On the surgical aspect of hepatic abscess : being three lectures delivered at the Hospital for Consumption and Diseases of the Chest, Brompton / by Rickman J. Godlee.

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ON THE

SURGICAL ASPECT OF HEPATIC ABSCESS,

Being Three Lectures delivered at the Hospital for Consumption and Diseases of the Chest, Brompton.

BY

RICKMAN J. GODLEE, M.S., F.R.C.S.,

Surgeon to the Hospital and to University College Hospital.

[Reprinted for the Author from the BRITISH MEDICAL JOURNAL, January 1890.]

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LECTURE I.

It is needless to tell anyone connected with this institution that the chest contains many more organs than the student of anatomy is disposed to put into it. You must cut off the trunk at the level of the third lumbar vertebra—that is, at an inch above the umbilicus—to include everything that is enclosed between the thoracic parietes; and think what a range this will give you. The stomach and spleen, the liver and the kidneys, the transverse colon and the duodenum, to say nothing of the aorta and the vena cava, the pancreas and the bodies of the vertebræ, and other more obscure and puzzling structures. We are much too apt to look at the body as consisting of distinct anatomical regions, and, while we are devoting our attention to one, to miss what is going on in the adjoining one. To illustrate my meaning, let me recall a case that occurred to me not long ago, in which a most able surgeon had been directing his attention to the abdomen in the search for a spinal abscess, and a distinguished physician to the chest in a supplementary search after the cause of the patient's trouble, which was pain in the back and palpitation apparently of the heart. I saw the patient, who, by the way, was the subject of old hip disease, casually, and was on the point of missing, as they had done, the cause of the trouble, when, as he was about to dress, he pointed out to me that his flutterings were just at the margin of his ribs; and thus, by a mere piece of good fortune, I was able to discover that they were caused by a large aortic aneurysm. But this is not all; the chest often contains morbid products which have made their way up or down from quite distant parts. Thus, a pericæcal abscess may burst into either pleura, and an abscess starting from the cervical vertebræ may, in the same way, enter the mediastinum or the pleura. I need therefore offer no apology for introducing to your notice the subject of abscess of the liver, the symptoms of which are in very many cases more or less thoracic. If I were to apologise, it would be on different grounds. It may seem presumption for any London surgeon to treat of this matter, because, even with exceptional advantages, none of us can have a very large experience of it, at least as compared with our *confrères* in tropical countries. I have, however, had rather unusual opportunities, chiefly because of the friendship of Sir Joseph Fayrer, to which I owe many of the facts I propose to bring before you, and to whose kindness and knowledge of the subject I

desire hereby to bear testimony. I would also apologise for discarding the methodical manner of the textbook, and adopting a somewhat disjointed style—illustrating what is said by the cases that have, from time to time, come under my notice.

In the first place, then, I must clear the way by getting rid of one form of hepatic abscess which was very familiar to us in my student days, and which then, at all events, was as common in this country as it is in the tropics, though its cause was usually different —I mean *multiple pyæmic abscess*. This form is often much less easy to diagnose than the single abscess, and is generally not amenable to surgical treatment, or, if this be attempted, it is unsuccessful. In hot countries it is not infrequently the result, or, at all events, the concomitant of dysentery, or some other ulceration of the bowel. In this country it may arise from the same cause, but it more generally depends upon an abscess in connection with the cæcum, or upon any wound giving rise to pyæmia; and there is a rare condition that might almost be included under this head—namely, suppurative inflammation of the portal vein, or pylephlebitis, about which also a word or two must be said. I will first give examples of the old-fashioned pyæmic abscess.

Case I.—E. J., a married woman, aged 54, was admitted into University College Hospital, November 20th, 1874, on account of two deep wounds at the inner side of the lower end of the left forearm, produced by putting her hand through a window some days before. She was previously healthy. A diffuse cellulitis set in, accompanied by suppuration, for which incisions were made, and all was progressing favourably, the temperature being under 100° F., though the pulse was rapid for more than a week. Then came on the following train of symptoms.

November 28th. First rigor with a temperature of 104°.

November 30th. Second rigor. Basic *râles* on both sides; a little harsh breathing, but no alteration in percussion sounds.

December 1st. Third rigor, with a temperature of 105.8°. The tongue was brown and dry.

December 2nd. A slight rigor, No. 4. A crop of herpes labialis made its appearance, and the patient was noticed to be very sallow. Very likely she was slightly jaundiced.

December 3rd. Rigor No. 5, also slight. Delirium set in and tracheal *râles* were heard. Dr. Roberts diagnosed bronchitis, but could discover no pneumonia. Severe pain at the hypochondrium was complained of.

December 4th. The delirium continued, and the patient gradually sank and died.

At the *post-mortem* examination, extensive recent adhesions were found in the right pleura, and from twelve to twenty embolic abscesses in the right lung; but the left lung and pleura were healthy. The liver was large, and weighed seventy-two ounces. It contained a very large number of abscesses; so many indeed, that it was impossible to slice it across without opening more than one of them. Their capacity varied from a few minims to one or two drachms, and their contents consisted of bright yellow pus. There was an old deep scar on the surface of the liver. No joint was involved in the original mischief, and no phlebitis was discovered. The symptoms here were simply those of acute embolic pyæmia, and there was nothing to direct attention to the liver, except the sallow colour, which is almost always present in pyæmia, and the hypochondriac pain on the last day. The pus, it will be observed, was bright yellow. This I think may be taken as a very typical example of the condition under discussion.

The next case is of the same nature; but here there was nothing at all to draw the attention to the liver, except that it was enlarged; and, as the patient was obviously the subject of amyloid disease, this fact was of little importance.

Case II.—E. H., aged 9, came into University College Hospital, August 20th, 1873. She was highly tubercular in appearance, and had a marked tubercular history. From the age of two years she had had chronic hip-joint disease, which had suppurated and left sinuses. She was in the hospital for eight months, and during this time she submitted to a series of operations for the removal of the dead bone, culminating in excision of the hip-joint. She had a varying temperature, but one almost always of a hectic type, and she suffered from one attack, if not two, of erysipelas and died at last exhausted—the climax being hastened by diarrhœa. She had no rigors. *Post mortem* the liver was found to be very large, extending three inches below the ribs in the nipple line and markedly amyloid. Throughout its substance were numerous abscesses, the largest of which contained perhaps a drachm of yellow pus. There were also numerous pyæmic abscesses in the lungs, especially the left, and some were also found in the right kidney. No clots were found in the veins either of this or the former case; and yet it is almost certain that they were present at the seats of the original mischief.

The presumed mechanical cause for embolic abscesses in the liver and other viscera than the lungs is that septic clots escape into the venous circulation from softening thrombi in the veins at the seat of the primary mischief and are arrested in the lungs, where they give rise to the well-known conical patches of pulmonary apoplexy, followed by gangrene, round which suppuration is set up. Some of the original septic clots, however, it is supposed, may be so minute as to pass through the lungs and thus enter the *arterial* systemic circulation; or fresh ones may be formed in the pulmonary veins and thus be launched upon the same course. These then may stick in any of the systemic capillaries; but why this arrest should so frequently occur in the viscera, and so seldom in the muscles and cellular tissue the mechanical theory is unable to explain.

But there are other ways in which embolic hepatic abscesses may perhaps be caused. The late Dr. Wooldridge has shown[1] that the injection into the jugular vein of a dog of a special proteid substance obtained from various tissues (particularly the thymus gland) will cause clotting in the portal vein, the extent of the clotting depending upon the amount of the fluid used. These infarctions are hæmorrhagic, and do not result in suppuration, but it is conceivable that in cases of pyæmia such a material may be the cause of infarctions which, under such circumstances, are extremely likely to become the seats of suppuration. It is moreover not necessary that the emboli should reach the liver by means of the hepatic artery, as there are two feeders for the hepatic capillaries; and in cases of multiple abscess following dysentery and typhlitis, and in cases of *fistula in ano*, etc., we may look to the tributaries of the *portal vein* itself for the local source of mischief. It appears to be certain also that thrombosis and subsequent suppuration may occur in the *hepatic veins* or their tributaries.

Pylephlebitis suppurativa is a rare disease, and very difficult of diagnosis; but, as it is not unlikely that a surgeon's opinion may be asked when it is present, it is right to give a brief outline of it

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[1] *Transactions of the Pathological Society of London*, vol. xxix, p. 421.

in this connection. It almost always depends upon suppurative inflammation in the parts where the portal vein originates, but it may depend upon a variety of causes. Frerichs gives them under the following heads: 1. Traumatic—there is a solitary case on record of a fish bone penetrating the stomach, and entering the portal vein. 2. Ulcerative processes in the intestinal canal and stomach; the most common locality being the vermiform appendix, and less frequently the rectum. 3. Abscesses of the spleen opening into the portal vein. 4. Suppuration in the mesentery and the mesenteric glands. 5. Abscesses in the liver, and diseases of the bile ducts; gall stones. 6. Inflammations of Glisson's capsule. The symptoms are usually preceded by those of the disease or injury upon which it depends, such, for example, as typhlitis. The special symptoms consist of pain in the epigastrium, the right or left hypochondrium, the cæcal or the umbilical region. Then follow rigors, usually frequently repeated at more or less irregular intervals. The liver and spleen are enlarged and tender, and slight or severe jaundice occurs. The stools are either loose, copious, and bilious, or there may be constipation. Then should follow the ordinary symptoms of peritonitis, the temperature usually becoming hectic, and at last there is delirium and death. Ascites does not appear to be frequent, though it is the rule in plastic thrombosis of the portal vein; but distension of the abdominal veins has been observed. In Dr. Wooldridge's experiments no ascites occurred, however extensive the thrombosis was. The disease, which appears to be absolutely hopeless, may run its course in a fortnight, but usually lasts from five to six weeks. Sometimes in addition to these symptoms are superadded those caused by the development of metastatic abscesses in other parts of the body. After death the liver is, in the majority of cases (three quarters), found to be enlarged on account of abscesses in its interior; but, if there be none, the size is unaltered. The portal vein is occupied by clots which are more or less broken down into the condition of pus. The characters of the spleen resemble those of the liver. I did not have the chance of making the necropsy myself in the two cases which are to follow; but the symptoms of them are so remarkably like those which have been described by writers upon this question as at all events to justify a short description of them.

