocytosis in appendicitis	!			26, 43
Localised abscess				14
intra-abdominal suppuration				3
Lockwood, C. B				8
McBurney's point			7, 25,	53, 55
Makins, G. H				16
Meso-appendix				8
				-
New growths in appendix				16
Nomenclature of appendicitis				3
Oblitantian of appendix				11
Obliteration of appendix		***		et seq.
Operation for appendicitis				88
peritonitis				
Ovaritis, right-sided				43
Pain in appendicitis			1.	37
peritonitis				86
relief of, in appendicitis	***			49, 50
Parametritis				. 70
Paul's tube				89
Pelvic suppuration	·			69
Perforating gastric ulcer				42
Perforation, operation for				88
Perforative appendicitis				39
Peritoneum, affections of				13
Peritonitis		,		13, 77
acute general, in appendici	tis			26
adhesive				13
after-treatment				90
cause				14
classification				82
constipation				86
				4000

diagnosis of tubercular 79 dry 16 diarrhœa in 86 fatality 83, 84 general 13, 16 pain 86 pelvic, symptoms of 73 primary 16 prognosis 87 secondary 16 septic 77, 82, 83 signs 84 simple 77, 82 specific 77, 82 symptoms 84 systemic symptoms 84 tubercular 43, 77 et seq., 82 temperature 87 treatment 88 vomiting 85 Perityphlitic abscess 13, 15 Perityphlitis 3 Peper's patches 10 Phagocytosis 83 Plastic peritonitis, treatment 89 Prognosis of appendicitis 35 Prognosis of appendicitis 44 peritonitis 24 Purgatives in appendicitis 50 Pus in appendicitis 50 <	Peritonitis (continued)				PAGE
diarrhœa in	diagnosis of tubercular				79
fatality	dry				16
general 13, 16 pain 86 pelvic, symptoms of 73 primary 16 prognosis 87 secondary septic 77, 82, 83 signs 84 simple 77, 82 specific 84 simple	diarrhœa in				86
pain	fatality				83, 84
pelvic, symptoms of	general				13, 16
primary 16 prognosis 87 secondary 16 septic 77, 82, 83 signs 84 simple 77, 82 specific 77, 82 symptoms 84 systemic symptoms 84 tubercular 43, 77 et seq., 82 82 temperature 87 treatment 87 vomiting Perityphlitic abscess Perityphlitic abscess .	pain				86
prognosis .	pelvic, symptoms of				73
secondary	primary				16
septic 77, 82, 83 signs 84 simple 77, 82 specific 77, 82 symptoms	prognosis				87
signs <td< td=""><td>secondary</td><td></td><td></td><td></td><td>16</td></td<>	secondary				16
simple	septic			77	, 82, 83
specific 84 systemic symptoms 84 tubercular	signs				84
symptoms 84 systemic symptoms 84 tubercular 43, 77 et seq., 82 temperature treatment vomiting Perityphlitic abscess Perityphlitis Peyer's patches Phagocytosis Plastic peritonitis, treatment Pneumococcus Pregnancy in appendicitis Prognosis of appendicitis Purgatives in appendicitis Pus in appendicitis Pyæmic disease of liver	simple				77, 82
systemic symptoms 84 tubercular 82 temperature 87 treatment <td>specific</td> <td></td> <td></td> <td></td> <td>77, 82</td>	specific				77, 82
tubercular 43, 77 et seq., 82 temperature 87 treatment 88 vomiting	symptoms				84
temperature 87 treatment 88 vomiting Perityphlitic abscess Perityphlitis Peyer's patches Phagocytosis Plastic peritonitis, treatment Pneumococcus Pouch of Douglas Pregnancy in appendicitis Prognosis of appendicitis Pulse in appendicitis Purgatives in appendicitis Pyæmic disease of liver	systemic symptoms				84
treatment	tubercular		43	77 et	seq., 82
vomiting85Perityphlitic abscess13, 15Perityphlitis3Peyer's patches10Phagocytosis83Plastic peritonitis, treatment89Pneumococcus11Pouch of Douglas73, 74Pregnancy in appendicitis35Prognosis of appendicitis44peritonitis87Pulse in appendicitis24Purgatives in appendicitis50Pus in appendicitis39Pyæmic disease of liver17	temperature				87
Perityphlitic abscess	treatment	***			88
Perityphlitis <td>vomiting</td> <td></td> <td></td> <td></td> <td>85</td>	vomiting				85
Peyer's patches	Perityphlitic abscess				13, 15
Phagocytosis 83 Plastic peritonitis, treatment 89 Pneumococcus 11 Pouch of Douglas 73, 74 Pregnancy in appendicitis 35 Prognosis of appendicitis 44 peritonitis	Perityphlitis				3
Plastic peritonitis, treatment 89 Pneumococcus	Peyer's patches				10
Pneumococcus 73, 74 Pregnancy in appendicitis </td <td>Phagocytosis</td> <td></td> <td></td> <td></td> <td>83</td>	Phagocytosis				83
Pouch of Douglas 73, 74 Pregnancy in appendicitis	Plastic peritonitis, treatment				89
Pregnancy in appendicitis	Pneumococcus				II
Prognosis of appendicitis 87 Pulse in appendicitis 50 Pus in appendicitis	Pouch of Douglas				73, 74
peritonitis 87 Pulse in appendicitis 50 Pus in appendicitis 39 Pyæmic disease of liver <td< td=""><td>Pregnancy in appendicitis</td><td></td><td></td><td></td><td>35</td></td<>	Pregnancy in appendicitis				35
Pulse in appendicitis 50 Pus in appendicitis <td>Prognosis of appendicitis</td> <td></td> <td></td> <td></td> <td>44</td>	Prognosis of appendicitis				44
Purgatives in appendicitis 50 Pus in appendicitis 39 Pyæmic disease of liver 17	peritonitis				87
Pus in appendicitis 39 Pyæmic disease of liver 17	Pulse in appendicitis				24
Pyæmic disease of liver 17	Purgatives in appendicitis				50
Pyæmic disease of liver 17	Pus in appendicitis				39
Pylephlebitis 16, 33	Pyæmic disease of liver			****	17
	Pylephlebitis				16, 33

