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THE ANTISEPTIC METHOD

IN

RELATION TO DRAINAGE OF THE PERITONEUM

IN

ABDOMINAL SURGERY

BY

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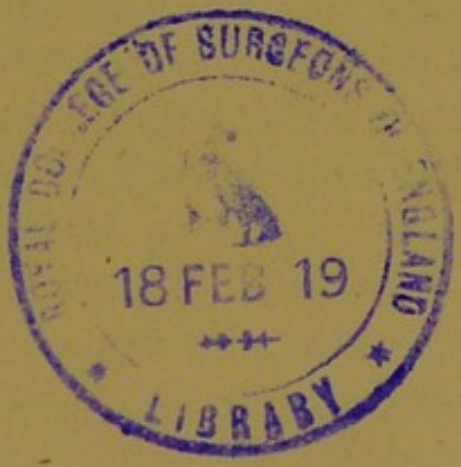

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1879

THE ANTISEPTIC METHOD

IN

RELATION TO DRAINAGE OF THE PERITONEUM.

THOUGH my subject is "Drainage of the Peritoneum in Abdominal Surgery," I shall confine myself to the operation of Ovariotomy, because it is the most common of all peritoneal operations, and also, the one which most often raises the question of drainage. All I say about ovariotomy applies, however, with equal force to any operation in which the abdominal cavity is opened.

When antiseptic ovariotomy first became an established operation, and its successes cleared away the fear that the carbolic acid on the hands, instruments and sponges, and the cold vapour of the spray, would be as great or greater dangers than those which we hoped to avoid by the new method, I felt sure that the operation performed antiseptically would afford a convincing answer to those who affirm, that careful drainage is as important a factor in the results of antiseptic surgery as antiseptics themselves. I have always believed that the fluid pent up in wounds, would not be a source of danger provided it was aseptic, and did not cause by its quantity, such distension of the cavity containing it, as to irritate the nerves in the flaps or coverings of the wound, either directly by stretching the flaps themselves, or indirectly by tightening the sutures. In the peritoneal cavity, especially when its anterior wall has been stretched by the presence of a large tumour, we have such space that almost any amount of secretion may accumulate

without causing distension or tension of the sutures. Theoretically then, it seemed to me that, if we could be sure that our antiseptic method had been so perfect that we were certain of all being aseptic in the cavity when the external wound was closed and dressed, we had nothing to fear from the blood, serum, or other fluids which might remain even after carefully cleansing the peritoneum, or might be poured out during the first few hours after the operation, as the result of the irritation caused by handling, sponging and carbolic acid.

In bringing before the Medico-Chirurgical Society a table of my first twenty-five cases of complete ovariotomy, I ventured to explain the simple fever so often seen after that operation, by the disturbance to the circulation caused by the large increase in the quantity of blood circulating through the remaining parts of the body (especially the brain), after the removal of a large vascular tumour without much loss of blood, either from adhesions, or by its removal in the tumour as in an uncomplicated ovariotomy. (*Med. Chir. Trans.*, Vol. lx. 1877).

While I was on the continent last autumn, some of my surgical friends there, objected to this theory, and endeavoured to persuade me that the fever is entirely due to the absorption of the blood and serum poured out at the seat of operation. This is the theory first propounded, I believe, by Billroth, and though there are facts which support it, there are quite as many in favour of my view, and I am inclined, from recent observation to think that we must learn to recognize both forms of fever—one caused by excessive blood-supply and the disturbance it induces, the other due to reabsorption of mixed serum and blood. We must never forget, however, in considering the special class of cases

in which we have the peritoneum to deal with, that the fever may be due to the serum, mixed with blood or ovarian fluid, causing peritonitis. It is exceedingly difficult to diagnose correctly these different forms of fever following extensive peritoneal operations, but, with care and experience, it is not only possible, but absolutely necessary to success, for each requires its own special treatment, and what is good for one is bad for another. It is only when we can exclude sepsis, that we can begin the study of this important branch of the after-treatment. When putrefaction was so frequently present in greater or less degree, there was always a certain amount of fever, due to the absorption of the poisons generated, and this led to so much doubt, and made the symptoms so much alike in the different cases, that any attempt at accurate diagnosis was hopeless. Before proceeding to discuss the question of drainage in connection with antiseptic peritoneal surgery, I must glance at what has been written on the matter before the days of Antiseptic Ovariotomy, and relate briefly my own experience during the same period.

