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HUNTERIAN LECTURES ON THE EXPERIENCE OF ST. GEORGE'S HOSPITAL IN LAPAROTOMY; EXCLUSIVE OF GYNÆCOLOGICAL OPERATIONS, FROM 1888 TO 1894 INCLUSIVE.

Delivered at St. George's Hospital Medical School

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LECTURE I.—LAPAROTOMY FOR INJURY; EXPLORATORY FOR ABSCESS AND FOR PERITONITIS.

THE object of these three lectures is to exhibit the entire experience of a metropolitan hospital, during seven years, of abdominal section, performed on ordinary surgical indications, omitting the operations of gynecology¹ for reasons of convenience, and omitting such operations as enterostomy, gastrostomy, and inguinal colotomy, in which, though the peritoneal cavity is opened, the operation itself is of inferior relative importance, and is to be regarded rather as a step in the palliative treatment of a necessarily fatal disease.

The operations which are recorded are 110 in number, and of these 68 died and 42 recovered. It is not asserted that the list is entire. Some successful cases may have escaped record under the scheme of registration now in use, since these cases are sometimes transferred from physician to surgeon, and sometimes not. And some of the surgeons of the hospital have more or less distinct recollection of successful cases which I have been unable to find. But all deaths are registered in the *post mortem* books: and as I have carefully searched those books for the seven years in question, I have no doubt all the fatal cases have been enumerated.

I was anxious to produce an unselected and continuous series of hospital cases of this kind, which I believe has not hitherto been done, for these reasons. We are inundated in the medical papers with successful cases of laparotomy for various conditions, and from this state of things two opposite conclusions seem to be drawn. Some seem to think that you have nothing to do but lay open the abdomen, and all difficulties will vanish—the patient will get well, and “live happy ever after,” like the end of an old 3-vol. novel. Others of a less credulous or enthusiastic turn reflect that published cases have been published because they were successful, and if they had not succeeded would never have been heard of; that even when distinguished surgeons give their whole experience, that experience represents the practice of a specialist who is called in precisely because the case is a promising one, and who would neither desire nor be allowed to operate unless the case were promising. The unselected and complete experience of a hospital into which a man is sent, not because his case is promising, but too often because it is hopeless, would, as these critics think, tell a very different story. And no doubt they are to a great extent right. No continuous series of hospital cases can be expected to give such good results as the experience of private practice, for the very reason so often pointed out, that the private practitioner is obliged to reject the worst cases, while the hospital surgeon, if he does his duty, must take even the faintest chance of saving life; nay, sometimes, as in railway injuries, has to operate without any chance of

saving life, but merely in the hope of procuring for his patient an easier death. Such a series then cannot be expected to show any high proportion of cures. The indications for laparotomy vary, as you will see by the sequel, from cases in which the whole of a pretty long series will prove uniformly successful, to others in which all of a similar series are uniformly fatal, and the cases are often sent into hospital after all rational prospect of cure is over. But one thing we may say, that nearly every case so operated on would, in times so recent as my own election on the staff of this hospital, have proved fatal; so that we are entitled to rank every success as a gain, while the failures are indeed to be deplored; or, what is much better than deploring, are to be used in order to see how to prevent them in future. Still they are no loss. Failure is only what was inevitable in every condition of surgery known to us hitherto.

It will be seen as we go on that the event of the case was decided almost always by the nature of the disease and the state of the patient; and that the operation of laying open the peritoneal cavity freely enough for adequate surgical exploration and manipulation, formidable as it looks and doubtless is, may be undertaken with tolerable confidence, that is, will not at any rate prejudice the patient's chances, provided he is fairly strong—that in our long list of cases few if any have died earlier than they would have done had laparotomy not been performed; while, on the other hand, there are many cases in this list which did prove fatal, but which would in all probability have recovered had the operation been done earlier. And I will add that I have found many cases in our *post-mortem* books where no operation was performed, in which any surgeon would say that the patient would have had a far better chance if it had been. And that this has been the view of my colleagues I cannot doubt when I see how much more frequent laparotomy has become in the later than the earlier of these seven years, the number rising from 7 in the year 1888 to 26 in the year 1894, a figure which will, I believe, be largely exceeded this year.

