NOTES ON TWO CASES OF LAPAROTOMY FOR PENETRATING GUNSHOT WOUND OF THE ABDOMEN; RECOVERY IN ONE.

WITH REMARKS ON RECENT STATISTICS.

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THE following cases are a contribution to the study of a class of injuries which, though they have received far greater attention abroad, and especially in America, than in this country, must doubtless have a keen interest for all surgeons.

CASE I.—A. T., aged 23, a French jeweller, was admitted into University College Hospital under my care on November 20th, 1887, at 3.20 A.M., having shot himself in the abdomen about half an hour previously. He was suffering from moderate shock, and though quite conscious when spoken to, seemed dazed and frequently groaned. His pulse was 56, and markedly dicrotous (from subsequent observation this was probably its normal condition); it was of good volume. The skin was normal, and the temperature in the rectum 98.2° F. He had not vomited. He lay on his right side, with his knees drawn up; his breathing was slow and shallow, with an occasional catch. There was a small bullet wound, with blackened edges, over the border of the costal cartilages on the right side, one inch from the middle line, at the level of the tip of the ensiform cartilage. The pistol was a small "pin-fire" weapon carrying a conical ball 11 millimètres long, 7 millimètres in diameter, and weighing 60 grains. There was little or no external bleeding from the wound, and no evidence of fluid in the abdomen except a suspicion of dullness in the right flank, but there was much tenderness on pressure over the abdomen.

I first saw the patient at about 5 A.M., two hours or so after the injury, when he was beginning to recover from shock. Feeling confident from the situation of the bullet wound that the ball must have entered the abdomen and have struck the liver, and fearing that the slight dullness in the right flank was commencing effusion of blood, I had little hesitation in deciding on laparotomy in order to check hæmorrhage, suture any lesions if present, and cleanse the abdominal cavity. Having, therefore, made every arrangement for complete antisepsis, the operation was done at about 6.30 A.M.

I first made an incision two inches and a half long over the tip of the ensiform cartilage, and on drawing its edges apart could see the opening in the peritoneum through which the ball had entered the cavity. Nearly under this, and at the attachment of the falciform ligament to the liver, was a patch of ecchymosis under the serous covering of the organ, which suggested the point at which the latter had been struck by the bullet. There was no corresponding breach of surface of the liver, either here or elsewhere, though I carefully examined most of the anterior surfaces of the left lobe by pressing it down and throwing the light well between it and the ribs, and also by passing my hand over it. The surface of the organ was, however, stained with blood, and a dark clot was seen extending directly downwards in the middle line. This was about the size of the little finger when drawn out, and led me to think that it came from the track the ball had taken. I therefore prolonged the incision to the umbilicus, and found some more and larger solid clots lying underneath the abdominal walls and upon the colon and omentum.

The first point was now to see that the stomach was not injured, and a careful examination of its surfaces as it bulged up into the wound, as well as the fact that it was tense with gas, clearly indicated that it was not perforated. It was therefore pressed back into the abdomen, and the transverse colon lying just below it was hooked up and drawn out of the wound to the extent of about eighteen inches for careful inspection. This also was found

intact, but the omentum along its lower border was noticed to be much blood-stained and covered with clots ranging from one the size of my thumb downwards, apparently derived from lesions of some of its own vessels. These clots were therefore carefully disentangled from the omentum, and the latter was wiped clean, and while this was being done the bullet was found in its folds, and a moment later a small round wad. From the position of the bullet it appeared quite clear that it had struck the liver at the insertion of the falciform ligament, and had glanced off it and passed between the abdominal wall and the stomach and transverse colon as nearly as possible in the middle line, to become entangled in the folds of the omentum, some of whose vessels were torn. It seemed highly improbable, therefore, that any other viscera were injured. Nevertheless, all the coils of small intestine exposed by the incision were carefully examined; then sponges wrung out of sublimate solution were thrust into both flanks and the recto-vesical pouch, but came out unstained. The viscera exposed were then thoroughly cleansed by sponging, and were adjusted with the omentum over them, after which the abdominal wound was closed in the usual manner. The bullet track in the abdominal wall was also scoured well, rubbed with iodoform, and a very fine short drainage-tube was passed into it as far as the peritoneum, but not through the latter. Firm bandaging over a salicylic wool dressing completed the operation. The latter was well borne, and when the anæsthetic was recovered from there was no vomiting and only moderate pain, easily relieved by a little morphine. The patient was fed for some days with nutrient suppositories. The temperature rose the same night to 103.6°, the pulse to 100, and the patient became rather restless, but twenty-four hours after operation both were normal, and remained so practically to the end of the case. The dressings were changed on the sixth, tenth, and sixteenth days, union having taken place by first intention, except in the bullet track, which, however, closed rapidly, the patient leaving hospital on the twenty-first day quite well. The bowels had acted normally several times.