It is unnecessary, I hope, at the present time, to do more than mention the old plan of leaving the pedicle ligatures long enough to hang out of the wound. Those who employed this extraordinary method, must have had curious notions as to putrefactive processes; and the results obtained shew, as one would expect, that putridity much more often travelled down the road so carefully prepared for it than the discharges its presence caused travelled up.

Dr. Marion Sims' proposal to provide for vaginal drainage in every case, was much more in accord with pathology; but it had obvious disadvantages, not the least being the fact that no drain through the pouch

of Douglas into the vagina, can be thoroughly at the bottom of that pouch, when the patient is lying on her back.* To get perfect drainage, it is necessary to puncture the pouch through the rectum, a plan which Dr. Keith of Edinburgh at one time advocated and successfully practised in cases in which a putrid collection had formed after ovariotomy. To Kœberlé of Strasburg, the credit is due of having first introduced the admirable method of drainage, brought to perfection by Keith, and now almost universally recognized. I refer to the plan so clearly and concisely described by Mr. Spencer Wells, in his paper on three hundred additional cases of Ovariotomy, read before the Medico-Chirurgical Society, Feb. 27, 1877, and published in the Transactions, Vol. lx. A glass tube, long enough to reach from the lower angle of the abdominal wound to the bottom of the pouch of Douglas, is fixed in position when the wound is closed, its mouth, opening outside the incision, covered with a carbolised sponge placed under whatever dressing is used; this tube is emptied at intervals (every 6 or 8 hours in non-antiseptic cases) by means of a smaller india-rubber tube attached to an ordinary glass syringe, the same tube and syringe being available for the washing out of the pelvis with antiseptic fluids, if necessary.

At the meeting of the British Medical Assocation in Manchester, August, 1877, Dr. Bantock read a paper on Drainage in Ovariotomy, which was published in the Journal, Sept. 29 of the same year. He gives full details of the five successful cases in which he em-

* New York Medical Journal, December, 1872 and April, 1873. Since this paper went to press I have heard from Dr. Marion Sims, he says, "I do not now advocate drainage by the cul de sac of the vagina, nor do I think it should be universally resorted to. My views have undergone a complete change and this change has been effected by the antiseptic method. When drainage is called for, it should be done by the abdominal incision, as practised by Kœberlé, Keith and Thomas."

ployed the above method of drainage, and of one unsuccessful case, in which death appeared to be due to a small collection of putrid fluid near the liver, which the tube had failed to drain. The fact that such partial collections may still lead to a fatal result, is the one point in the paper which extends our knowledge beyond what Mr. Wells had already stated.* Two equally important matters are not referred to. 1. The tube may itself be a cause of danger, by causing matting of intestines and adhesion leading to fatal obstruction, and Mr. Wells gave us a word of warning on this point. 2. The tube is in itself a source of danger, because it keeps open a road for the entrance of putrefaction from without, just as the old long ligatures did, though it provides us with a much more perfect outlet than they did, for the fluid poured out by the peritoneum in consequence of the irritating presence of tube or ligature. I have not the least doubt that in some cases, it is the means of introducing mischief which it fails to remove. I shall have to refer farther on to a case, in which the tube caused chronic peritonitis with great discharge of serum, though the case remained aseptic, and in the end made a perfect recovery. In the days before antiseptics, it was a well-known fact, that very simple cases of Ovariotomy often died from septicæmia or septic peritonitis, whilst very complicated ones got well with no bad symptoms. This can only be explained, by

* Since I read this paper before the Harveian Society, Mr. Wells has called my attention to the following passage in his paper: "the patients had died of septic peritonitis, and considerable quantities of bloody serum, with lymph or clots, had been found in the upper parts of the peritoneal cavity on either side of the vertebral column quite unaffected by the vaginal drainage, and very imperfectly by the drain through the abdominal wall." Clearly, I should have given Mr. Wells the credit of warning us as to this imperfection in drainage, and I apologize for the error, which I need not say, was due to an oversight in rapidly re-reading his paper along with others before writing my own.