Case III.—On August 31st, 1889, I saw for the first time a member of our own profession, aged nearly 50, who had suffered for some years from obscure pains at the epigastrium, accompanied or followed by intestinal colic, which had been diagnosed as neuralgic, but which, it is possible, might have originated from trouble in the gall bladder, for it is well known that intestinal colic is often the most marked symptom of both biliary and renal calculi. Whilst taking his holiday in Scotland, about a month before, he was seized with a pain which, as far as we could learn, started somewhat in the same manner as on former occasions, but which led up to what appeared to be an attack of typhlitis. As this, however, did not subside, but began to be accompanied by rigors, he returned to his home in the midlands. The rigors continued and became more severe, occurring usually twice a day for a fortnight or more, when they ceased; but only to be replaced by periodical rises of temperature, accompanied by most of the unpleasant symptoms usually associated with a rigor. During this time the pain extended up into the right hypochondrium and epigastrium, and these regions became excessively tender; and ultimately an indefinite dulness showed itself below the margin of the ribs, and there were signs of compression of the base of the right lung. The patient became slightly jaundiced,

and rapidly lost flesh, and passed into a somnolent and occasionally semidelirious state. A few days before I saw him an exploring needle had been passed through a lower intercostal space in the right back, but only blood had escaped into the syringe. The abdomen was distended. The bowels acted, the stools being clayey and unformed at first, often in small lumps: later they contained more bile and were more formed. There was some vomiting, at first of undigested food, and later of bilious material. The tongue was dry and brown, and there was an erythematous rash on the wrists and ankles and some other parts of the body. At this time there appeared nothing for the surgeon to do, but a week later, September 6th, as the dulness had increased, it was thought right to make an incision at the upper end of the right *linea semilunaris*, but this only led down to a large collection of dark blood clot, which was apparently shut off in this part of the peritoneum. No good followed, and on September 25th the patient died, eight weeks from the onset of the illness. The temperature towards the end lost its hectic type, but remained constantly high, 101° to 102.5°, reaching 104° two days before death, when there was a rigor.

At the necropsy, the liver was found to be universally covered by recent adhesions and creamy lymph, and contained numerous abscesses, varying in size from that of a shot corn to cavities containing two drachms. It was studded through with them. No clots, suppurative or adhesive, were observed in the portal vein. The gall bladder could not be found, though a careful search was made for it. The cavity which had contained the clot communicated with the peritoneum by an opening of the size of the finger. There was a large abscess in the spleen close to the hilus, and the splenic substance was very soft and diffluent. The intestines were matted together, and there were abscesses in the mesenteric glands; one being just below the pancreas. There was an abscess under the iliac fascia on the right side, about the length of the finger, extending down to the pubes, possibly connected with the appendix, which was blackened, but intact. There were recent adhesions in the right pleura, but no abscesses in the lungs. There is therefore no actual evidence that this was a case of suppurative pylephlebitis, but as the branches of the portal vein were not slit up, the evidence is not conclusive against it; for it is well known that the clots are sometimes only found in the smaller branches of the vein. It reads almost exactly like some of those quoted by Frerichs, with the curious additional symptom of the peritoneal hæmorrhage, for which I am unable to account, though it is worthy of notice that Dr. Wooldridge frequently, in the course of his experiments, observed subperitoneal hæmorrhage on the gall bladder, the contents of which, in one case, were very tenacious colourless mucus, which, he says, if it had entered the common duct would infallibly have produced jaundice.

Case iv.—The next case is more obscure, and it is possible that some mischief about the gall bladder may have been at the bottom of the trouble. I saw the patient on August 18th, 1888, with Drs. Forman and Whitelaw, of Stoke Newington. He was a barman, aged 19, and his illness began on June 2nd with diarrhœa of typhoid type, and pain and tenderness over the cæcum. After three days' treatment this subsided, but on June 16th he hurried home, and immediately he felt ill and had a rigor, and pain and tenderness came on at the *scrobiculus cordis*, and continued till the time of our consultation, but the old cæcal tenderness did not return. The rigors persisted generally (as in the last case) twice daily for five weeks, and were followed by profuse sweating, the

temperature being of a hectic type. Rapid emaciation ensued. The belly became distended with fluid, and there was dulness at both bases. The bowels were sometimes loose, sometimes bound, motions always offensive.

The patient was seen by Dr. Bruce, and the diagnosis suggested (though the case was admittedly most obscure) of subdiaphragmatic abscess, which I was asked, if I saw my way to do so, to open. I did not, however, see what was to be done beyond ascertaining the fact that there was serous fluid and not pus in the peritoneum and in both pleuræ, and so he was left alone, and he lingered till the beginning of September, three months after the commencement of his illness, death occurring at last from hæmorrhage into the stomach, which, it will be observed, is one of the recognised symptoms of plugging of the portal vein.

At the necropsy, it was found that the lungs reached no lower than the fourth rib, so great was the pressure from below, but there was only a slight excess of fluid in the pleuræ and the pericardium, and nothing else abnormal in the thorax. On cutting into the liver, however, Dr. Forman found a large abscess on the under surface, containing about half a pint of matter about the consistence and appearance of French mustard. The liver tissue was intensely congested, and resembled that of the spleen; it was throughout studded with tiny collections of ordinary looking pus. The gall bladder was empty and shrunken, and the abscess was in a direct line with it. The abdomen contained about a gallon of fluid. All the other organs were healthy. A gummous-looking clot was noticed in the portal vein, which, in fact, was filled by it; so this, I have little doubt, was a case of the sort under discussion.

I have nothing further to say about the relation of the bile ducts to hepatic abscess beyond this: Mere obstruction of the bile duct does not give rise to suppuration, but if ulceration have occurred from the passage of a gall stone either along the ducts or directly from the gall bladder into the intestine, it may produce an abscess, either by causing extensive suppurative phlebitis of the portal vein, or by starting the process in the smaller vessels, and so originating what might be called a local pyæmia of the liver. It is also possible that, in cases where a stone has been impacted, and has caused ulceration, the ducts may become distended with pus, and the extension of a purulent collection thus formed may give rise to a genuine abscess of the liver.

Of the diagnosis of so-called *tropical abscess* of the liver, it is quite unfitting that I should speak, even if I were able to do so. In talking to people who have been in India and other countries where malarial troubles are common, one cannot help being struck with the fact that some will say that they have suffered from one form of malaria, others from another, others again describing two or more distinct kinds. Some, again, will say that they have had attacks of liver, others not; but almost all of them who have abscess of the liver have at one time or another had something of the malarial nature. One is led to conclude that the tropical abscesses are of two sorts; one the multiple which appears to be of the pyæmic kind we have just been considering. The other, which is usually, though not quite invariably, single, is apparently the most advanced stage of the attacks of hepatitis to which reference has been made. What part dysentery plays in the history of hepatic abscess has been the subject of much discussion, some maintaining that it is the cause, others the result, and others merely an accidental concomitant. Certain it is that many people who have abscess of the liver have never had dysentery, and it is

of course well known that only a very small proportion of patients with dysentery ever develop liver abscess. I think it may be equally certainly stated that, if a patient with abscess of the liver be passing dysenteric stools, or much mucous discharge with the motions, the chance of his recovery, when the pus is evacuated, is very much diminished. I said that surgical treatment of a case of multiple abscess was very hopeless, and I will now give an example of a bad case of this kind to illustrate my meaning. Unfortunately it is impossible to do much more than hazard a guess as to whether any particular case is single or multiple.

CASE V.—E. S., a Bohemian Jew, aged 36, had been resident in Kimberley for eight years, and had enjoyed good health there, without fever or dysentery; but he developed intermittent fever on his way home at Madeira, in July, 1883, and this continued for two weeks after his return to Germany. It was then absent for three months, but returned in April, 1884, accompanied by pain in the right lobe of the liver, and this continued with slight intermissions till May 7th. The patient was attended by Dr. Dunbar Walker, of Notting Hill, and had seen Sir Wm. Gull and Sir Joseph Fayrer. By this time the liver reached down to the umbilicus, and an abscess was obviously pointing at the epigastrium. He was stout, flabby, of a muddy colour, with a foul tongue and a weak pulse, and a temperature varying from normal in the morning to 102° or 103° in the afternoon. I opened the abscess, after ascertaining the presence of adhesions, and evacuated about half a pint of disagreeably smelling yellow pus. There was a good deal of bleeding. The temperature was normal for all the next day—but on this day only; it afterwards began to rise in the afternoon, the patient always becoming much worse at this time of day; and by the 17th it had again a range of from normal to 103°. The pulse was weak and rapid, 110 to 150. The tongue coated and dry, though he continued to take milk. The bowels acted freely and the motions were plentifully bilious, but the abdomen was distended with gas. Thus, though the abscess behaved quite well, the discharge being sweet and small in amount, we felt sure he had another. Accordingly, on the 14th, a week after the first operation, at Sir Joseph Fayrer's suggestion, I first punctured the liver just below the ribs, a little outside the first opening, and failing to find pus at three inches, I passed the needle through the seventh or eighth space at the lower part of the axilla and drew out three or four ounces of yellow pus, from a depth of four inches. The wound was then enlarged, and using the cannula as a guide, dressing-forceps and the finger were passed into the abscess. This caused terrific hæmorrhage, and I was obliged (in the weak state of the patient) to plug the wound. Two days later I removed the plug and introduced a long tube, which appeared to drain the abscess satisfactorily for a time. But the general state showed no improvement, and ten days later a fine trocar was passed deeply through the lateral wound and evacuated a quantity of pus, probably a third abscess, though this is not quite certain. But none of these evacuations did the patient the slightest good, and on June 3rd, nearly five weeks after the first operation, he died, and though we could not obtain a *post-mortem* examination I have no doubt that his liver was riddled through with abscesses.

