THE
SURGICAL TREATMENT OF DIFFUSE
SEPTIC PERITONITIS;
WITH SUCCESSFUL CASES.

BY

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WITHOUT doubt the term diffuse septic peritonitis comprises many kinds of disease. Surgeons seem to have included in it cases in which the peritoneum was hardly altered after death; others in which its vessels were full of blood and its surface smeared with oil-like lymph; others in which there was ashen-grey lymph, with slight adhesions; others in which purulent fluid predominated, and so forth. There seems, however, a consensus of opinion that in diffuse septic peritonitis the inflammatory action has no definite limits, runs an acute and rapid course, and is almost invariably fatal.

If this is correct, it is necessary at the outset of this communication to say what kind of peritonitis is implied by the term diffuse septic peritonitis.

Fully conscious of the difficulties of definitions, I would say that in the diffuse septic peritonitis which

I refer to the inflammation is acute and has no definite limits; the serous membrane is smeared with lymph, which is either transparent and oil-like or collected in ashen-grey fibrinous flakes; adhesions are absent, or very slight; the peritoneal cavity contains a variable quantity of thin purulent fluid, which often has a fæcal odour; or it may be full of gas; the intestines are distended and paralysed; and the disease runs a rapid and fatal course when left alone.

Although the cases which come within this definition are numerous, surgical literature does not contain many instances of recovery after operative intervention.

Senn,¹ who has paid great attention to this subject, has recently said that diffuse septic and suppurative peritonitis are seldom, if ever, cured by laparotomy.

Writing in 1892, Körte² said that cases of general septic peritonitis with little exudation and with paralysis of the intestinal walls were not capable of improvement by direct surgical interference. Fränkel is almost as despondent.³

Mr. Treves,⁴ in his Lettsomian Lectures, in which he exhaustively deals with the literature of peritonitis, says, "The surgical treatment of acute diffused peritonitis as a purely inflammatory affection has not been very successful, and has, indeed, been comparatively unsuccessful. This treatment consists of incision and the evacuation of the effusion. . . . It is comparatively useless."

Mr. Tait has said that when once peritonitis is completely established it is a practically incurable disease, and almost uniformly fatal.⁵

With the exception of the cases which I am about to narrate there has not been, so far as I am aware, a case

¹ 'Principles of Surgery,' Philadelphia and London, 1890, p. 301.

² 'Berlin. klin. Wochenschrift,' No. 31, 1892.

³ 'Deutsche medicinische Wochenschrift,' January 22nd, 1891, p. 140.

⁴ "Peritonitis," 'The Lettsomian Lectures for 1894,' London, p. 13; also "Trans. of the Med. Soc. of Lond.," 1894, vol. xvii.

⁵ Quoted by Treves, loc. cit., p. 101.

of recovery after laparotomy for diffuse septic peritonitis in St. Bartholomew's Hospital or in the Great Northern Hospital.

Scattered throughout surgical literature, however, cases are to be found in which diffuse septic peritonitis got well after operation. Some are mentioned in Mr. Treves' lectures,¹ some in the 'Transactions' of the Clinical Society, and elsewhere; but they all differ from the cases which I am about to relate in not having been treated upon a definite and systematic plan.

So far as I can judge, diffuse septic peritonitis caused by perforations of the vermiform appendix have hitherto given the best results; then those in which the cause was unknown; next, those in which there was a perforation of the small intestine; and lastly, those in which the stomach or duodenum was perforated. Of course I refer to cases in which the peritonitis was fully established, and not to cases of recent perforation or laceration.

Many of the cases described under the headings of *diffuse septic peritonitis*, *general septic peritonitis*, and of *suppurative peritonitis* are probably examples of localised septic peritonitis. Moreover, as I have just said, none of them seems to have been treated upon a definite plan such as is advocated in this communication.

Like other surgeons, I have had a most disheartening experience of this class of cases. Clinically they are like acute intestinal obstruction due to mechanical causes. Therefore I have in many instances performed laparotomy, more because I was afraid of overlooking a mechanical obstruction than in the hope of curing the peritonitis.