supposing that something gained access to the peritoneum in the one case, which did not in the other. Some peritoneums are much more inclined to pour out serum than others. This one sees constantly during operation ; and if there is this tendency, the more one sponges and irritates, the more the serum flows. In a healthy peritoneum, as in healthy wounds, the normal condition of the tissues is inimical to the life and multiplication of the causes of putrefaction ; and, so long as the fluid is only in such a thin layer that it is spread between peritoneal surfaces and exposed to the healthy vital action, putrefaction does not take place, or if it does, its products are so rapidly absorbed that the patient merely suffers from mild septicæmia. I state this natural power of the healthy tissues as a fact, because I do not see that we can in any other way explain the number of cases that recovered, often without any bad symptom, before the days of antiseptics,—cases in which the wounds, whether peritoneal or of other parts, must have received during the operation any quantity of infective material. It is beyond the scope of this paper to discuss the causes of putrefaction, but those who are specially interested in the subject should carefully read Professor Tyndall's papers, keeping in mind the facts with regard to the past period of peritoneal surgery. Whilst the tissues of some patients evidently possess this healthy vital power in a marked degree, others seem to have lost it all together. I have seen a patient die within 12 hours of operation, with a temperature of 109° to 110° F., the body almost putrefying before life was extinct, and directly after, passing rapidly into a most horrible condition. However much one may be inclined to admit different varieties of the seeds of putrefaction, such cases, especially when operated upon

in circumstances apparently most favorable, force us to admit differences in the power of resistance, or greater fertility of the soil.

But, if at any point, a collection of fluid takes place, as for instance at the bottom of the pouch of Douglas, the tissues can no longer act upon it all, and if any of the causes of putrefaction are present, the collection putrifies, and when once there is an enclosed collection of putrid bloody serum, we get rapid poisoning with fever; the collection is kept at a high temperature, and in the very best position for increase of the causes of putrefaction. Wherever the putrid fluid is in contact with peritoneum, it irritates that sensitive membrane, fresh fluid is poured out, and there is thus a constantly increasing supply of liquid poison, which is constantly irritating fresh surfaces, and we have rapidly spreading septic peritonitis along with the general condition known as septicæmia.—If the patient is strong enough to resist the poison, and the latter is rapidly absorbed, she may recover, after being in great danger; or, if adhesive inflammation is caused and the fluid is not too rapidly poured out, we may get an encysted putrid collection which may be evacuated by the surgeon with a successful result; or a putrid abscess may form and be its own surgeon, finding its way out at the wound or into vagina, rectum or bladder. Such are briefly the terminations of cases in which fluid, left in the peritoneum or poured out after the wound is closed, putrefies; and such are the reasons why drainage was so necessary and often so useful, when we could not exclude sepsis. Practical experience must lead to the belief, that there are different kinds of sepsis, and different degrees of poisoning, according to the kind. At least, such is my conviction after a very large

experience in peritoneal surgery. I will now briefly record the results of drainage in my own hands before I began antiseptic ovariotomy, and then pass on to the discussion of the important question: How far rigid Listerism will enable us to dispense with drainage?

In all this question of drainage, there is one fact which is the key note, and, in the paper already alluded to, Mr. Spencer Wells struck it when, after stating how the first necessity for drainage may arise, he said, "farther secretion would be excited." If the poison, whatever it be, was admitted and did its work in the fluid it found, I think it would rarely prove deadly. It is the fact that it makes this fluid obnoxious to the tissues so that they pour out more fluid to wash themselves; if there is free escape, nature is all-sufficient; but, if the fluid is pent up, the very effort she makes, multiplies the food for the poison, and the quantity of the poison, and the danger in proportion. Hence the necessity for drainage! Now if we can exclude the poison, or rather exclude what leads to its formation, can we not dispense with drainage? This, in another form, repeats the question I have asked above, but in order to answer it we must extend our researches, and try and find out whether mixtures of serum, blood, ovarian fluid, &c., are of themselves poisonous when re-absorbed into the circulation. Their absorption causes fever, according to Billroth, and I believe from careful observation, that their rapid absorption in quantity, causes high fever (hyper-pyrexia), which may then become absolutely dangerous, but may be recognized and differentiated from septic fever, and is certainly curable by appropriate treatment. The drainage tube then, aids the vital action by allowing healthy tissues to remain in

contact, and thus limiting the irritated area, while it aids the washing process by constantly allowing overflow. Nature rapidly pours out fresh fluid and weakens the poison formed, the tube conveys this out of the body before there is time for the fresh fluid to become itself poisonous, or for any serious reabsorption to occur.