CASE VI.—I have had another case: An Indian officer, Major L., aged about 40, whom I saw with Sir Joseph Fayrer and Mr. Leedham, in which the evacuation of the abscess gave the patient no relief; but this case was complicated with diarrhœa, and the discharge from it was unusually profuse. He was very thin and emaciated at the time of the operation, March 16th, 1886, and he

lived only a fortnight, having become much more emaciated before death. I can only record this as an unsuccessful case without being able to account for it, except on the theory of its being one of multiple abscess.

I will try now to draw a picture of the subject of a tropical hepatic abscess as it will be seen by an English surgeon. The patient will probably be a man (I have only met with one case in a female), and he will probably have been resident in India or some tropical country. It may be, however, that he will have contracted his disease during a casual visit, as happened with Case v., or with a young American whom I saw this year, and to whom I will refer later, who was travelling round the world, and was taken ill at Colombo. He will be sallow, partly from combined anæmia and mild icterus, and partly from the bronzing which is caused by the burning tropical suns. Rarely will there be yellow jaundice; I have only seen one case, that referred to by Sir Joseph Fayrer in his book on tropical diseases, p. 193. He will be thin and anxious looking, and walking slowly as if in pain, but though his limbs and face will have fallen away, the abdomen will be full and more or less motionless. The tongue will be pale and furred, and the extremities tending to be cold and clammy. The liver will probably be enlarged, perhaps considerably, but sometimes scarcely extending below the ribs; but he is sure to say that he has been told that at one time it was very large. There will most likely be a prominence, either at the epigastrium or a little to the right, or else in the lower part of the right axilla. If in the latter situation, the dulness will almost certainly be raised, and the intercostal spaces slightly bulged; but when the patient lies on his left side, a position he is sure to find excessively disagreeable, both the bulging and the increased dulness will diminish or disappear. This, however, will not be so marked if the abscess be actually pointing through the ribs; and in this case the tenderness will be superficial. But, if the matter should be at some depth from the surface, it may require considerable pressure to elicit any tenderness at all. His appetite will be very capricious, and his temper too; he will be languid in his movements, and look as if he were sick to death of the struggle for life. The bowels will, in most cases, be confined, but this is not certain, and the motions will probably be pale. The temperature will be slightly raised, but in some cases will be considerably above the normal. The urine will be scanty and high coloured. This is only intended as a general description to which there are, no doubt, many exceptions, and it is possibly very different from one that would be given by an Indian surgeon who sees this disease in its earlier stages. The surgeon would probably be asked to explore such a liver with the aspirator, and now let me interpose a word of warning, lest anyone should fall into a mistake which I once made.

Case vii.—I was asked to puncture the liver of a young man who had been in South America, and who had much the appearance of my supposititious patient; but he had a well-marked hectic temperature, and the tenderness of his very large liver was very diffuse. He had also a large and tender spleen. He had been examined by several physicians, but somehow attention had not been paid to the fact that he had frequent nose-bleeding, spongy gums, and had had petechial spots upon his legs. I introduced a needle in the two usual situations mentioned above, but found nothing, and in a few hours he was dead of hæmorrhage into his peritoneum. I need not say that he was the subject of leucocythæmia; nor, I hope, that, in considering any subsequent cases, this

one has always held a prominent place in my mind. It should, however, be added, that a puncture of the liver, if there be no adhesions, is never free from danger from this cause. A large vessel wounded near the surface of the liver may, in a healthy subject, give rise to fatal hæmorrhage, and thus, though considering the great rarity of the occurrence we must not be deterred from doing it, I think it behoves us not to speak too lightly of the performance to the patient or to his friends.

It has been often asserted that, in cases of suspected liver abscess, mere puncture of the liver has been followed by a sudden improvement of the symptoms; and in the face of the numerous cases, and the facts that similar results have followed puncture of an inflamed testicle, or of a painful kidney, it would be unwise carelessly to deny the possible causal relation of the two phenomena.

CASE VIII.—I once was attending a man aged about 30, who was a great drinker, and who had considerable hepatic enlargement and tenderness. The most tender spot was decidedly prominent at the epigastrium and I thought fluctuated, so I introduced the needle of an aspirator (I will not say into the liver, but certainly through the abdominal wall) and drew off, to my surprise, a few ounces of clear serum. From that moment the patient began to mend, and rapidly recovered from his urgent symptoms. What was the nature of his trouble I cannot say—perhaps a localised serous peritonitis.

Supposing pus to have been discovered, there can be no doubt that the best plan is to give exit to it at once by making a hole large enough to admit the finger and afterwards a drainage tube of the same size. Most likely, if the abscess form a prominent swelling, and almost certainly if the skin be reddened, the surface of the liver will be adherent to the abdominal walls; and, if the liver dulness in the axilla be markedly increased upwards, it is probable that the lower part of the pleura will have been obliterated by adhesive inflammation, but it is not safe in any case to assume the presence of these adhesions. It is therefore wise if the incision is to be made in front, to cut down very cautiously through the abdominal wall and to ascertain the state of the case. If no adhesions be met with it is not difficult by means of a full-curved needle held in a needle-holder (Hagedorn's is very good) to pass a series of stitches through the parietal peritoneum and pretty deeply into the substance of the liver. The stitches should be in a double row, they may be from one-half to three-quarters of an inch long, and should overlap one another. I did this in one case (Case XVI.) in which the abscess was so near the surface that a drop or two of pus escaped when the stitches were being put in, but good adhesions formed as I unfortunately had the opportunity of seeing *post mortem*. If the abscess be pointing at the side, the incision should be below the normal line of the pleura if possible (roughly not more than two inches above the margin of the ribs in the mid-axillary line). But if it be made higher we must keep a look out for two serous cavities—the pleura and the peritoneum. If the pleura be opened it will be necessary to stitch the diaphragm to the costal pleura as I once did in a case which will be described later on (Case XVIII). It would no doubt be very difficult to stitch the liver to the diaphragm in this situation, but I have no doubt it might be done, and ought to be done, but the opening in the chest-wall would have to be even larger than in the case I have mentioned.

I do not think that the escape of a little pus into the peritoneum

would of necessity prove fatal. I expect it sometimes actually happens, as I believe that the precautions I am recommending are very often omitted. But there can be no doubt that such a contamination should be avoided. Liver pus is presumably as irritating as the contents of a hydatid cyst, and though our dread of interfering with the peritoneum is gradually diminishing, we should not think of admitting this to it under any avoidable circumstances. I always consider that this occurred in the case of an enormous abscess which I opened through one of the lower intercostal spaces (Case XII). Immediately on recovering from the anæsthetic the patient complained of acute pain on the left side of the abdomen, and he continued to have great abdominal pain, much distension, and almost constant vomiting for some days, though there was little or no rise of temperature.

The most convenient form of tube, I think is the flanged tube, such as we use for empyema; and it should be, as I said, in most cases as large as the finger, and of a sufficient length to go well into the cavity—three or four inches, or even longer. For trouble is very often met with afterwards from the fact of the tube being pushed out, or the track becoming oblique. I know of no way to guard against this obliquity of the opening, because it is impossible to calculate in what way the contraction of the liver, which is sure to be very considerable, and which varies in proportion to the size of the abscess, will take place. The tube is often pushed out by the deep part of the wall coming in contact with the superficial long before the proper time has come for its removal. As a rule the tube should not be taken out till the discharge has almost stopped. But I have known a case (Case XII) where a very copious colourless discharge continued for a long time, and was at last stopped by very materially shortening the tube and then removing it.

The sort of dressing which it is best to employ is not very easy to determine. It must certainly be antiseptic. I have found, in my last two cases, Sir J. Lister's new cyanide of mercury guaze answer admirably. If this be not at hand, there is nothing better than carbolic acid gauze. The alembroth gauze or any soluble preparation of mercury must on no account be employed. I am not sure that it may not have an evil effect on the liver, and it is certain to result in irritation of the skin, and indeed this is a difficult thing to avoid, whatever antiseptic be used. If the discharge be at all copious, the dressing must be very extensive and will very likely want changing within a few hours. Afterwards the frequency of changing will depend altogether on the amount of the discharge. The necessity of keeping the tube in until the discharge is very much reduced was well shown in the following case.

CASE IX.—Mr. W., a young lawyer, had contracted in India a tropical abscess situated deeply in the liver, which had been opened through an intercostal space some time before I saw him at the desire of Sir J. Fayrer. The tube had been shortened to about two inches, and occupied only the outer end of a sinus nearly six inches long. The patient suffered constantly from a hectic temperature with daily great elevation. He had constant diarrhœa, and a most capricious appetite and temper. I introduced a series of straight bougies, of gradually increasing size, into the sinus, until it was large enough to admit a fair sized flanged drainage tube, thus ensuring a satisfactory escape for the matter. The diet was also very rigidly limited. He immediately lost his hectic temperature, the diarrhœa soon stopped, the appetite improved, and he made a good recovery, although the abscess had

of course become septic. This is the right and only way of dealing with such cases.

The character of the pus met with at the first opening varies considerably; sometimes it is plain creamy pus, but often it is chocolate coloured. Afterwards it is most common, if the abscess be kept really aseptic, not to have any more true pus formed; but the discharge consists of two materials: a thick tenacious dark morone-coloured or more or less bile-stained mass of mucus, mixed with clots of blood, which is found on the dressings immediately round the wound; while, further away, the dressing is soaked with a copious thin fluid, sometimes quite colourless, sometimes slightly, sometimes deeply, bile-stained. But as I have hinted above, there is occasionally a considerable discharge of actual bile, which may come on at first or during the process of cure, and which may gradually diminish, or may suddenly come to a conclusion.

In making the first incision, if any considerable depth of liver tissue have to be traversed, very free hæmorrhage is likely to occur, as happens in the case of incisions made into the kidney. This must be treated by plugging the wound with the finger for a minute or two, when, in all probability, it will cease; but, if this be not the case, a plug of antiseptic material must be left in for a day or two. This hæmorrhage, when it is seen for the first time is truly alarming, but it need give rise to no anxiety.

At Sir Joseph Fayrer's suggestion I have had made an instrument for aiding in the opening of deep liver abscesses, which I have previously shown here in a lecture on abscess of the lung. It consists of a trochar either sharp or blunt, which, as well as the corresponding cannula, is grooved upon one side. This is to be plunged into the abscess, and then a fine pair of dressing forceps is to be run along the groove, and the track is to be widened by expanding the blades; or, if thought safe, a bistoury may be employed for this purpose.