The cases are distributed as follows:—

	Cases.	Re- covered.	Died.	
Injury	3	0	3	
Exploratory	5	3	2	
Abscess	11	10	1	
Peritonitis	6	1	5	
Tuberculous peritonitis	3	1	2	
Peritonitis from twisted ovarian pedicle	1	1	0	After ovariectomy.
Perforation of appendix, etc. ...	10	0	10	
Removal of appendix	3	2	1	
Hydatids	6	4	2	
Pancreatic cyst	1	1	0	
Hydronephrosis	1	1	0	
Uterine	2	1	1	Exploratory operations for tumours which turned out to be uterine. One re- covered after hysterec- tomy.
Other tumours	5	1	4	
Gastric ulcer and duodenal ulcer	14	4	10	
Cholecystotomy	3	3	0	
Gastrojejunostomy	4	3	1	
Intussusception	5	0	5	
Kink and volvulus	4	1	3	
Strangulation by bands	11	4	7	
Stricture of bowel	7	0	7	
Internal hernia	4	1	3	
Gangrene of cæcum	1	0	1	
Total	110	42	68	

¹ Three gynecological operations are recorded in the sequel, which were commenced as exploratory laparotomies.

I shall speak first of laparotomy on account of traumatic injury. One of the most striking of the many advances which surgery has made in my day is in the successful operative treatment of traumatic injuries of the abdomen, which when I was young were universally regarded as necessarily fatal, and which therefore received no efficient treatment, and uniformly ended in death. Rupture of the bladder into the peritoneal cavity and rupture of the intestine from contusion of the abdominal wall are good examples of such lesions.

If I am not mistaken, Mr. Croft had the distinction of having been the first surgeon to demonstrate (as Mr. Battle says²) that traumatic rupture of the intestine without external wound could be cured by surgery. He published in the *Clinical Transactions*, vol. xxiii, a most striking and instructive paper on this subject founded on two cases in his own practice, in the former of which (ann. 1887) he had established an artificial anus by stitching the ruptured portion of the bowel to the abdominal wall. This operation was in itself quite successful, but the patient succumbed after the subsequent operation for closing the artificial anus. Mr. Croft in his second operation (ann. 1889) resected the lacerated portion of the intestine with its mesentery and a portion of the injured omentum, and the boy perfectly recovered, though at the time of the operation (fifteen hours and a-half after the accident) peritonitis was unmistakably present, and there was a large quantity of faecal fluid in the peritoneum.

A very good example of the feasibility and success of such an attempt is recorded by a surgeon bearing the honoured name of Nélaton in vol. xviii (1892), p. 600, of the *Bulletin de la Soc. de Chir. de Paris*. The man had been kicked by a horse about sixteen hours before the performance of the operation, and peritonitis had already commenced, yet he recovered completely.

There is also a very interesting paper in the *Bull. de la Soc. de Chir.*, 1893, p. 247, in which a successful case under M. Michaux's care is related, and reference is made (as in Mr. Battle's paper) to seven successful cases. Two of them were operated on by the same surgeon (Jahoda, of Vienna), and in one of them the operation was performed as late as twenty-five hours after the accident, when peritonitis had been fully developed. Of course the sooner the diagnosis can be established and the operation performed the better will be the patient's prospect, but it is interesting to know that the lesion can be dealt with successfully at so late a period after its occurrence as twenty-five hours.

The total number of published cases appears to be twenty-nine, taking Mr. Croft's and Mr. Battle's lists together. That seven of these should have been saved from otherwise certain death is surely an encouragement to deal boldly with such cases in the future.