In my first 38 ovariotomies, which were performed without antiseptics, I drained with the glass tube in 13 cases. Five of these died, and as I have already given details in a paper read before this Society,* I need not farther refer to them, except to say that I am inclined to think that the very free serous discharge, which occurred in one case, hastened death by exhaustion, and the *post mortem* shewed how much the tube had irritated; it was walled in by a complete mass of intestines, closely adherent with firm yellow lymph; the end also had caused some redness and abrasion where it rested; this in a short period of 37 hours during which the patient lived.

In another case, I feel sure, the tube was a cause of putrefaction and was useless. Nothing of any consequence came away during the 24 hours it was left in, but after its withdrawal, symptoms of septic mischief came on rapidly. I have no doubt that either it left something, which was a cause of mischief, at the bottom of the pouch, or something actually entered in the air which replaced it as it was withdrawn. This case led me always in future to introduce a piece of carbolised india-rubber tube to the bottom of the glass one before withdrawing it, so that a channel, though a smaller one, might remain; this india-rubber tube was then shortened bit by bit at each dressing.

* "Unsuccessful Ovariotomy with Cases," read Feb. 21, 1878, published in *Med. Times and Gazette*, June 22, and July 13, 1878.

After adopting this plan, I never lost a case in which I drained. One case was very curious; the india-rubber tube, in each 24 hours, became blocked with a delicate embryonic connective-tissue, which grew in at all the holes and filled its calibre so that withdrawal required some force. This patient lately brought a fine healthy baby to see me, born 18 months after the operation. In one case where I did not drain at first, the patient, after doing well for some days, became very feverish, and eventually some red fluid escaped from the lower angle of the wound, and I inserted a tube (india-rubber) which was in for nearly three weeks. She certainly improved after the tube allowed free and regular discharge. I have gone carefully through my case books, and can only find one other case in the whole 38, in which I think it *just possible* that a fatal result might have been avoided had I put in a tube. But among the cases are *many* in which I hesitated whether to drain or not, and in which, had I drained, I should very likely have attributed to the drainage more than its due share in the recovery.

The fact that it is often very difficult to decide whether to put in a tube or not, is certainly one of the objections to drainage.

To sum up the disadvantages we have:—

1. The difficulty in deciding when a tube is necessary.

2. The tube, if not necessary, is decidedly a source of danger; it keeps open a possible track for the entry of the causes of putrefaction, it lengthens the time during which the wound is unhealed, and it may cause obstruction of intestine or chronic peritonitis.

3. It retards convalescence. I find that the average stay in Hospital after operation, of 18 cases in which I did *not* drain, was 25 days; this includes some

of my early cases in which I used the clamp, and it always retarded the complete closure of the wound as much as the tube does. The average in the 8 drainage cases, on the other hand was 30 days.

Another disadvantage which the tube shares with the clamp, is that it leaves a weak place in the incision, through which hernia is apt to occur, and at which a fungating protrusion may appear if there has been any malignant element in the case. I have one such case now in the cancer wards at Middlesex Hospital. Of course if no tube had been used, and this recurrance had been intra-peritoneal, the patient would have suffered far less than with an external fungating mass, offensive and painful both to herself and others.

In the 8 cases above mentioned the glass tubes, remained in for periods of 83, 90, 92, 77, 240, 96, 148 and 172 hours; the india-rubber tubes which replaced the glass, 75, 150, 196, 95, 120, 336 hours, and some days, respectively.

I have already stated my theoretical position as regards drainage in antiseptic surgery of the peritoneum, and I will now give my practical experience. I must first state that I believe we are now able to say we can perform ovariotomy with perfect antiseptic precautions, in any case in which there has been no previous tapping, or in which tapping has been performed antiseptically. I now always tap with the spray, and as carefully as I perform any other surgical operation antiseptically, and since doing so, I have never seen any evil result follow tapping, no cyst inflammation as it was called: it should be called admission of the causes of putrefaction into a cyst by tapping. In cases which have been tapped before they come to me, I never feel certain that I can per-

form aseptic ovariotomy, because the cyst may already contain the causes of putrefaction, and if this be so in a difficult case with adhesions, we cannot be certain that some of the putrid material will not pass over portions of the wound or peritoneum without being rendered innocuous. The mere fact that the fluid is *not* offensive is no guarantee that it contains no causes of putrefaction, for I have found fluid full of active bacteria, yet without odour; moreover, when the spray is playing over everything, it is difficult to detect odour unless it be very powerful, and one cannot pause in an ovariotomy to examine the fluid microscopically. I have observed many facts which make it probable, that the causes of putrefaction may be present in a cyst, without the patient presenting the usual symptoms of cyst putridity, and without odour from the cyst contents. And yet, when brought in contact with fresh blood, serum, and wounded tissues, these latent causes of putrefaction become active. They are in fact dormant in the cyst. This is too difficult a subject to discuss here, and I want more facts; but it is necessary I should mention it, to make my views on drainage intelligible.