LECTURE II

It will now be convenient to give a few typical examples of tropical abscess, it being understood that it is difficult to meet with a case which does not present some special peculiarity.

Case x.—Lieut. H., age 26, invalided home from India with threatening liver abscess, was seen by Sir Joseph Fayrer some months before he came under my care. He was put under treatment and much improved, so that he considered himself well enough to take open-air exercise, hunting, and so forth. On returning to show himself, it was found that he had an abscess pointing at the epigastrium, over which the skin was slightly reddened. There was great tenderness at the epigastrium, and some over the lower ribs in the axilla. He was strong, well-built, and well nourished, but with the characteristic dirty yellow complexion described above.

I opened the abscess in the epigastrium, finding plentiful adhesions, on February 5th, 1884, letting out 4 to 6 ounces of yellow pus. The discharge in this case assumed the characters I have just described: thin serum and dark red muco-pus. It gradually diminished, and the abscess was completely closed by March 11th.

The case presented the following features of interest: 1. The temperature up to March 4th was usually normal or subnormal in the morning, but rose to 99° or just over 99° in the evening. 2. The bowels were very obstinate, not acting except after a sulphate of soda mixture and an enema. 3. Tenderness and pain continued for three weeks, during which time he could only lie on his right side, or on the face, 4. The tongue was clean and the appetite for the first few days was good for milk; but soon he had almost absolute anorexia and nausea. At last, after three weeks, he suddenly felt a desire for a boiled potato, and his appetite returned. During this time his temper was abominable.

There was considerable trouble with the tube in this case. The dressings were of carbolic acid gauze.

Case xi.—Lieut. W., aged 23, was under the care of Sir Joseph Lister and Sir Joseph Fayrer, but I had the privilege of assisting at the operation and dressing the case afterwards, and am kindly allowed to publish it. In November, 1878, he had fever and hepatitis in Hyderabad, from which he recovered. In May he had hepatitis and jaundice; in September, hepatitis and diarrhœa, there having been traces of blood for some months previously. In October he was sent to England, where he arrived in December. At this time he was jaundiced, with a furred tongue, no appetite, clayey motions, profuse night sweats, and occasional rigors. The liver dulness was increased upwards, and an abscess was projecting over the lower ribs in the axilla. Temperature from normal to 101°. On December 20th Sir Joseph Lister opened the abscess in the seventh intercostal space, 3 inches outside the

nipple. Profuse hæmorrhage occurred for a few minutes, but quickly stopped. He recovered without a bad symptom, except one slight attack of ague. The jaundice quickly disappeared, the tongue cleaned, and the appetite returned. The wound was completely healed about February 20th. The only peculiarity in this case is the occurrence of intense jaundice, which certainly is not common. I have not seen it in any other case.

CASE XII.—Lieut. M., aged 27, went to India in 1877, and stayed there for four years, returning in 1880. During his time in India he had several attacks of fever, and was at last almost invalided with it. He remained at home till 1882 and quite recovered his health. He first began to feel pain in the right shoulder in May, 1883, which was followed by pain in the right side and loss of appetite and power of digestion. His bowels acted freely, the motions being light-coloured and loose. He had no rigor, no vomiting, and no dysentery. He became yellow, but not actually jaundiced. His habits with regard to alcohol were very temperate. When I saw him in November, at the request of Sir J. Fayrer he was emaciated and of an ashy colour, but he was not really jaundiced. The tongue was clean, the pulse 92 and moderately strong, the temperature a little over 99°. The skin was cool. The bowels only acted with medicine, the motions being sometimes light, sometimes dark. The liver dulness was not increased downwards, and only slightly upwards (fifth rib in the nipple line, sixth anterior axillary line, seventh posterior axillary line). The upper extent of the liver dulness distinctly diminished when the patient lay upon the left side, which I believe is an important point to notice, as it probably indicates that the pleura is not abolished by adhesions to the upper limit of the dulness, but simply that the lung is pushed away by the enlarged liver. The recognition of this fact may save the unnecessary opening of the pleura. The right side measured 1 inch more than the left at the level of the xiphoid appendix. The whole of the hepatic area was tender, but the most tender spot was in the tenth interspace, 6 inches from the spine and 3¼ inches above the tip of the twelfth rib. The abscess was opened on November 1st, 1883, after ascertaining the presence of pus with an aspirator near the tenderest spot, but rather lower down so as to be sure of avoiding the pleura. When I introduced my finger into the wound it felt as though there were no adhesions between the liver and the diaphragm, but the pus flowed freely, and there was no difficulty in replacing my finger by the tube; but when he awoke from the anæsthetic he was much collapsed, and complained of intense pain on the left side of the abdomen. In spite of opiates the pain and tenderness continued on the left side for three days. There was also a great deal of vomiting for a week, and much prostration, but in the meantime the discharge from the wound diminished, and remained quite free from smell under carbolic acid gauze dressings. The temperature on the third day reached 100.2°, but was for the rest of the first week normal. At the end of this time the bowels acted, the tongue cleaned, and he started on a rather tedious but complete recovery, only interrupted by a short attack of tonsillitis.

This case was slow because of the large amount of discharge, which was mostly serous and bile-stained, necessitating daily changing of dressings for more than three weeks. Then it somewhat rapidly diminished and the abscess had closed at about the end of the eighth week. The peculiarities of this case are: 1. That it is probable that a very little of the pus escaped into the peritoneum (though I am not quite sure of it) and set up a mild form of peritonitis, very likely quite local. 2. That in all probability a bile

duct of some size leaked into the abscess, and so kept up the quantity of the discharge.

Tropical abscess of the liver is much less frequently met with in women than in men; which, considering that it appears to be distinctly due to climatic influences, being much more common, for example, in some parts of India than in others; and considering also that, though it sometimes occurs in the most temperate, it is often preceded by injudicious eating or drinking, is not to be wondered at. For the latter cause is certainly less likely to be present in women than in men, and the occupation of men naturally leads them more into places where they are exposed to malarial influences. It is, however, well known that people who have never been out of England may suffer from a hepatic abscess, not to be distinguished from tropical abscess, and that others who have been abroad years before, but have long resided in England, may be similarly affected.

Case xiii.—I have met with one case in a lady. Mrs. E., aged about 30, went to India in January, 1888, and was married in November. She suffered from boils, dysentery, and hepatic congestion. The liver became much enlarged (four inches below the ribs) and very tender, and the temperature rose at times to 103°. I saw her in August, 1889, with Sir J. Fayrer and Dr. Mair. She was then very much emaciated and slightly jaundiced. The liver was large and tender, and there was marked prominence at the epigastrium, a sense of nausea being caused by manipulating the liver, which is a not very uncommon symptom. On August 24th some blood and, it was thought, some pus, had been passed from the bowel. I opened the abscess at the epigastric prominence, finding good adhesions. The abscess contained a very large quantity of pus. The dressings were of cyanide gauze. The liver, in a few days, came up under the margin of the ribs, leaving only an indefinite sense of resistance in the loin, the nature of which could never be ascertained. It ultimately completely disappeared, and the abscess was entirely healed, except a small superficial button of granulations, in a little over two months. The discharge, after the first week or ten days, was quite trifling, and she quickly put on flesh, but remained rather yellow after the abscess had closed.

Case xiv.—Mr. G., aged about 30, was an example of a patient with hepatic abscess who had never left England. He was under the care of Sir Joseph Lister (who has given me leave to publish the case) in 1877. The abscess, which was small, pointed at the epigastrium, and was opened there. It was treated with carbolic acid gauze, and he made a good recovery in five or six weeks, interrupted only by a mild attack of erysipelas. Mr. G. is now alive and well.

An abscess of the liver may burst in several different directions: (1) through the abdominal or thoracic wall; (2) into the stomach; (3) into some part of the intestine; (4) into the pelvis of the right kidney; (5) into the lung; (6) into the right and perhaps into the left pleura; (7) into the pericardium; (8) into the peritoneum.

Let me here interpose a few words of anatomy. How different is the liver of to-day from the liver of our studentship! Then it was a flat body, with two plane or at most somewhat uneven surfaces, and a circumference, the latter being broad and thick behind, but thin in front and to the left. Now we recognise three well-marked surfaces, following the careful method of observation taught us by His; and we know exactly what fits into each of the numerous and well-marked impressions. As of old the upper surface is closely ap-

plied to the diaphragm, and for a very small space both the right and left lobes are in contact with the abdominal wall at the epigastrium; but we are able to make out a distinct impression close to the crossing of the suspensory and coronary ligaments corresponding to the under surface of the heart. The Spigelian lobe is banished to the posterior surface, and no longer bounds the foramen of Winslow, this function being fulfilled by the caudate lobe; but the Spigelian lobe rests against the bodies of the tenth and eleventh dorsal vertebræ and the right crus of the diaphragm and the aorta. Next, to the right, comes the vena cava in its special fossa, while still further to the right is the space between the two layers of the right lateral ligament, which touches the diaphragm opposite the tenth and eleventh ribs and has a distinct little impression for the suprarenal capsule. Here, that is at the tenth interspace, we might puncture the liver without wounding the peritoneum, but not without traversing the pleura and the lung. The under surface of the left lobe has a beautifully curved surface corresponding to the upper half of the anterior surface of the stomach, including the pylorus, which should touch the neck of the gall bladder. Then comes the gall bladder in its own special fossa, and just to the right of its neck is a well-marked pit for the first part of the duodenum. Still further to the right are two obvious fossæ separated by a pretty sharp ridge; the anterior reaches the free border of the gland, and receives the hepatic flexure of the colon; the posterior reaches the posterior surface, and is occupied by the kidney.