						PAGE
Pyopneumothorax						62
Pyosalpinx	***					43, 69
Pyrexia						75, 86
Recurrent appendic	itis				5,	28, 29
operation for						55
Rectum, examination	on per					25
Relapsing appendic	itis				5,	29, 48
Rolleston, H. D.		•••				8
Signs of appendicit	is					25
peritonitis						84
Simple appendicitis						26
						17
pyogenes albus						83
pyogenes aurei						83
4						17
pyogenes aure						11
Subdiaphragmatic :						57
appendicitis, a						34
diagnosis						65
induration						64
pancreatic cys						66
percussion						65
						62
signs				***	***	61
symptoms						66
treatment						59, 60
Subphrenic abscess						69, 73
Suppurating hæma	tocele					37
Symptoms of appear						84
peritonitis					***	87
Systemic symptom	s of pe	ritoniti	S			0/
· Property of						20 21
Temperature in ap				***		23, 24
peritonitis					***	87

				PAGE
Treatment of peritonitis			 	49, 88
Treves, case of appendicit	tis		 	38, 86
on nomenclature			 	3
on acute peritonitis			 	85
Tubercle bacillus .			 	80
Tubercular peritoni			 	69
Tumour in intussusception	n		 	41
Tympanites		·	 	85, 86
Typhlitis			 	10
Typhoid fever			 •••	26, 42
Ulcer, chronic			 	58
gastric			 	58, 87
Valve of Gerlach			 	8
Vomiting in appendicitis			 	23
in peritonitis			 	85
Widal's reaction of the b	olood		 	43

entr.