Last year, however, I operated upon a case which was encouraging, and afforded food for reflection. A boy eight years old came into the Great Northern Hospital after having had, for at least a week, an acute septic peritonitis around the vermiform appendix. About the time of his admission there is no doubt that the peri-

¹ Loc. cit., p. 113, *et seq.*

tonitis became diffuse, and at the operation a diffuse septic peritonitis was found. A large quantity of purulent and feculent fluid was washed out of the pelvis, from the flanks, and from amongst the coils of intestines, which were very slightly adherent. The vermiform appendix was perforated in six places, and was removed. The abdomen was washed out and drained. Before this the boy was evidently dying; he had had absolute obstruction for five days, with frequent fæcal vomiting. His face was pale, with hollow cheeks and sunken eyes. His temperature was subnormal. Afterwards he revived with heat and stimulants, and improved so much that it seemed possible for him to recover. But two days after the operation the abdominal distension returned. He became sick again, and died towards the middle of the third day.

Before his death an endeavour was made by Mr. Kendall, the house-surgeon, to relieve the distension by thrusting a small trocar and cannula through the abdominal walls into the intestines. This was quite inefficacious.

In septic peritonitis, Mr. Malcolm¹ has said, "there are signs of a triple pathological state,—of peritonitis, of blood-poisoning, and of paralytic obstruction of the bowels." Now it seemed clear that of these the intestinal paralysis and distension were the fatal elements in this case. I have regretted ever since that a bolder course was not pursued, and that I did not again open the abdomen and empty the intestines.

The importance of this intestinal distension and paralysis was pointed out by Benjamin Travers, and has of recent years been better appreciated by surgeons. Senn² and Greig Smith³ have drawn especial attention to it, and in preparing this paper I am indebted to their writings.

I have, however, been unable to ascertain that either

¹ 'Med.-Chir. Trans.,' vol. lxxi, 1888, p. 58.

² 'Intestinal Surgery,' Chicago, 1889.

³ 'Abdominal Surgery,' 1888; also communication before Royal Medical and Chirurgical Society, March 8th, 1892.

of those surgeons has published a successful operation for diffuse septic peritonitis.

The distension and intestinal paralysis are not the only factors to be considered in these cases. There is in addition the septic poisoning, and owing to this and want of food, constant vomiting, pain, sleeplessness, and mental distress, the patients are in an exhausted and critical condition. Thus some of the causes of death from diffuse septic peritonitis cannot yet be overcome—the septicæmia, for instance; but the sapræmia may be cured by copious irrigation and drainage; the intestinal distension by the evacuation of gas and fæces; and the exhaustion and collapse by the methodical use of warmth and stimulants.

We now possess many means by which the exhaustion and collapse may be met. I myself have only gradually learnt the proper value and absolute necessity of the measures which I am about to advocate as a routine practice in these cases. They are as follows. Before operating the patient's condition is temporarily improved by the subcutaneous injection of strychnine (about $\frac{1}{20}$ grain), and by enemas of brandy and hot water. These may be repeated during the operation, with the subcutaneous administrations of ether in addition. Next the operation room is heated to 70° or 75° F., and draughts excluded. A hot-water bed for the patient to lie upon during the operation is absolutely essential, and may be supplemented with hot-water bottles in the axillæ and to the feet. It is wise to wrap the limbs in cotton wool. All towels, sponges, instruments, and lotions should be hot. I have found 110° to 112° F. a suitable temperature. The anæsthetic should be used sparingly, and only pushed to prevent violent contractions of the abdominal muscles. I am inclined to think the A. C. E. mixture causes least depression. Every manipulation is carried out as speedily as possible. Slow operating means failure. The abdomen is opened by a long incision in the linea alba below the umbilicus without looking for muscular inter-

spaces. If no altered intestinal coils are quickly found, the cæcal region is at once explored. Most of the causes of mechanical or of inflammatory obstruction are to be found there. If none are found and the cæcum is distended, it is clear that the obstruction is in the large intestine, or is inflammatory. To settle this point the sigmoid flexure is next examined. If it be distended, and if there be no obstruction in the rectum, a point previously ascertained, the case is clearly not one of mechanical obstruction. This search is made easier by a sufficient extrusion of small intestines. Towels which have been sterilised and wrung out in hot water are used to keep the extruded intestines moist and warm. This is a point of extreme importance. Pursuing the search, the small intestines are more fully examined, and then the pelvic viscera. In some cases the incision must be carried upwards, or a new one made, and the stomach and duodenum explored.