The longest axis of the liver is directed from behind forwards and to the left. The lower border corresponds nearly with the margin of the ribs behind and as far forwards as the ninth right cartilage, and then it stretches across, ascending somewhat, to reach the left eighth cartilage. The upper limit is marked on the surface of the chest by a line drawn from the fifth right to the sixth left chondro-sternal articulation, but varies, as does the lower border, somewhat with inspiration and expiration. The right lung, however, lies in front of the liver as far down as the upper border of the sixth rib in the nipple line, and the heart as far down as the fifth interspace on the left side. It extends, as a rule, 1½ to 2 inches to the left of the left border of the sternum.

The recognition of these facts is all-important in coming to an understanding of the method of rupture of a hepatic abscess.

1. I have already sufficiently explained the two most common situations in which a hepatic abscess may make its way *through the parietes of the body*—namely, either in the neighbourhood of the epigastrium or through a lower intercostal space, usually in the axilla. But it by no means follows that an abscess bursting externally may not have previously opened in some other direction. It should also be added that any abscess which has found its way amongst the planes of the abdominal wall may burrow between them to some distant situation, such, for example, as the umbilicus. Thus I may mention a case of abscess of the gall bladder, which pointed in the right lumbar region, from which situation gall stones were extracted.

Another puzzling case of a somewhat similar nature was

Case xv.—W. E. M., a civil engineer, aged 31. He went to India in September, 1879, and had good health till 1887, except for occasional and slight attacks of fever, the first of which was when he had been out only three months. He was twice laid up with boils, but had no dysentery and no hepatic trouble. He was almost a teetotaller. In April, 1887, he went to Burmah, had malarial fever in May, and was invalided in July. He returned to Eng-

land and saw Sir Joseph Fayrer, who found the liver enlarged but no suspicion of abscess. He went back to Burmah in December, 1888. There was a strong history of tubercle in the family.

The report of Mr. Darwin, of Rangoon, says that he first came under observation in April, 1889, for an ulcer on the leg and bubo, the result of an abrasion through walking and riding. He had also an inflamed throat and fauces. He went to work in an unsatisfactory state of health, and had a few attacks of fever. In May he was still troubled with his throat; nothing was observed wrong with chest or liver. June 17th he had a stitch on the right side, and friction was heard at the base of the lung at the seat of pain. This was followed by a slight dulness at the right base and increase of the area over which friction sounds were heard. The temperature rose to 101°, and it was thought slight friction was heard on the left side. By the 23rd the temperature had come down to normal, and the only sign remaining was a little dulness at the right base. He was recommended for twelve months' leave. Between July 8th and 24th he was at the Rangoon Hospital, and was treated for hepatic pains, debility, and slight febrile symptoms.

On his return to England he consulted Dr. Lauder Brunton, who sent him on to me. I saw him on September 23rd, 1889. He was then in fair general health, walking about and feeding like anyone else. He had a prominent red swelling over the eighth right cartilage, evidently an abscess. There was a little enlargement of the liver downwards, but it was very slight, and there were no abnormal physical signs in the chest. It was agreed that the diagnosis was doubtful, but that it lay between tubercular disease of a costal cartilage and an abscess of the liver. I have described the course of the symptoms and the physical signs in some detail, so as to make more clear the difficulty of coming to a definite diagnosis. The bowels were acting well, and the skin, though brown, could hardly be said to be jaundiced.

On the 25th I made an incision into this, and opened first a cavity in the subcutaneous tissues; then a small opening led down to another compartment beneath the edge of the rectus, at the bottom of which was the rib cartilage, exposed but not at all roughened. Round the lower border of this another track led into a cavity of much larger size, containing perhaps 4 ounces of pus, which was either in the substance of the liver or in the adhesions formed between it and the diaphragm and abdominal walls. It was very irregular in shape, and the interior was marked by pits and bands. In the pus were found a number—thirty to forty—of minute, flat, square bodies with rounded edges, hard and smooth, like small and curiously-shaped gall stones; they were found on examination to consist of cholesterine. A drainage tube was put in and the wound was dressed with cyanide of mercury gauze. The patient made a good recovery. For the first few days he was feeling perfectly well. Afterwards he had occasional slight rise of temperature up to 99° F., and a sensation as if a rigor might be impending. At these times also his appetite fell off. He left for Eastbourne on October 19th, and returned to see me on November 20th. There was then a spot an eighth of an inch across unhealed from which no discharge had come for several days, and into which a probe could not be introduced.

I have never seen such bodies as these described either in a gall bladder or a hepatic abscess, and the question must remain undetermined as to where they were formed, especially as the exact position of the abscess could not be decided when the finger was introduced, but I have little doubt that it was a genuine abscess

of the liver, and that the bodies were not formed in the gall bladder. The difficulty of finding the track in this case was rather considerable, and it is therefore important as indicating the care that must be observed and the necessity for a free incision in abscesses which burst close to the margin of the ribs.

2. I have no experience of abscess *bursting into the stomach*; but we are assured by Indian surgeons that it is by no means uncommon for this method of evacuation to lead to a perfectly satisfactory cure.

3. On the other hand it is well recognised that for an abscess to *burst into the intestine* is not a very favourable, though by no means necessarily a fatal, condition. It will be remembered that in the case of the lady described above it is possible that this may have occurred, yet she made an excellent recovery, and this is quite consistent with the fact that a similar result sometimes happens when the same thing occurs when a basic pulmonary abscess, or an empyema follows the same course. The most common portions of the gut to be perforated are the transverse colon and the duodenum. It is important to recognise the characteristic white flocculent appearance which is presented by pus that has traversed any considerable length of the intestinal canal. It has quite a different look from pus recently evacuated from an abscess, and may readily be supposed to be some of the ingesta curiously altered in character. In the following case the abscess had opened into both these viscera.

Case xvi.—Mr. G., aged about 34, a barrister from Bombay, came under the care of Dr. Stanley Smith, with whom I saw him on August 7th, 1888. Dr. James Arnott, of Bombay, reports that he saw him on June 1st, 1888, and found him suffering from severe pain just over the position of the gall bladder, and fever ranging from 99.5° to 102°. This lasted for a month, when the temperature fell, and continued apparently in the neighbourhood of 100° till he came under notice. The pain quickly subsided, but tenderness remained, and extended far back on the right side. The liver was considerably enlarged downwards, and percussion over it caused nausea and vomiting, which indeed were troublesome symptoms throughout. The tongue was always foul, and the bowels were kept open by means of purgatives. Dr. Arnott made the diagnosis of a hepatic abscess opening into the stomach or some part of the intestine, being, I presume, led to this opinion by the character of the vomiting. His general health improved on the voyage home, and the tongue cleaned, but by July 28th a distinct bulging had begun to show itself at the epigastrium, which, by the time he reached England, was undoubtedly a pointing hepatic abscess. On August 4th he had a severe rigor in the early morning, but at 10 a.m. the temperature was normal. He was thin, emaciated, and sallow, but not jaundiced nor very anæmic. His manner was remarkably lethargic. The liver reached the umbilicus, and pressure over the tender prominence caused nausea. The bowels were constipated, the motions dark, the tongue clean, the pulse small, the skin moist, and he required a fire even on a hot August day.

I made a vertical incision about an inch and a half below the margin of the ribs, a little above the most prominent part of the swelling, that is, about the middle (from side to side) of the rectus, and, after dividing the abdominal wall, found no adhesions at the part of the liver exposed. I therefore separated the rectus from the posterior layer of its sheath, so as to expose a portion such as is shown in the sketch (Fig. 1). Then with Hagedorn's needles, two rows of stitches were applied, the outer being

interrupted and of silk (*e*), the inner continuous and of catgut(*f*). The needles went right into the liver substance, and the closure was, as far as could be ascertained, complete. But so near was the pus to the surface that, in introducing the needles, a drop or two of matter escaped at one or two points, which was carefully sponged away. I therefore thought it wisest to open the abscess at once, introducing a large drainage tube. An ounce or two of thick yellow pus, with a faint smell, escaped. I did not squeeze it nor introduce the finger, It was dressed first with unprepared gauze soaked in a 1 to 4,000 sublimate lotion, outside which was placed a mass of alembroth gauze. The operation took one hour and a half, but was well borne.

The patient never improved, however, after, but remained in a curious dazed lethargic state, taking all the food given to him, but without appetite. His temperature was usually sub-

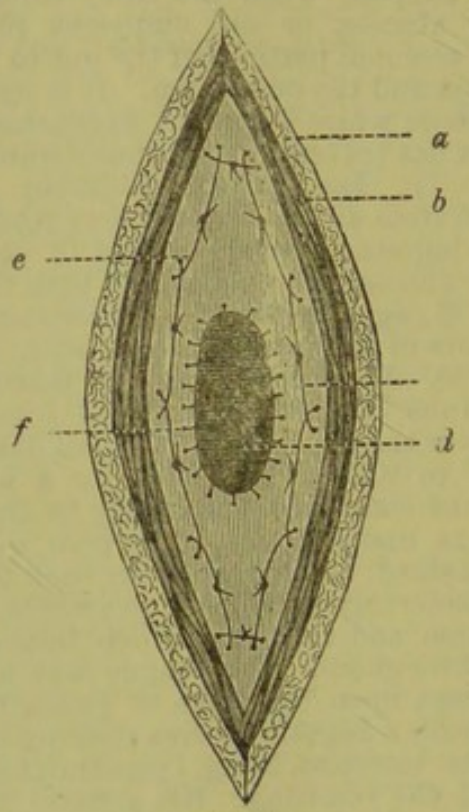

Fig. 1.

a. Subcutaneous fat.
b. Rectus.
c. Sheath of rectus.
d. Liver.
e. Interrupted suture.
f. Continuous suture.

normal, but for two or three days reached 99°, falling again afterwards. A few days after the first operation a fresh pointing took place rather lower down, and it was then ascertained that both this and the original opening communicated with a large cavity more deeply situated. Diarrhœa now set in, the motions being dark and containing sago-grain masses of mucus. He became gradually weaker, and died on August 15th, eight days after the original operation.

At the *post-mortem* examination we found the lower part of the liver, that is, the part at which the second opening was made, adherent to the abdominal wall by old adhesions, and that the adhesions formed by my stitches were complete and sufficient, but that there was no recent general peritonitis. The main abscess had three principal diverticula; two I have already described, the third reached the under surface of the liver and communicated

with the first part of the duodenum and the transverse colon. Throughout the large intestine there was extensive, but apparently not very old, ulceration.