Our experience during these seven years of laparotomy for ruptured bowel is confined to two unsuccessful cases. The first patient was a boy, aged 8, under Mr. Haward's care; the symptoms were not very marked, and the operation was not performed till next day, twenty-two hours and a-half after the accident. The lesion in the intestine was not detected, though the bowel was carefully traced up from the ileo-caecal valve. It is a matter of interest to note that the boy did well for five days after operation, when it became necessary to remove the sutures of the abdominal wound, and substitute strapping. The wound burst open, and a coil of gut protruded. This was replaced, and the wound again closed, but he sank rapidly, and died in two days from acute peritonitis. On post-mortem examination a rent was found in the small intestine some 3 feet above the ileo-caecal valve, which it is permissible to conjecture had been closed by the protrusion of the mucous membrane till the disturbance caused by the breaking down of the wound. At any rate, at the operation nothing but a small quantity of blood was found in the peritoneal cavity; and this doubtless proceeded from the rupture of the spleen, the preparation of which is before you. This preparation is of interest as showing this lesion practically cured by the adhesion of the spleen to the serous surface of the diaphragm; and it leads us to the question whether in future some cases of more extensive laceration of the solid abdominal viscera may not be rescued from death by free exposure of the rent and packing the abdominal cavity with gauze.

² The Medical Society's *Transactions*, vol. xxvi, p. 274.

With reference to the latter point, you will find in the *Lancet* for March 2nd, 1895, a most interesting case of inflammation and suppurative of the gall bladder, leading to its perforation, in which Mr. Sheild operated with success. The gall bladder was freely laid open and the wound packed with carbolised gauze. In this instance the tissues of the gall bladder were so thickened and so rotten that it was impossible to unite the edges of the ulcer by means of sutures, while the patient's condition did not admit of the total removal of the organ.

The second case, again, illustrates the difficulty which often besets the diagnosis of rupture of the bowel. A man, aged 50, was thrown off his cab when drunk, and the wheel passed over his belly. He was complaining of much abdominal pain when admitted. The urine was drawn off. Next day he became suddenly much collapsed, and an operation was performed when *in extremis*. Incision above the pubes opened a cavity containing foul-smelling fluid, which was thought to be urinous, and therefore the bladder was opened by an incision in the perineum, but was found to be uninjured. After death the laceration was found to be in the small intestine, and was an inch in length.

The statistics of the published cases of laparotomy for intraperitoneal laceration of the bladder are given in a recent volume of the *Annals of Surgery*. They show a total of 29 cases, 12 of which recovered. In one of these, however, the particulars are so loosely given that it is uncertain whether the lesion was not extraperitoneal.

Our experience of laparotomy for uncomplicated intraperitoneal rupture of the bladder during the period covered by these lectures has been *nil*. In a case under Mr. Turner's care, where a poor boy, who had fallen in climbing a tree, had his bladder perforated from the rectum by a branch which ran through into the peritoneal cavity, it was judged right to perform laparotomy, suture the peritoneal rent in the bladder, and wash the foreign bodies (pieces of twig, etc.) and the vesical and intestinal contents out of the peritoneal cavity; but the case was a desperate one, and terminated in death on the next day but one.

Our experience, then, of laparotomy for injury during these seven years has been very slight, and is purely negative; but I thought you would pardon this short reference to it, for the subject is an important one, and though the cases are rare, a life may occasionally be saved by timely operation, which would be sacrificed by refusal, or even delay, to operate. I have met with one case, at any rate, in our *post-mortem* book, during the period under review, of ruptured intestine, in which no operation was performed, yet which, to judge by the description, was very similar to some of those which have been treated with success.

Turning now to cases in which the peritoneal cavity has been opened in the attempt to remedy the effects of disease, the first class which I will select is that of operations undertaken as exploratory measures.