If the cause of the peritonitis be met with, it is dealt with as seems best at the time. If a perforation of the small intestine is found, as in one of my own cases, it is not closed at once, but is used to facilitate the next step in the operation, namely, the evacuation of the gaseous and fæcal contents of the intestines. The gas is let out of each coil by puncturing it with a trocar and cannula about 1·5 mm. in diameter. This is introduced as often as is necessary to empty each coil. The fæcal contents are evacuated through incisions half to three quarters of an inch long into one or more of the fullest loops. This is made longitudinally, as far as possible from the mesentery. In one of my cases this incision merely enlarged the perforation; in another it enlarged a puncture which seemed disposed to leak. A little squeezing helps the gas and fæces to escape. As the coils are emptied they are washed and put back, but the incised one is kept extruded until the last. When nothing more escapes from it the opening is closed with Lembert's suture, and it is dropped back into the abdomen.

The abdomen is washed out in a definite order; first the flanks and intestines, next the iliac fossæ, and then the pelvis. A large glass drainage-tube is introduced into Douglas's pouch, and the abdomen is closed in the usual way with silkworm-gut sutures. No time is occupied with sponging to remove fluid. What remains is sucked from the drainage-tube. After the operation a skilled person is told off to combat shock with subcutaneous injections of brandy, ether, and strychnine. Subsequently no attempt is made to introduce food by the mouth, but rectal feeding is practised as follows. The rectum is washed out with tepid water, and a rectal tube left in for twenty minutes. This usually allows flatus to escape. Then about four ounces of concentrated nutrient enema, consisting of peptonised milk, peptonised meat essence, with a little good brandy and a little opium, is administered. This enema is used every three hours during the first few days, and is gradually discontinued. Thirst is relieved by enemata of tepid water. Feeding by the mouth is begun with great caution. Small quantities of fluid peptonised food are given for some weeks.

I ought to apologise for mentioning such details as some of the foregoing; they are familiar to every surgeon. Nevertheless I believe them to be no less important than the most impressive details of the operation.

In the preparation of the skin, instruments, towels, and other materials the usual precautions are taken to obtain asepsis. The mere fact of the case being already a septic one is not a reason why more sepsis should be introduced.

I will now describe a case of diffuse septic peritonitis which was successfully treated after the manner which has just been briefly described.

The patient was a boy seven years old, and born of Polish Jew parents. He was admitted under the care of Dr. Hensley, for whom I was asked to operate. He

seems to have been ailing and getting thinner for three weeks before his critical illness began. On the evening of May 26th, 1894, he began to vomit, and his abdomen became distended. He had a very slight action of the bowels on May 26th, upon which day he was admitted, but the last natural action of the bowels had occurred, it is said, five days previously—on May 21st.

When I saw the boy upon the afternoon of May 26th he was suffering from acute intestinal obstruction, with the usual distension of the abdomen, vomiting, and inability to pass flatus or fæces. The abdomen was tender all over, and exceedingly tense, tympanitic, distended, and motionless intestinal coils could be plainly discerned. The general condition was precarious. The temperature was 100.8° F., the pulse 110 and very small, and the respirations twenty-two per minute. The face was pale with hollow cheeks and sunken eyes. There was no indication for localising the source of infection, but the vermiform appendix was suspected. Recovery was clearly out of the question, and the boy had evidently but a few hours to live.

A median incision six inches long having been made below the umbilicus, it was seen that a severe acute diffuse septic peritonitis was in progress, with purulent fluid in the flanks and pelvis, with some free gas and flakes of lymph about the intestines and mesentery. These were pulled off wherever they could be reached.

The peritonitis was of the kind in which there seems to be hardly any tendency to form adhesions. The odour of the fluid and lymph was fæcal. The mesenteric lymphatic glands were much inflamed and swollen. The purulent fluid having been rapidly washed out with hot water, I soon ascertained that the cæcum and vermiform appendix were intact, but that both the cæcum and the sigmoid flexure were distended. Thus the idea of a mechanical obstruction was put aside. Next the small intestines were extruded and examined, and in the ileum a small circular aperture was found, with intestinal con-

tents running from it. I therefore proceeded to systematically empty the intestines by puncturing every distended loop with a small trocar and cannula. As the loop with the original hole in it did not empty easily the aperture in it was enlarged with the scissors, and a quantity of fæcal contents evacuated. Afterwards this opening was closed with Lembert's sutures, the intestines returned, the abdomen thoroughly washed out with hot water, and drained with the usual glass tube. During the operation a quantity of lymph was removed from betwixt the folds of the mesentery, and from amongst the coils of intestines.