I think this is a very important case from two points of view: first, as showing that we cannot be certain, even when an abscess is actually almost pointing, that the liver will be found adherent; and, secondly, that, by careful stitching, perfectly sound adhesions may be formed, and that there is no danger in proceeding at once to evacuate the matter. This is just what the experience of gastrostomies, colotomies, enterotomies, etc., would lead one to expect, and it is a useful piece of knowledge in connection with the question of opening putrid or other abscesses of the lung. Thirdly, it seems to show that the fouling of an abscess by a communication with the bowel is a dangerous condition, though I confess that the case is complicated by the presence of the ulceration of the intestine. The occurrence of diarrhœa, and especially if mucus be present, I regard as a point that should make us give the most grave prognosis.

LECTURE III.

CONTINUING our account of the directions in which an abscess of the liver may rupture, we come next to the following:

4. Hepatic abscess opening into the pelvis of the right kidney is merely mentioned as a pathological curiosity. The fact is recorded by Annesley.[1]

5. For a hepatic abscess to burst into the lung it is necessary that it shall have perforated the diaphragm. This probably, though not of necessity, indicates the presence of peritoneal adhesions, and certainly of pleural adhesions. Such abscesses are situated in the right lobe of the liver, at its upper, and I believe most often at its posterior, part, I think it is most usual for an abscess which is about to, or has already, burst into the lung, to cause an upward increase of dulness, but show little or no appearance of enlargement downwards. The abscess most commonly, if not invariably, perforates the base of the lung and induces, and is often preceded by the signs of, pneumonia in this situation, but not of great extent. If the abscess do not become cured, the prolonged expectoration of its contents will almost certainly give rise to chronic fibrosis and dilatation of bronchi, or extensive disorganisation of the lung. Not infrequently, however, a cure may be thus effected but, as far as I can learn, this is not the most common termination. The rupture probably takes place quite suddenly, and does not give rise to any special premonitory symptoms. The expectoration is at first perhaps pure blood, then either light-coloured or chocolate-coloured pus. Afterwards, according to my experience, it may assume very different characters, either being constantly pus mixed with dark blood, almost entirely bright blood mixed with a little pus, or muco-pus tinged with bile. It is said occasionally to consist almost entirely of bile. The amount of blood daily secreted by a liver abscess is sometimes a source of danger to the patient, and it is remarkable to observe how rapidly this diminishes when an external opening is made; no doubt because of the rest given to the abscess by the subsidence of the cough.

An abscess which is being expectorated, but which does not give any local signs of its whereabouts, offers one of the most puzzling problems to the surgeon, for he has to weigh the chances of spontaneous cure against, first, the danger to the lung and to life, if nothing be done; and, secondly, the risks of exploring the liver for an altogether unlocalisable collection of pus. I will give a case in point.

CASE XVII.—Lieut. S., aged 30, was a patient of Sir J. Fayrer, who asked me to see him in August, 1889. He went to India in 1881, and whilst there and in Burmah had dysentery and numerous attacks of fever.

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[1] *Sketches of the Most Prevalent Diseases of India.* By James Annesley. Second Edition. London, 1831; p. 485.

On April 8th, 1888, he had the first symptoms of hepatic abscess. On May 12th, slight hæmoptysis, and on May 21st he expectorated matter. He believes that at this time there was dulness front and back to the level of the armpits, with absence of breath sounds. By June 24th the back had cleared up, and breath sounds began to appear in front. By January 30th he was much collapsed, and was bringing up 30 ounces of blood and pus a day. From that time he began to mend, and he got about and spent the winter in the South of France. While there he was pretty regularly without expectoration for a fortnight at a time, and in perfect health, each period being followed by a relapse. By April he was in bed again, but again he picked up and got about. By the end of June the expectoration had stopped, but in July it recommenced.

When I saw him he was in very fair health, but was constantly expectorating from 6 to 8 ounces a day of bright red blood mixed with some mucus and a little pus, and was of course always

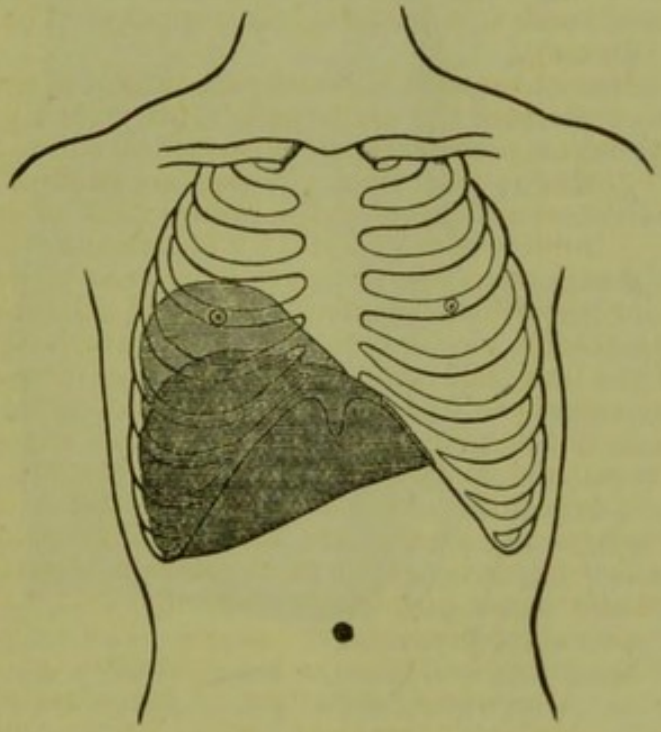

Fig. 2.

coughing. There was dulness in front almost to the nipple, and no breath sound below this line. Vocal fremitus and vocal resonance were abolished below a curved line (see Fig. 2) reaching a little above the nipple, and behind there was dulness and no breath sound below the tenth rib, though vocal resonance could be traced a little lower. The breathing whenever heard was quite normal. The heart's apex was not displaced, and there was no increase of liver dulness downwards, nor was there anything in the way of pain or tenderness by which to localise the abscess.

Under these circumstances, and especially as he had been several times so nearly cured, we advised him to try almost complete rest for the present. I did not see him again, and was much disappointed to see a notice of his death a few days before the delivery of this lecture. His father writes to me that he gradually became worse after I saw him, expectorating at last as much as 37 ounces a day. An attempt was made in Birmingham to reach the abscess, and it appears that the needle passed right through it into the liver, but none was evacuated. At the *post-mortem*

examination it was found that the whole of the right lung was hollowed out into an enormous abscess, containing three or four pints of pus, the lower part of which was almost cheesy. There was a layer, one inch in thickness, of vesicular lung at the back. The bronchus opened directly into it, about one inch below its first division. There was a small abscess in the upper part of the right lobe of the liver. The heart was altogether to the left of the middle line. The left lung was quite healthy, and there was no trace of tubercle in the body.

As the case has turned out, I cannot but regret that an attempt was not made to reach the matter at first, but it is more than possible that it would have proved an unsuccessful search.

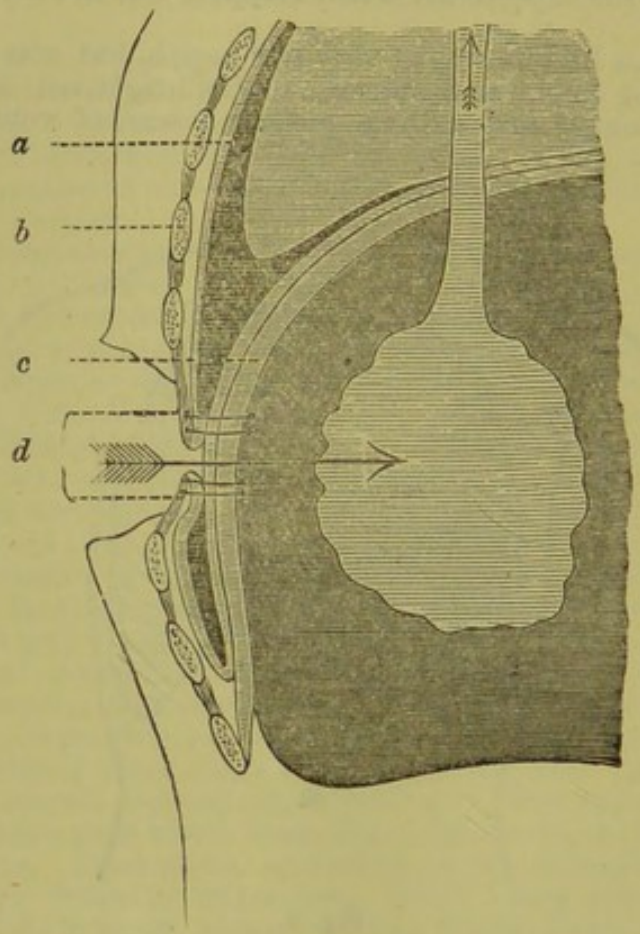

Fig. 3.—Diagrammatic representation of the method of opening the abscess in Case xviii. *a*. Cavity of the pleura; a portion is also shown below the sutures. *b*. Ribs and intercostal muscles. *c*. Diaphragm adherent to liver. *d*. Double row of stitches uniting diaphragm to chest walls. The small vertical arrow indicates the opening from the abscess through the lung. The large horizontal arrow shows the direction of the opening made at the operation, and the position occupied by the tube.

Quite different was the following case, which, though it has been previously reported,[2] I must here briefly refer to.

Case xviii.—The patient was at University College, under the care of my colleague, Dr. Roberts. He was a fine strong soldier, who had been in India, but was extremely anæmic, and, in fact, I thought in a moribund condition on account of the large amount of blood-stained mucus daily expectorated. The liver was slightly tender, and could just be detected below the margin of the ribs. In the right back there was dulness, not well defined, one inch and a half above the angle of the scapula, and over this area the

[2] Journal, October 22nd, 1887.

breathing was weak, vocal resonance and fremitus were abolished, and coarse *râles* could be heard. There was no tenderness over the lower ribs. Thinking that there was probably an empyema, the dull area was selected for operation, and after ascertaining, as the result of several punctures, the presence of deep-seated matter, the needle was retained as a guide, and the incision was made in the ninth interspace behind. After removal of a piece of the ninth rib, however, it was found that the pleura was healthy, and a pneumothorax was necessarily set up. Being very desirous (for the man's sake) of completing the operation at one sitting, I stitched up with great care and some difficulty the diaphragm to the costal pleura; and, when I was certain that it was airtight, I opened the abscess through the diaphragm and inserted a large tube. The method of procedure will be made clear by looking at Fig. 3. The patient made an excellent recovery, the expectoration gradually diminishing and the abscess behaving in the best possible manner.