In the case of very large tumours, I do not think that any one spray producer, however powerful, is sufficient to produce a large enough cloud, and I shall record a case in which the patient died of septicæmia, of which I believe a too small spray to be the explanation, though it might have arisen from numerous tappings without antiseptic precautions, before the case came under my care.

The fever-inducing power of fluids effused from surgical wounds, must also be kept in view, although this also is a subject on which we want the light of extended observation and experience.

The first case in which I drained was my third after commencing antiseptic ovariotomy, and I put in the tube because the spray failed in the middle of the operation. I had also tapped in the old way, a short time before operation. At the first dressing I obtained 3 oz. of bloody serum from the tube and sponge, and there was a little in the dressing. At the next changing, 12 hrs. later, there was about 3 oz. of paler serum, none had passed the sponge; the next 12 hrs. only 2 oz., the next only 1 oz. at the bottom of the tube. I intended at the subsequent dressing to remove the tube, but found a decided increase in the discharge of pale yellow serum. From this time the increase in quantity was rapid, till the dressings were soaked each time; on microscopic examination I found the serum full of lymph corpuscles. From the morning of the second day when the temp. was 99·6, it had been normal, and the patient was in all respects so well, that I felt certain the tube was keeping up irritation; I therefore removed it when it had been in 72 hrs. No rise of temp. followed, and the pulse stood at 88. On the morning of the 5th day, I heard there was discharge, and found the dressings soaked with serum. The flow continued so freely till the 9th day, that I used to turn the patient on her side and empty the peritoneum through the opening where the tube had been, of course under the spray. During this procedure, air could be seen freely bubbling in and out, and yet there was never any sign of putrefaction, and the temp., pulse, and general condition were quite normal. On the 9th day the opening closed, and though for some days I could detect serum in the peritoneum in large quantity, there was no further discharge, and the patient got rapidly well and went home 19 days after the operation. I should

have mentioned that, when I took out the tube, my colleague Mr. Doran and myself could distinctly see the intestines, injected and reddened, rolling about in the abdominal cavity.

I will next record the last case in which I have drained, as a striking contrast. The patient was a single woman of 35, with an enormous multilocular tumour. She came in with well-marked symptoms of mischief in the cyst, which had been tapped some months previously, though only a small quantity of fluid was then obtained. She was jaundiced, and had a rapid, weak pulse; morning temperature generally over 99·0, afternoon and evening from 101·4 to 102·0. The operation was a difficult one, the cysts (there were three or four much of a size) all contained a mixture of ovarian fluid and a brown clot-like material (fibrinogen?), with a distinctly unpleasant odour. I had to break up the septa and pump this material out with my hand; much of it necessarily flowed over the wound, and though I was careful in washing it away, and cleaning my hands as often as possible, I could not feel any confidence that I did not introduce causes of putrefaction into the peritoneum. Extensive and very vascular adhesions had to be separated, and both ligatures and cautery were used to control the hæmorrhage. The peritoneum also poured out serum freely, and I therefore decided to put in a tube in spite of very careful cleansing of the abdominal cavity.

At the evening dressing the temperature was 99·4; pulse 116, very feeble; respiration shallow, 30; there was a little pale serum on the dressings, and 2½ oz. almost pure fluid blood, from sponge and tube. Second dressing next morning, temperature 100·0, pulse 120, respiration 26; no discharge on dressings, only about