We have lately heard much about the unjustifiable nature of exploratory laparotomy; and, no doubt, all operations, and especially so grave a one as the free exposure of the peritoneal cavity, must be justified by some rational and adequate motive, in order to exempt the surgeon from merited blame; but as far as our experience goes such operations are (always under this condition) perfectly justifiable, for the only operations which turned out to be merely exploratory, that is, in which nothing was found, were followed by complete recovery. One, under Mr. Bennett's care, was an exploration of the kidney, in which the woman suffered from purulent urine, and was thought to have a movable kidney; another was in a case of Mr. Dent's of supposed impacted gall stone, and a third case was under Mr. Pick's care a few months ago, in which laparotomy was undertaken to ascertain the existence of perforation of the stomach. No perforation was found. The patient completely recovered.

The two following operations might possibly be classed as purely exploratory, since nothing was found at the operation; but they differ from the above cases of recovery in the essential particular that a real and necessarily fatal cause of death existed.

The first was a woman, aged 41, a patient of Mr. Pick, who had had symptoms of obstruction for three days. On cutting into the peritoneal cavity, nothing was found to account for

the symptoms; but on *post-mortem* examination the cause was discovered to be gangrene of the small intestine caused by a thrombosis of the mesenteric vein from vegetations on the cardiac valves.

Another case was that of a woman suffering from ascites, and in whom a tumour was thought to be felt. The operation was performed as a last resource by Mr. Dent to discover the nature of the supposed tumour. The case had been taken to be either malignant disease of the liver or enlargement of the gall bladder from impacted gall stones. Exploration led to the conclusion that it was malignant, but on *post-mortem* examination it turned out to be a cirrhotic liver, the diagnosis not being finally established till after microscopic examination. The tumour perceptible externally was the displaced spleen. She never rallied.

I think, then, we may say that exploratory operations seem rarely to prejudice the patient's prospect of recovery, and I am sure that a careful study of our *post-mortem* book would lead to the discovery of many cases where such an operation would very probably have led to effectual surgical interference.

The next class of which I shall speak is that in which from whatever cause a limited abscess-cavity is found in the peritoneum. The most familiar instance is that of hepatic abscess; but our list contains cases also of abscess around the caput coli, abscess due to perforation of intestine in which the suppuration has been limited by adhesions, and abscess lying behind the peritoneum and external to it, but only to be reached by opening that cavity and draining the abscess through it. These cases may be treated with almost certain success—if we can trust to our experience hitherto—by laparotomy with drainage, the walls of the abscess-cavity being attached to the wound so as to prevent the escape of its contents into the general peritoneal cavity. The following table shows the nature of these cases:

Laparotomy for Limited Abscess.

Name.	Age.	Date.	Nature of Abscess.	Surgeon.	Result.	Remarks.
1. — M.	—	June, 1889	Pericæcal	Mr. Bennett	R.	It is doubtful whether the peritoneum was opened or no.
2. (M.)	13	Dec., 1890	In peritoneum containing a faecal concretion	Mr. Pick	R.	This must have proceeded from perforation of some bowel, which had healed.
3. H. W.	29	July, 1891	Hepatic	—	R.	—
4. (M.)	24	Sept., 1890	—	—	R.	—
5. — P. (M)	25	June, 1891	In right iliac fossa	Mr. Haward	R.	Appendix intact, but adherent to colon.
6. J. B.	20	Nov., 1894	In peritoneum	Mr. Pick	R.	—
7. —	—	1888	Abscess from perforation	Mr. Bennett	R.	Details notes lost.
8. S. J.	32	— 1892	Pericæcal	—	R.	—
9. J. S.	—	— 1892	In peritoneum	Mr. Pick	R.	Thought to be due to perforation.
10. H. M.	20	Oct., 1894	Behind peritoneum	Mr. Bennett	R.	The displaced bladder was accidentally opened in reaching the abscess, and sutured.
11. J. M.	52	Aug., 1894	„	Mr. Sheild	D.	The man was dying when admitted; the sigmoid flexure had been perforated by the abscess.