Had a correct diagnosis been arrived at, probably the opening might have been made at a lower level and the pleura avoided. The case, therefore, teaches two lessons: (1) that it will not do to assume the presence of an empyema or even of adhesions when the dulness is much increased upwards, and (2) that if by chance the pleura be opened, the operation may with care be safely concluded without endangering the pleura or the patient's life.

An abscess of the liver bursting into the lung may easily simulate a pulmonary abscess.

Case xix.—In the spring of 1885 I was asked by my colleague, Dr. C. T. Williams, to see a man, aged about 30, who had been in India, and who was supposed to be suffering from an abscess in the base of the right lung in front, the peculiarity of the case being the curious brown expectoration, which was very copious, as a result of which the patient was much exhausted, the illness being one of long standing. In the lower part of the front of the right chest were all the physical signs of a pulmonary cavity, and there was a tender spot about the sixth interspace below the nipple. An incision was made at this spot, and passed through pleural adhesions, then through the diaphragm into an obvious liver abscess in the right lobe. The expectoration at once stopped, and the abscess quickly closed without any untoward symptoms.

I shall have to return to this subject when speaking of abscesses caused by hydatids.

6. Frerichs says, in speaking of rupture into the pleura, that it usually causes no remarkable disturbance; a dull pain and slight dyspnœa, together with the physical signs of pleuritic effusion, being the sole indications of its occurrence. The abscess may burst either into the lung, or externally, if it be not treated as an ordinary empyema. My experience of this condition is confined to one case only, but it must be owned that the symptoms at the time of rupture were more marked than those described by Frerichs.

Case xx.—The case was that of a man, aged 34, who had served as a soldier in India for five years, and had suffered from ague. He was admitted under the care of Dr. Roberts into University College Hospital on November 18th, 1885. He had returned to England in 1884, and had remained well till October 28th, 1885, following an occupation in which he was exposed to great variations of temperature; he was then seized with hepatic pains and vomiting, which forced him to keep his bed, and continued with greater or less severity till the time of his admission.

On admission he looked fairly well and was not jaundiced; he complained of constant throbbing pain in the hepatic region,

especially at the lower margin of the thorax and the posterior part of the right axilla, over which area there was also tenderness. The appetite was bad and there was diarrhœa, the stools being dark brown and semi-solid. There was very slight enlargement of the liver upwards, none downwards. The spleen could not be felt. The temperature was 102°.

On December 28th he was suddenly seized with very marked signs of right pleurisy, and it was soon obvious that a large amount of fluid had collected in the right pleura, there being dulness in front as high as the clavicle and behind to the level of the angle of the scapula; and the heart's apex being displaced outwards so as to be just outside the left nipple. An aspirator drew off some chocolate-coloured pus. In the meantime blood had on several occasions appeared in the motions.

On December 30th I saw him, and opened the pleura in the seventh intercostal space, just in front of the posterior axillary fold. The finger was introduced with some difficulty between the ribs and felt the diaphragm covered apparently by soft granulations; but no opening through it could be discovered. The fluid consisted of dark brown serum mixed with curdy pus. I used in this case a valved tube (which I was then in the habit of employing, and have described in a previous course of lectures, but have since discarded), and thus no air was admitted into the pleura. The wound was dressed with carbolic acid gauze.

The empyema behaved well enough, but it was impossible to check the now typically dysenteric diarrhœa, and on January 2nd, 1886, the man died. The temperature up to the time of rupture into the pleura had been of a hectic type, usually varying from 99° to 102°; but after that event it was usually normal or subnormal, reaching only on one occasion, the day following, 100°, and on the next day 99°.

At the *post-mortem* examination the liver was not found to be much enlarged, but presented one large excavation of the size of the palm of the hand, and half an inch deep in the centre and lessening towards the circumference, the rupture of which had given rise to the empyema. The rest of both lobes was studded with innumerable minute points of suppuration. There was ulceration throughout the length of the colon.

Case xxi.—In this connection I am able to mention, owing to the kindness of Mr. Roughton, who asked me to see the case with him, the case of a strong young American of most temperate habits, who was travelling round the world and was taken suddenly ill whilst in Ceylon with an acute tropical abscess. The reference to this case will be very brief, as it will shortly be published by Mr. Roughton. It was opened close to the costal margin, 3 inches from the middle line, and was apparently on the point of healing, when sudden right pleural effusion occurred. This was aspirated several times and had become purulent before Mr Roughton saw him. He opened the empyema after removing a piece of the sixth rib, just in front of the posterior axillary fold. The cavity did not drain well, and at last there was expectoration of fœtid pus, and an evident bagging of similar material in the deep part of the wound, but the position of the cavity could not be ascertained.

When I saw him he was not losing ground, but had marked clubbing of the fingers. The liver was not apparently enlarged either upwards or downwards, but I suspected some collection of matter in the lower part of the pleural cavity because the right back was almost completely dull, though weak breath sounds could be heard as far as the ninth rib.

I was present at Mr. Roughton's operation on January 12th, which

was an endeavour to find the cavity from which the discharge came, in which, after prolonged efforts, we were, apparently, not successful. A trocar, passed through the lower part of the dull area behind, no doubt entered the liver, for, as we afterwards discovered, there was no lung in this situation. Then the original opening was enlarged by removing more rib, and, after cutting through the dense pleura, several tracks were followed up but without success, causing a good deal of hæmorrhage; and it was quite impossible to be certain how far we were working above the diaphragm and how far below it. The case, I think, is a very important one as indicating the great difficulties that arise when an abscess is situated partly above and partly below the diaphragm. The surgeon may expect to meet with very similar trouble in dealing with caries or necrosis of the lower rib cartilages. It has occurred to me more than once. There can be no doubt that ultimately this abscess communicated with the lung as well as the pleura, though whether it burst into the former or the latter first is purely a matter of surmise. This patient, after undergoing an attack of pneumonia and acute albuminuria, is, I am informed, convalescent, and it appeared from the subsequent progress of the case that, in the operation described, Mr. Roughton did really reach the position of the retained pus.

7. Rupture into the pericardium has been mentioned by various observers. The physical signs are sufficiently obvious. The result has always been fatal; but the condition should hardly be beyond the limits of modern surgery.

8. Rupture into the cavity of the peritoneum is one of the least common terminations, for the obvious reason that as the abscess approaches the surface of the liver adhesions are almost certain to be formed. This is quite consistent with our experience of the course of other intra-abdominal abscesses; the amount of surrounding inflammation no doubt distinguishing these cases from those of chronic ulcer of the stomach or intestine, in which, as is well known, rupture is often followed by acute general peritonitis.

Case xxii.—I have not myself met with such a case, but I may mention, as one somewhat of this nature, that of Mr. H., aged about 30, a resident in Calcutta, whom I saw with Sir J. Fayrer in the summer of 1888. He presented typically the signs and symptoms of a large hepatic abscess, the liver extending far down, below the umbilicus, and the dulness being raised very considerably both in front and in the axilla; and marked tenderness being present in the latter situation. An exploring trocar having been introduced through one of the lower intercostal spaces determined the presence of pus, and, on making an opening in this situation, exit was given to 60 ounces of matter which lay between the upper surface of the liver and the diaphragm. It was, in fact, a subdiaphragmatic abscess.

Now a subdiaphragmatic abscess is a rare condition. It may arise from local peritonitis, from perforation of the stomach, or from abscess of the liver, or from suppuration about the kidneys, possibly also from the downward bursting of an empyema, or from the upward travelling of abscesses that originate lower down, say, in connection with the cæcum, or from caries of the costal cartilages. It may easily be confused with a supradiaphragmatic empyema—another rare condition.

A careful search was made in Mr. H.'s case for the opening into the liver, but it could not be found, so a very large drainage tube was inserted and a carbolic acid gauze dressing was applied. The liver at once came up, and it was evident that it was very little, if at all, enlarged; and the abscess followed a perfectly typical aseptic

course. The patient rapidly put on flesh and regained his appetite, and beyond the fact that he had for a long time a pulse of 120 or more the case presented no peculiarities.

A few words must now be said about suppurating hydatids of the liver; for if the cyst be situated in the upper or posterior part of the gland the characteristic symptoms of hydatid may be absent, and until the matter is evacuated there may be nothing to distinguish such a case from one of hepatic abscess.

Case xxiii.—The first case I will describe occurred ten years ago (admitted February 26th, 1880) at University College Hospital, under the care of my colleague, Dr. Ringer. It was that of a young woman, aged 20, with a phthisical history, who had lived eleven years in America, but, for the eighteen months previous to admission, in England. There were signs of right empyema, namely, retraction and immobility of the side, the dulness being below the third rib in front, the fifth in the axilla and the angle of the scapula behind. There was a high temperature, 101° to 104°, and marked clubbing of the fingers; no note was made of the liver. There was copious muco-purulent expectoration, which, in March, was noticed to be yellow.

The patient continued much in the same state till July 10th, but gradually became weaker. I was then asked to see her, and made an incision in the back through an intercostal space below the angle of the scapula, giving exit to a large amount of pus mixed with hydatid cysts. An ordinary tracheotomy tube was inserted. The drainage was evidently imperfect, for the expectoration again became yellow. Owing to the closing of the hospital, we now lost sight of the patient; but she returned on October 1st in a moribund condition, and at the *post-mortem* examination we found the right lung full of disseminated tubercle. The liver was of normal size, and contained three hydatid cysts: one close to the junction of the posterior and upper surfaces as large as a walnut, shrunk and calcified, and communicating through the diaphragm with the lung; a second, of the size of a Maltese orange, opening into the common bile duct; and a third apparently still active. The spleen and kidneys were albuminoid. No doubt the opening here should have been much more free, but the case was evidently a most unpromising one for treatment. I would particularly direct attention to the tubercles in the right lung only in connection with the fact that this lung had been constantly irritated for eight months, *à propos* of the question of leaving alone abscesses that are being expectorated.