This operation lasted more than an hour, but was not followed by very excessive shock. Strychnine, ether, brandy, enemas and warmth brought about an improvement. As he came round, and when we were about to wash out his stomach, a quantity of orange peel, orange pips, grape skins, and such like things were vomited up. He was fed by nutrient enemata, and at night his temperature had risen to 101.9° F. This was its highest point. Next day it became normal, and did not afterwards fluctuate. For a time after the operation his condition was precarious. His breath had a peculiar sweet offensive odour, vomiting was troublesome, and his face was dusky. However, on May 29th he was decidedly better. The glass tube was withdrawn, and a rubber one put in its place, the vomiting ceased, and he began to be fed by the mouth. The discharge from the drainage-tube was purulent, but had no fæcal odour at any time. After this he slowly but surely mended. On June 4th he ceased taking opium, and on the 5th the nutrient enemata were discontinued, and upon the same day his bowels were opened twice. After this our only anxiety was about the wound, which had suppurated, broken down, and gaped widely. At its bottom the granulating coils of small intestine were clearly displayed.

However, cicatrisation proceeded steadily, and the wound was healed at the end of July. During the early part of August he seemed to have some difficulty in swallowing,

but this disappeared. He was discharged on August 14th because he seemed quite strong and well, and was very noisy and troublesome in the ward.

For many of the foregoing details I am indebted to Dr. Brooksbank's very clear and full notes of the case. Throughout his illness the child owed much to the care of Mr. Rudolph Smith, the house surgeon, and to the nursing he received in Matthew Ward. Before his departure his abdomen had become quite soft and natural, but was rather sensitive. Adhesions were probably absent, as was proved to be the case in a similar instance described further on in this communication (see p. 16).

As regards the cause of the perforation of the ileum in this case, I felt sure that it had been something which had been eaten. When the hole was enlarged a quantity of husks escaped, and Sister Matthew afterwards showed me the husk of an almond nut which she had found amongst the vomit.

I operated upon another case of diffuse septic peritonitis on September 8th, 1894, using similar measures.

The patient was a married woman aged forty years. She was the mother of three children, of whom the eldest was sixteen years of age, and the youngest two and a half. At the last confinement the womb was lacerated, and there was possibly some pelvic inflammation. The menstruation was normal, the last period having ceased four days before her illness began. With the exception of indigestion, and pain and flatulence after food, the general health was good. Beyond this nothing in the history pointed to the existence of a gastric ulcer or of any intestinal affection.

Her illness began at 10 a.m. on September 6th. Whilst doing her household work she was suddenly seized with an abdominal pain. This was said to have been worst in the right iliac region. She did not faint or become unconscious, but was quite prostrated, and had to take to her bed. The pain was quickly followed by severe vomiting, which ceased after the subcutaneous injection of morphia.

Her bowels also ceased to act, and neither fæces nor flatus were passed.

It is possible that her illness was aggravated on September 8th by a fire which necessitated her removal from home. She was admitted into St. Bartholomew's Hospital on September 8th. She was a stout, florid woman, whose face was dusky, with an anxious expression. The pulse beat eighty per minute, and the respirations were forty. The tongue was dry, and she complained of nausea and of pain in the abdomen. There was almost complete intestinal obstruction. After admission a little flatus was passed, but an enema only brought away a few scybala. The abdomen was distended and resonant everywhere, the liver dulness being absent. There was universal tenderness, but not more in one situation than in another. Pain could not be localised. Although the abdominal walls were fat, the distended and motionless coils of the small intestines could be seen. A rectal examination revealed nothing; the os uteri was patulous, but there seems to have been no endometritis.

Dr. Norman Moore, who saw her in consultation, concurred with me that this patient was dying of acute septic peritonitis. He also agreed that although its source was unknown, a perforating gastric ulcer might be excluded. It was determined to perform laparotomy with the view of treating the peritonitis, and, if possible, of removing its cause.