an ounce from sponge and tube, with fragments of clot. Third dressing, temperature 101·4, pulse 120, respiration 26; an increase of pale serum, over 2 oz. in all. Fourth dressing, morning of second day, temperature 100·2, pulse 114, respiration 20; about 2 oz. from sponge and tube, the latter looking as if there had been a little fresh hæmorrhage. Fifth dressing, evening of same day, temperature, pulse, respiration, and discharge, exactly as in the morning. Sixth dressing, temperature 99·0, pulse 108, respiration 20; much serum in dressings, tube and sponge full. Seventh dressing, evening, temperature 99·6, pulse 112, respiration 22. Eighth dressing, temperature 99·8; pulse 120, weaker; respiration 20; dressings soaked with dark yellow serum. Thinking the tube was keeping up the discharge, as in the former case, I took it out. I carried some of the fluid home, and was disturbed on finding in it numbers of large motionless rod-shaped bacteria. It was quite odourless. In the afternoon I did not like her look, and she was sick for the first time since the first day; the temperature was only 100·4, but flatus was passing badly, and there was increasing tympanitic distension. At 9 p.m., temperature 101·2, pulse 134, respiration 24; darkly flushed and unnaturally drowsy, slight subsultus, skin getting dry. I removed the dressings, and passed a silver male catheter (No. 10) through the tube opening which had closed, but no serum flowed. I turned her on her right side to encourage the passage of the flatus, and in this succeeded, but at grievous cost. She complained of smarting in the abdomen, and from that time her temperature rose rapidly till 1 a.m., when it was 104·6; pulse, running, 144. At 2 a.m., she brought up a large quantity of coffee-ground material. I now

passed a tube to the bottom of the pouch of Douglas, but it was dry; the fluid had been absorbed only too rapidly. She got worse quickly, and died at 9.45 a.m. The cause of death undoubtedly, was rapid septicæmia. Now there are two possible views of the course of events.

1. The causes of putrefaction were introduced at the time of operation, but as there was little discharge of any kind, and that little quickly removed, they had no food for development; very possibly they were in some of the ligatures, or higher up in the abdomen. The tube set up peritoneal irritation, and serum was poured out which found its way to them; as a result, there was some rise of temperature and increase of pulse-rate, with marked decrease of strength. The serum still getting freely away, downward progress was slow, and might have been overcome if the tube had been left in. The withdrawal of the tube caused a collection at the bottom of the pouch, which I failed to reach when I first introduced my catheter, and this was at once spread over the abdomen by turning the patient on her side. Result, rapid poisoning, evidenced by rise of temperature, increase of pulse-rate, and black vomit. The pouch was dry when I put the tube in again, simply because all secretion was stopped by the violent poisoning, another evidence of this, being the drying of the skin.

2. The dressings were not often enough changed after the serous discharge became free, and putrefaction spread in through the tube. They were as often changed as in the other case, but then the external parts about the wound had not in the other case, been bathed at the time of operation with a putrid fluid as they undoubtedly were in this last.

I believe if I had not put in a tube at all, or if I had

removed it when the discharge was at its least, all would have been well. But, having put it in, I ought to have retained it as long as there was any discharge. The rule which I laid down for myself before antiseptics, of putting in an india-rubber tube when the discharge became slight enough to dispense with the glass-tube, should have been followed here; but I thought the discharge was weakening her, and finding no odour, removed the tube. Had I first found the bacteria, I should have left it, although I think the ultimate result might still have been doubtful, as she was losing strength fast, the flatus was passing badly, and, after removal of 60lbs. of solid and fluid, with her reduced health, she would have struggled but poorly against profuse and long-continued discharge.

I have related these cases at some length, because the success obtained in the one led me to remove the drainage tube in the other, without, however, sufficiently considering the marked difference in the general and progressive symptoms.

Including these, I have drained in 8 cases since I began antiseptic ovariotomy, and, looking through my cases, I find 22 in which I should certainly have drained had I not trusted to antiseptics. Only one died, and she was the patient I have already referred to as having been tapped several times without antiseptic precautions. The tumour was an enormous one, 75lbs., and the patient a very bad subject. A tube *might* have saved her.

Of the 8 cases in which I drained, three died, the one I have given above, and two others.*

The first of these was that of a very delicate girl of 28. I removed an unusually solid tumour of 29lbs.

* Of course these figures do not include many cases operated upon, in which there was no necessity to entertain the question of drainage.

The adhesions, parietal, omental and pelvic, required many ligatures, but I should not have drained had I not noticed an unusually free outpouring of serum from all the peritoneal surfaces; the more I sponged the worse it was. Very little came from the tube, but she did badly from the first, the pulse never falling below 140, and mounting to 162 on the day after the operation. Chest symptoms with high fever, but comparatively tranquil breathing, came on, and she died early on the morning of the 2nd day after the operation. Each pleura contained over a pint of perfectly clear serum, and the parietal pleuræ were intensely injected. There was old caseous tubercle in right lung. The weather was very cold, and I believe the patient died from the chill at the time of the operation setting up lung mischief, which was increased and rendered rapidly fatal by the change of dressings every 12 hours, necessitated by the presence of the tube. One is always most careful to avoid chill after ovariotomy; but it is almost impossible to do so, when dressing under the spray while the patient is in a bath of perspiration.