The last case I will inflict upon you is one of especial interest in connection with thoracic surgery, because it had been diagnosed as an empyema and opened as such; and, to make a full confession, I looked upon it as one myself at first, though I think there were data at hand which should have enabled us to come to a correct diagnosis.

Case xxiv was that of a lady, Miss R., aged 30, whom I saw with Dr. Slater, of Barnsbury, on May 17th, 1889. Her illness began six months before whilst she was staying at Cambridge, which is said to be developing an evil notoriety for hydatid disease. First she was said to have become abnormally stout, and then an abscess formed below the angle of the right scapula. This was punctured and then freely opened by Drs. Ellis and Batten, of Gloucester, and a drainage tube was passed between the ribs. They report that early in January she had pain at the epigastrium and over the region of the liver; that at the time of the operation there was dulness and absence of breath sounds to midway between the angle and the spine of the scapula, and the heart was much displaced outwards, but there was no apparent enlargement of the liver. They clearly

recognised some peculiarity about the case, however, because the matter did not flow freely at first, its escape being no doubt prevented by the hydatid cysts; and also because a distinct hepatic enlargement was manifest soon afterwards. It was assumed therefore that there was a second abscess lower down, and that it was probably an empyema depending upon some subdiaphragmatic suppuration.

Before she came to London some burrowing of matter had taken place in the soft tissues of the back, and the tube had slipped out from between the ribs. When I saw her she was thin and very much emaciated; the fingers were clubbed, and the extremities blue. The liver extended two inches below the umbilicus, and was very hard, but it was not easily felt, because the whole abdomen was tense, suggesting from its shape and hardness a football when it was manipulated. Dulness extended up to the third rib in front,

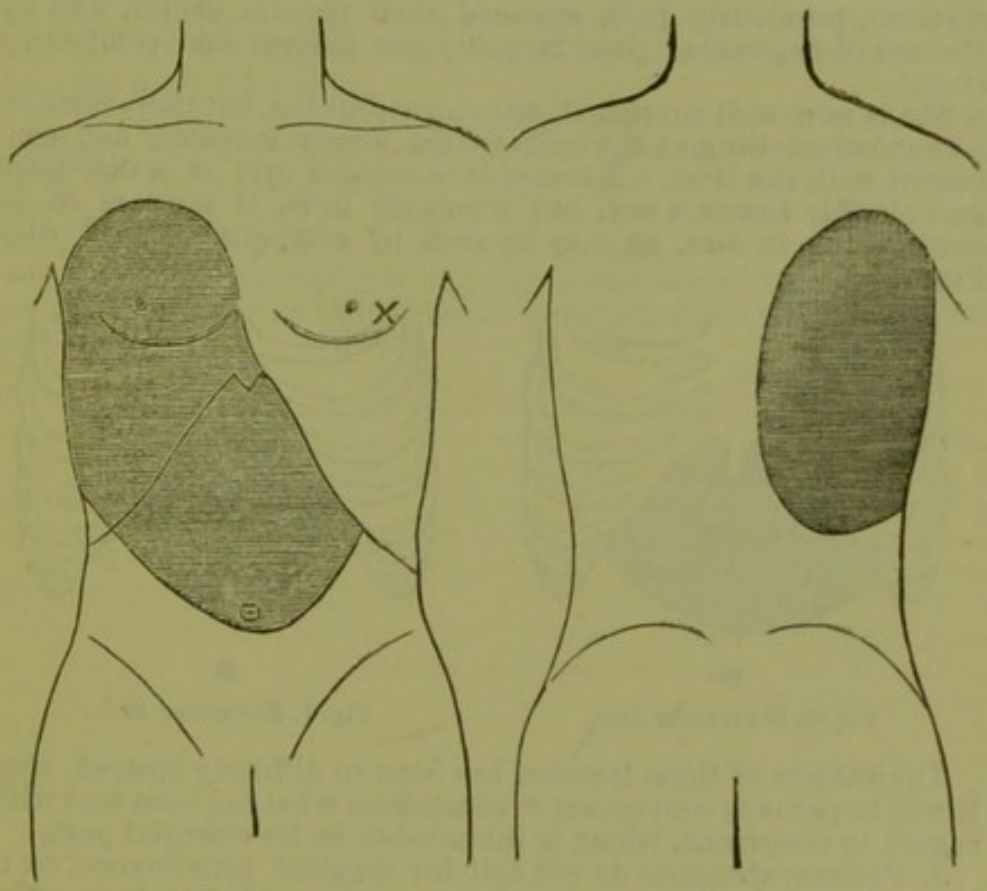

Fig. 4. Fig. 5.

and was sharply defined (Fig. 4); behind it faded off gradually halfway up the scapula (Fig. 5). The level of dulness passed across the apex of the axilla. Breath sounds, vocal resonance, and vocal fremitus were abolished over the dull area, except close to the spine. The heart's apex was in the sixth interspace, one inch outside the nipple. The temperature varied from 101° to 103°. The appetite was capricious. There was no expectoration and no albuminuria. There was an opening discharging pus opposite the ninth rib, outside the angle of the scapula.

I enlarged the cutaneous opening, and, at the outer part of the subcutaneous abscess, discovered a small track passing into a cavity within the ribs. This gave exit to a large quantity of pus and hydatid membranes, and then it was found that the cavity was situated altogether beneath the diaphragm, which had been pushed up to this enormous height by the gigantic hydatid cyst.

I would here raise the questions, without venturing to answer them, Whether an enlargement of the liver often or always pushes the heart over more or less than a collection of fluid in the pleura. In this case the dislocation was very considerable. The cavity was washed out with solution of chloride of zinc (40 grs. to ℥j), and the wound was dressed with boracic lint and salicylic wool. The liver rose one inch.

The case progressed favourably, though at one time she was in some danger of sinking from exhaustion, and she became still more extremely emaciated. Whether or not this depended upon the fact that there occurred an enormous flow of pure bile from the wound, half a pint to three-quarters of a pint *per diem* for some time, I will not pretend to say. The result was, however, that bedsores formed over the angles of the scapulæ and the most prominent rib angles. In the course of time, however, this diminished and finally stopped. She began to put on flesh. The motions, previously pale, assumed their natural colour, and by the end of September (four months) the abscess had completely closed.

She is now well nourished, and in good spirits, but there remains a rounded swelling at the epigastrium, freely movable, and connected with the liver. Whether it is another cyst or a distended gall bladder I cannot say, but whatever it is, it appears to be diminishing in size, as may be seen by comparing Fig. 6 with Fig. 7.

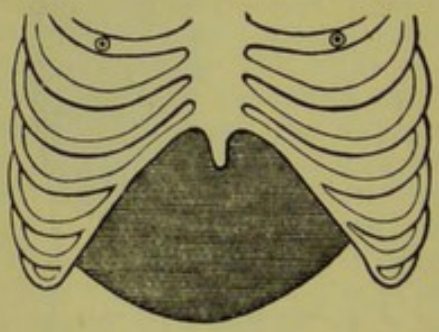

Fig. 6, September 24th.

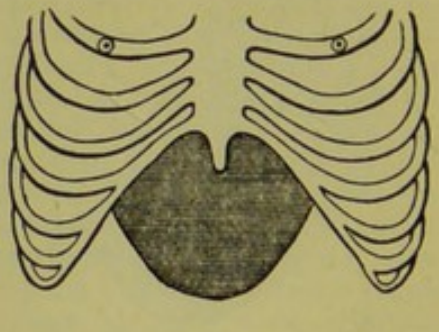

Fig. 7, November 29th.

The subject of these lectures has been so diffusely treated, that it will be perhaps convenient to summarise what has been said with regard to treatment, which is intended to be its essential part.

1. Pyæmic abscesses do not call for surgical interference, or, if in rare cases one should point, it is only opened to relieve symptoms, but without hope of doing permanent good.

2. The same observations apply to abscesses resulting from suppurative phlebitis of the portal vein.

3. Multiple abscesses associated with dysentery or ulceration of the bowels are very unfavourable for surgical treatment. They must, however, be opened and treated on the same lines as the single or tropical abscess, because they cannot be certainly diagnosed.

4. Single abscess of the liver, whether tropical or not, must, if it approach the surface, be opened, the following precautions being adopted:

(*a*) If it present at the epigastrium, the presence of adhesions must be ascertained before incising the liver.

(*b*) If through the chest wall, a spot must be chosen below the normal limit of the pleura; but, if by chance either pleura or peritoneum be opened, the opening must be closed with a double row of stitches before incising the liver.

(*c*) Strict antiseptic precautions must be throughout adopted, either carbolic acid or some slightly soluble salt of mercury being employed for the dressings.

(*d*) The tube must be of large size at first, and a tube of some sort must be kept in until the discharge is reduced to a very minute quantity.

If the abscess have burst into the lung, pleura, pericardium, peritoneum, or kidney, and the position of the abscess can be clearly determined, it must be opened without delay. If the position of an abscess be only suspected and the patient be losing ground, it is right to puncture the liver in the most likely situations, bearing in mind that, though usually quite harmless, a slight amount of risk accompanies this very trivial operation. This rule applies to cases in which the abscess has ruptured into any of the cavities enumerated above. If, on the other hand, whether the abscess have ruptured or not, there are no means of diagnosing the whereabouts of the matter, and the patient be not losing or even gaining ground, the surgeon should hold his hand for a time.

5. Hydatids of the upper and back part of the liver are to be treated upon the same lines; but in cases of this sort, and in those of subdiaphragmatic abscess, it must be remembered that the diaphragm may be pushed up to a very great height, thus closely simulating intrapleural suppuration.

6. Empyema, pericarditis, and peritonitis caused by rupture of a hepatic abscess or hydatid must be promptly dealt with on general principles.