Reckoning from the sudden onset of pain to the time of operation, the peritonitis was of fifty-two hours' duration. The condition which was found was quite compatible with this calculation. The patient was placed upon the hot-water bed and her limbs enveloped in cotton wool. An incision in the middle line below the umbilicus gave exit to a quantity of gas and purulent fluid, and a quantity of the latter was rapidly washed out with hot water (temp. 110° F.) discharged from an irrigator. It had no particular odour. The parietal and visceral peritoneum were acutely inflamed and covered with lymph.

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This was either of the delicate transparent kind, or, in places, fibrinous and opaque. The inflammation was diffuse and unaccompanied with adhesions. All the intestines were tightly distended. The cæcum and vermiform appendix were inflamed but not perforated. The sigmoid flexure was distended. The small intestines were intact. They had to be extruded for examination, and were covered with sterilised towels wrung out in hot water. The right ovary and Fallopian tube were not seen, but they, together with the uterus, felt natural. There were more purulent fluid and flakes of lymph about the left Fallopian tube than elsewhere, and it looked very red, swollen, and cedematous. It seemed to me to be the probable starting-point of the peritonitis. The distended small intestines were now emptied of gas with a small trocar and cannula. About a dozen punctures sufficed. One continued to leak, so it was enlarged and used to empty out a quantity of bilious fæcal matter. This opened loop was kept extruded until the last, and the opening was finally closed with Lembert's sutures and the intestine was returned. Not the slightest difficulty was experienced in putting the intestines back. The abdomen was then methodically irrigated with about two gallons of water, temp. 110° F., drained with a glass tube in the pelvis, and closed and dressed in the usual way.

The patient was under the anæsthetic an hour and a quarter. Owing to the tightness and thickness of the abdominal walls the manipulations were very difficult. I gained great help by retracting the lips of the wound with a stout silk suture on either side. They were carried through the whole thickness of the abdominal wall. They are much better than retractors, and give complete command of the wound without getting into the way. I am indebted to Mr. Sheild for this device. Before closing the wound these sutures are of course removed. The operation was well borne, and the patient revived with warmth and brandy. She vomited twice during the night, at 11 p.m. and 1.45 a.m. After this the vomiting ceased and never

recurred. She was fed every three hours with concentrated, peptonised, nutrient enemata. On September 9th flatus was passed spontaneously, and there was no abdominal pain or distension. On September 11th a small quantity of chicken broth and champagne were given by the mouth, and afterwards these were gradually increased until a solid diet was reached; simultaneously the rectal feeding was gradually discontinued. The bowels acted spontaneously on September 16th, and afterwards gave no trouble. On September 11th, and for some days afterwards, the urine contained albumen. Subsequently it contained some mucus in addition, due to a slight cystitis. A catheter was passed once with proper antiseptic precautions. The wound, as usual in these cases, suppurated and gaped slightly, but healed rapidly after it had begun to granulate. The glass drainage-tube evacuated a quantity of purulent fluid, neutral in reaction, of a greenish colour, and devoid of odour. On September 14th it was changed for a rubber tube, which was gradually shortened, and finally discontinued on September 20th. The temperature was never high. Before the operation it was 100° F., and afterwards fell slightly, to rise again to 100.8° F. on the third day. It remained at this level until the tube was removed on September 20th, when it rose to 101° F., and remained thus until September 27th, when it fell abruptly from 102° F. to normal, and continued normal for a week. During her convalescence it fluctuated without apparent cause. She left the hospital on December 10th in excellent health.

During her severe illness this patient's chief trouble was sleeplessness, accompanied with slight delirium at night.

I am indebted to the clear and exhaustive notes of Mr. Giles for most of these particulars. Mr. Maidlow, the house surgeon, bestowed infinite pains upon the case, and much was owing to Sister President.

These two cases were treated upon exactly the same

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lines, and may be commented upon together. In the case of the boy the cause of the peritonitis was found and easily dealt with. In the case of the woman it remains rather doubtful. The presence of free gas in the peritoneal sac pointed more to a perforation than to infection from the tube. In cases recorded by others, and which recovered, the source of the peritonitis was not discovered.¹ One is rather reluctant to fall back upon a phrase, and call this a case of idiopathic peritonitis.