The rest of the operations in this section were undertaken for peritonitis; but these must be further subdivided into those in which the peritonitis was traumatic or “idiopathic”—that is, uncomplicated by any intestinal lesion—and those in which it depended on perforation of some viscus—commonly the appendix cæci. They are tabulated thus:

read and discussed at the Medico Chirurgical Society October 23rd, 1894. This paper is founded on three successful cases, of which one was due to perforation: the others would, I think, be classified as “idiopathic.” These cases are said to have been the only instances of recovery after laparotomy for diffuse septic peritonitis in St. Bartholomew's Hospital or

Laparotomy for Peritonitis.

Name.	Age.	Date.	Nature of Case.	Surgeon.	Result.	Remarks.
1. A. E.	30	Aug., 1892	? From injury	Mr. Dent	D.	Early peritonitis; recent hæmorrhage behind the peritoneum round the head of the pancreas.
2. F. N.	30	Oct., 1893	Adhesions from peritonitis	Mr. Haward	R.	Adhesions binding down the ileo-cæcal portion of bowel; much pain in walking; this was quite cured by freeing the bowel.
3. E. V.	—	Sept., 1893	Acute peritonitis	—	D.	Old adhesions tying down the intestines.
4. T. J.	41	Dec., 1893	„	Mr. Pick	D.	—
5. G. G.	2½	Feb., 1892	„	Mr. Dent	D.	Old adhesions; bowel almost gangrenous.
6. E. L.	8	Sept., 1892	„	—	D.	Abscess below diaphragm, which had burst into the cavity.
7. A. F.	21	Sept., 1891	Tuberculous peritonitis	Mr. Dent	D.	Tuberculous peritonitis with band constricting the small intestine.
8. T. G.	30	July, 1894	„	—	D.	There was also pneumonia.
9. — F.	Adult	— 1894	„	Mr. Pick	R.	—
10. — F.	Adult	— 1891	Diffuse peritonitis from twisted ovarian pedicle	„	R.	Exploratory laparotomy; she recovered after ovariectomy.

³ *Med. Chir. Trans.*, vol. 78, p. 8.

⁴ *Med. Chir. Trans.*, vol. lxxviii, 1.

the Great Northern Hospital up to that date; nor do I see that any of the speakers in the debate which followed referred to any others.

Fatal Cases of Diffuse Peritonitis from Perforation.

Name	Age.	Date.	Duration of Symptoms.	Part Perforated, Found or Not.	Surgeon.	Remarks.
F. H.	16	Sept., 1890	12 days	Appendix cæci not found	Mr. Pick	This operation had been too long postponed, but was done at once after admission.
A. P.	18	June, 1894	5 "	"	?	Operation immediately after admission.
A. (M)	44	Jan., 1888	3 "	"	Mr. Turner	The peritonitis had resulted from bursting of a pericæcal abscess into the peritoneum.
M. M.	17	May, 1890	2 "	"	Mr. Dent	Two bands of adherent omentum were divided at the operation. Possibly this prevented a careful examination of the bowels.
W. L.	21	April, 1890	6 "	"	Mr. Pick	This operation was done at once, but too late.
G. F.	—	May, 1894	3 "	"	Mr. Haward	Operation at once. He was too collapsed to bear much examination. Several collections of pus existed in the peritoneal cavity.
M. C.	24	May, 1890	?	"	Mr. Bennett	In this case also the operation was immediate, but she was too far gone. She had had symptoms more or less severe for a fortnight, but was at work three days before admission.
H. J.	39	Aug., 1888	5 days before admission	"	Mr. Pick?	Operation only performed two days after admission, when <i>in extremis</i> .
P. C.	25	June, 1891	?	"	Mr. Bennett	The symptoms were those of peritonitis. Exploratory operation two days after admission failed to detect the cause.
A. S.	5	May, 1894	?	Small intestine, probably from tuberculous peritonitis	Mr. Dent	He survived the operation nine weeks, and died from general wasting.