The next case in which I used the tube, was the one immediately following this, operated upon in the same bitterly cold weather, just before Christmas. The operation was a very formidable one; the woman 34, and delicate. A good deal of bloody serum came from the tube during the first 6 hours it was in, and after that, practically nothing. At the end of 24 hours from the operation, she had symptoms of left pleurisy. This was on the side most exposed to the spray during the dressing, and I at once removed the tube and closed the opening with the suture placed for the purpose. No rise of temperature followed, the chest symptoms subsided, and she made an excellent recovery. This was my 100th ovariotomy.

I again used the tube in my 101st case, but only left it in 43 hours as little or nothing escaped after the first 6. I closed the opening with the suture in this case also. She made a rapid recovery.

I used it again in my 102nd case, and kept it in 68 hours; after I withdrew it, I could not close the opening as I had forgotten to insert a suture for the purpose. At the end of 12 hours I found some serous oozing, and therefore put in an india-rubber tube deep enough to pass through the parietes. This remained in another 48 hours, when the wound was quite dry and I removed it. The patient, a poor old blind woman, also recovered rapidly.

I used in the next case a curved tube which was suggested by my colleague Mr. Meredith, in order to have the opening higher up in the incision, and farther from the pubes. This was also an unusually difficult case of double ovariotomy, and I was obliged to leave a certain amount of venous oozing deep in the pelvis, so I put in a tube. Finding at the end of 48 hours, that the blood rather increased in quantity, and that the tube caused pain, I withdrew it and closed the opening. The temperature steadily fell from this time, and the patient went home on the 22nd day after the operation.

The only other case in which I have used a tube, was that of a patient with an enormous adherent tumour full of stinking pus and lymph, the result of previous tapping. She was in a very weak and exhausted condition, with high temperature and quick feeble pulse, but I thought it right to give her a chance. After removing the tumour, I found a dilatation of the opposite Fallopian tube; its connections were such that a complete removal of it would have much prolonged the operation, and I determined to

open and clear it out, as the patient was much exhausted. I did so, and left it as I thought quite safe, the glass drainage tube passing down close beside it. The patient died suddenly 4 hours after the operation. I was sent for and arrived too late; but, seeing her blanched condition, looked at the dressings; there was no appearance of discharge from the tube, and I concluded it was a case of syncope. At the post-mortem, made by my colleague Mr. Doran, nearly two pints of blood-clot was found passing up from the opened Fallopian tube into the abdomen. The hæmorrhage had occurred from the small vessels in the dilated tube. I had always looked upon drainage as a great safegard against fatal hæmorrhage, and yet in this case it gave no warning, though the clot must have absolutely surrounded the tube. I fear my paper has already exceeded reasonable limits, but I was anxious to place before you the data on which I found the opinions I am about to express.

When writing a paper on drainage towards the close of the septic period, a paper which I never published, I concluded as follows, "When in doubt, drain, and never withdraw the glass tube without replacing it by a carbolised india-rubber tube, to be gradually shortened as discharge ceases." I shall still give the same advice with regard to cases in which, from previous tapping or other cause, we cannot be sure of the asepticity of the case. And I will say that while we are in doubt as to the fever-producing power of mixtures of blood and serum &c., and as to the danger of spreading peritonitis arising from accumulations of the fluid, it may be well, in a few exceptional cases where the patient is in a low state of health, to drain for a few days or hours after a complicated operation, (*i.e.*, until we see if

much serum is formed), but, in these cases, I would advise the insertion of a tube suture at the time of operation, which should be closed when the tube is withdrawn. In such cases, I should withdraw the tube as soon as the discharge ceased to overflow into the sponge, *if the general condition of the patient, and the progressive decrease of discharge, gave evidence of asepticity.*

I have already enumerated the disadvantages and dangers arising from the use of the tube. It only remains for me to say in conclusion, that in fresh cases, and with a careful adherence to the teachings of Lister, or in other words—with aseptic cases and proper antiseptic precautions, I believe the need of drainage has passed away; at any rate cases requiring it must be very exceptional.

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