I do not propose to dwell any more upon all the methods which were employed, except to refer to the puncturing of the intestines. I believe that this is quite harmless when it is done with a fine trocar and cannula, and with the intestine in sight. The cannula is intended to evacuate gas, and therefore a very small one is required. A cannula suitable for the evacuation of the other intestinal contents would have to be very large, because, as in the case of the boy, they often contain bodies of considerable size. Such a cannula would be almost certain to make a hole which leaked. If the puncture made by the small trocar and cannula were to leak, it is easily closed with a suture; or, as the leak implies considerable tension, it may be converted into the opening for the evacuation of the faecal contents. This was done in my second case. There is clearly a great difference between the insertion of a trocar and cannula into coils of intestines which are in sight, and plunging them through the abdominal wall into viscera which cannot be seen. In the first the exact spot can be chosen, and a leak can be secured; in the second, large vessels may be wounded, or a fatal leakage remain undiscovered.

I first employed an incision for the emptying of intestines in diffuse septic peritonitis in July, 1888.² Since then I have seen it used in other cases, and have never known it cause faecal extravasation. It seems to be a safe and convenient procedure.

¹ Southam and Kelynack, 'Medical Chronicle,' Manchester, vol. xvi, 1892.

² 'Trans. of the Med. Soc. of Lond.,' vol. xv, p. 91.

Whether the incision ought always to be closed, or whether it ought sometimes to be converted into a faecal fistula, will require experience to determine. The immediate closure of the incision is the ideal procedure, as it obviates a second dangerous operation for the closure of a faecal fistula.¹

Hot water from the tap seems to be suitable for washing out the abdomen. It would be dangerous to use antiseptics strong enough to disinfect, and chemicals are known to be harmful to the peritoneal endothelium. It is probable, as Delbet² showed, that little is absorbed from the peritoneum for some time after profuse irrigation. I used some gallons of water at a temperature of 110° F.³ in the receptacle of the irrigator.

Although in these septic cases the wound seems always to break down and suppurate, yet it seems best to close it, except the part for the drainage-tube. The sutures do not yield for some days, so that for a time they obviate the danger of intestinal prolapse during coughing or vomiting.

The foregoing cases illustrate the value of immediate puncture and incision of intestines distended from peritonitis. In concluding this communication I propose to narrate a third case of a different type of diffuse peritonitis, which also recovered, and which incidentally illustrates the value of secondary intestinal drainage—that is to say, drainage established many hours after the laparotomy.

I have kept it apart from the others because it is of a different character, and because it was not operated upon in quite the same way. In it the peritonitis was

¹ *E.g.* see Mr. Croft's case, 'Clin. Soc. Trans.,' 1888, p. 254.

² 'Annales de Gynécologie,' 1889; also 'Brit. Med. Journ.,' October 5th, 1889, p. 778.

³ My friend Dr. Tunnicliffe has pointed out to me that lime salts are essential for the integrity of living protoplasmic cells. Dr. Ringer has shown these salts to be present in New River water. An irrigating fluid would be best prepared by making normal saline solution '6 per cent., and then adding enough bibasic phosphate of lime to make it slightly milky.

accompanied by more adhesion around its starting-point, which was probably the vermiform appendix, and with much more pus in the pelvis. But it was without definite limits, and had involved the serous coat of the small intestines and mesentery, and of all the lower part of the abdomen. The coils of the intestines adhered very slightly to each other, and were quite easily separated with the finger. The details of the case were briefly as follows.

The patient was a postman aged twenty-five years. His illness began suddenly upon June 3rd, 1894, without premonitory symptoms. He was seized with violent pains in the abdomen, his bowels ceased to act, and he had occasional vomiting. He was treated with opium and a liquid diet. I saw him upon June 11th in the Great Northern Hospital. His temperature was 100.2° F., where it remained until the 13th, when it fell to 98.6° F. Throughout the rest of his illness it never rose beyond 99.4° F. His pulse was 88, and never exceeded 96 per minute. He was exceedingly ill, with an anxious expression, and was suffering great pain. The abdomen was tense, and did not move with respiration. In the right iliac region it was more distended than elsewhere, and there was an induration about the cæcum, with slight cedema and redness of the skin. It was obvious that he was suffering from typhlitis, and, inasmuch as I have seen similar cases recede, leeches were applied, and afterwards warm fomentations. During the 12th, 13th, and 14th the iliac swelling disappeared, but his condition became decidedly worse. The abdomen was more distended. The bowels did not act after the enemata, and it was questionable whether any flatus escaped. The pain was most severe in the lower abdomen, and was only relieved by opium. Moreover a tense fluctuating swelling was felt in the recto-vesical pouch. As it was obvious that the patient would die if unrelieved, on June 15th I opened the abdomen in the right linea semilunaris with the idea of finding the vermiform appendix, and, if necessary,