Yet I suppose many cases of alleged success have been published, for a paper on Abdominal Section for Peritonitis by a Russian surgeon is abstracted in the *Annals of Surgery*, 1891 (vol. xiii), in which reference is made to 24 cases of laparotomy for "idiopathic peritonitis," in 19 of which recovery is claimed. The references, however, are not given, so that the cases could not be followed without great labour, and I must say that the result would not repay the trouble. No such ratio of success can reasonably be anticipated in any continuous series of cases. But Mr. Lockwood's and other published cases may encourage us in attempting the operative cure of the disease; and the suggestions which he gives for the details of operation seem eminently calculated to assist the operator in obtaining success.

I must allow that in looking over this series of cases the difficulties which stand in the way of success in the operative treatment of diffuse suppurative peritonitis come strongly before me. When the inflammation is purely traumatic I cannot doubt that the free irrigation and drainage of the peritoneal cavity will succeed in a large proportion of cases, but they are rare. No instance has been put on record here in these seven years. When the cases are classed as "idiopathic," this can only mean that the cause has not been discovered, and we cannot therefore feel much confidence either

that incision and drainage will remove that cause, or will enable the patient to survive its continued action. Tuberculous peritonitis seems to me to hold out but a poor prospect of permanent recovery, though a large proportion of cases are noted in the paper just referred to, in which the patient has survived the operation, and there is one such case in the foregoing list; but the list of cases just produced shows in how large a proportion the peritonitis is caused by perforation, especially of the appendix; and it shows also how liable the surgeon is to overlook such perforations, and this must be much more frequently the case if the operation is delayed till the patient is *in extremis*, and unable to bear a prolonged and exhausting search amid the contents of the abdominal cavity. If the surgeon will bear in mind the frequency of ulceration of the appendix, which is covered and concealed by adherent intestine and masses of lymph, and if there is the opportunity for that deliberate separation of the intestines from each other which Mr. Lockwood recommends, the source of the peritonitis could be discovered and removed, and the patient's chance of survival indefinitely increased.

This course was pursued in three cases, with results which are encouraging as far as so small a number permit of any deduction, two of them having recovered after the removal of the perforated appendix.

THE CROONIAN LECTURES. CONTRIBUTION TO THE HISTORY OF THE RESPIRATION OF MAN.

Delivered before the Royal College of Physicians of London.

By W. MARCET, M.D., F.R.S.

LECTURE III.

MR. PRESIDENT AND GENTLEMEN,—In my last lecture the first three forms of breathing were considered. Let us now proceed to the fourth, which applies to respiration under the influence of volition; but before doing so allow me to recall the remarkable experiment of Professor Mosso, of Turin. This gentleman constructed a metal instrument, a sort of glove, through which his fingers were inserted, with the exception of the middle one; with this finger he worked a weight up and down until the digital muscles concerned in the labour were completely exhausted; at this stage the muscular contraction was carried on by means of electrical excitation, and he found that if, after a short period, the excitation was discontinued, the finger was able still to maintain its work, showing that the muscles had not ceased contracting from actual fatigue, but from exhaustion of the will which had been exercised to move them.

There is an interesting borderland between psychology and physiology which is narrowing daily. The discovery of the electrical excitability of the brain by Fritsch and Hitzig, and of the motor centres by Ferrier and Yeo, followed by Horsley and Schäfer, has opened altogether a new field of research, and brought the mental and physical functions nearer to each other. We do not know much of the physical effects exerted on the body by the perception of our senses. Moleschott, as far back as 1855, showed that from one-tenth to one-fourth more carbonic acid was exhaled by frogs under the influence of light than when in the dark, and also that this increase varied directly as the intensity of the light, which acted through the eyes and skin.

It occurred to me that if light exercises a distinct physical action on the living body, perhaps sound would produce a similar effect; but even a fairly loud sound, such as that produced by the beating of a gong close by, gave no positive result; the carbonic acid emitted under the influence of the sound being sometimes a little more and sometimes a little less than normal, and the same could be said of the oxygen absorbed. There was, however, a slight excess of air breathed (expired) while the noise was continued, which varied from 0.036 litres to 0.733 litres per minute in eleven experiments; and this slight excess was balanced by a corresponding diminution of the volume of air exhaled during the first five or six minutes after the sound had ceased.