of removing it, and afterwards exploring and emptying the fluid in the pelvis. The tissues through which I cut were inflamed, and the parietal peritoneum could not be recognised. A substance was found which was supposed to be it, but an incision led into the cæcum. At this situation all the intestines were adherent, and they bled and were lacerated by the gentlest touch. The opening in the cæcum was therefore repaired with Lembert's sutures, and the abdominal wound was closed. A fresh incision was made in the linea alba. The peritoneum was thick and hard to recognise. In its interior the intestines were found acutely inflamed and covered with flakes of lymph. The peritonitis could be traced much higher than the wound, and had no definite limits. No firm adhesions were met with, and the various coils easily parted before the finger. About two pints of purulent and stinking fluid had collected in the pelvis. The vermiform appendix could neither be seen nor felt, and as there was much oozing of blood from the inflamed serous membrane, and as the man was in a precarious state, the abdomen was thoroughly washed with some gallons of hot water, and a glass drainage-tube was inserted into Douglas's pouch. The intestines were distended, but I did not puncture them, because, after the evacuation of the purulent fluid from the pelvis, they seemed to have enough room. He soon rallied under the usual remedies, and flatus was passed, both by a long tube and then naturally. The discharge sucked from the drainage-tube was purulent but not feculent. On June 18th the glass tube was changed for one of india rubber. The same night he again had a violent abdominal pain with a fresh outburst of the peritonitis. His abdomen became distended again, but fortunately his wound in the cæcum gave way. A quantity of flatus and fæces escaped, and his symptoms were gradually relieved. After this his bowels acted, although a good deal escaped by the fæcal fistula. By the end of July the median wound had nearly closed. On August 1st I closed the fæcal fistula by dissecting

the cæcum from the edges of the wound, and inverting the aperture with a double row of silk sutures. I was astonished on this occasion to find that the adhesions, which before had been troublesome, had almost disappeared. Indeed, after the cæcum had been freed from the edges of the wound it was easily drawn out, and many of the neighbouring coils of intestine came into view. They were unadherent, and looked quite healthy,—very different from their condition when seen six weeks before. As there was some purulent infiltration of the abdominal walls the wound was not closed. The sinuses were opened, the whole dusted with iodoform, and packed with iodoform gauze. The fistula never leaked again, and the wound speedily healed by granulation, so that the patient was discharged on September 3rd.

It is clear that this man owed more to good fortune than to surgery. I think he would have died if it had not been for the accidental opening into the cæcum. The formation of such an opening for the relief of the distension and obstruction which accompanies peritonitis has, as I have already said, been especially advocated by Senn and Greig Smith. The foregoing case seems to illustrate the soundness of their views. My colleague, Mr. Bruce Clarke, has recently had a case in which an opening into the small intestine saved a patient who had peritonitis after ovariectomy. I doubt not that many others could be adduced.

I have only to add a word upon the treatment of the intestines in this case. Had it been one of localised septic peritonitis care would have been taken to leave them undisturbed. In diffuse septic peritonitis I think it is advantageous to separate the coils from each other. In making post-mortem examinations after death from that disease, I have found much lymph and purulent fluid amongst them and amidst the folds of the mesentery. In my haste I could not tell whether this was so in the present instance. In another case, which ended fatally by a sudden syncope a few hours after the operation, I

found a great many collections of purulent fluid hidden away by the intestines and mesentery. Others have noted the same thing.¹ Further, although the adhesions are slight, yet they are extensive, and might prevent the recommencement of the peristaltic movements. Throughout the foregoing paper I have not referred to the pathology of diffuse septic peritonitis. Doubtless this term includes peritonitis which is due to many kinds of infection. It is evident, however, that some of these are amenable to surgical treatment.

¹ *E.g.* see a remarkable case by Messrs. Hawkins-Ambler and Knaggs, "A Case of Acute Diffuse Suppurative Peritonitis successfully treated by Laparotomy and Drainage," &c., 'Clin. Soc. Trans.,' vol. xxiii, 1890, p. 180.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' Third Series, vol. vii, p. 3.)