CASE II.—M. F. G., aged 37, an American, was admitted on the following night, November 21st, at 8.30 P.M., having been shot in the abdomen about half an hour previously with a Colt's revolver carrying a conical bullet 15 millimètres long, 9 millimètres in diameter, and weighing 143 grains. I saw him a few minutes after 9 o'clock, and found him quite comfortable, with no trace of shock and not suffering in any way. The shot had been fired at close quarters, and the ball had struck the abdominal wall $3\frac{1}{4}$ inches internal to the right anterior superior iliac spine and half an inch below it, and had emerged 3 inches behind the same iliac spine and also half an inch below it. From neither opening was there any bleeding at this time, but the clothes were considerably stained with blood. From the position of the wounds it appeared probable that the ball had passed through the soft parts external to the peritoneum and without entering the abdomen. This was explained to the patient, and also the necessity of giving an anæsthetic so as to make a thorough exploration. His assent was at once obtained, on the understanding that he was to be allowed to come to as quickly as possible in order to see his friends, who had been sent for. On enlarging the anterior wound a slit was seen in the tendon of the external oblique muscle, and through this a probe slipped into the abdominal cavity, while a considerable quantity of blood welled up from the latter.

It was plain then that a full exploration of the abdomen should be made, but it was necessary to let the patient know his condition and see his friends before going further. He was therefore allowed to recover from the anæsthetic, when he at once gave his consent to any operative treatment which might be necessary, his friends too acquiescing readily. It was not, however, until 1.5 A.M. that the operation was begun, owing to some delay on the part of the police authorities in taking the patient's depositions. All arrangements for complete antisepsis having in the meantime been made, I commenced the exploration at that hour by a four-inch incision in the direction of the fibres of the external oblique, and having the bullet wound in its centre. When the abdomen was thus opened blood mixed with clots, but without a trace of faeces or odour, escaped to the extent of three or four ounces. Knowing from a rather large experience of gunshot wounds the extraordinarily erratic course of conical bullets in some cases, my first care was to make out the track of the ball in this instance. The incision having passed through the aperture of entrance in the peritoneum, the aperture of exit had to be found if possible, and on sponging out the blood it was seen not

Cases of Abdominal Section Performed on Account of Gunshot Wound. (Continued from Sir William Mac Cormac's List, BRITISH MEDICAL JOURNAL, May 11th, 1887, page 1088.)

No.	Operator and Reference.	Age and Sex.	Time after Injury.	Special Symptoms.	Nature of Intra-peritoneal Injury.	Treatment.	Result.	Remarks.
33	Charles T. Parkes, (Chicago.) <i>Annals of Surgery</i> , Nov., 1887	Adult male	4 hours	Revolver shot. Moderate colic; pulse very fast, face pale; considerable bleeding from internal wounds. Two bullet wounds 4 inches to left of median line in a line one above the other, and 1½ inch apart; one had passed out of the body below last rib at outer side of erector spinae. Blush over right half of abdomen. Breathing entirely thoracic; the abdominal walls hard and motionless	Five perforations of small intestine; perforation of left kidney; no special bleeding from it. Vomited much food during operation	Four-inch median incision much blood removed from peritoneal cavity. Kidney not removed; antiseptic dressings. Rallied well from operation but died of bleeding from kidney	Died in about 24 hours after operation	The wounds had been easily cured and both they and the abdominal cavity were in a satisfactory condition post mortem.
34	Charles T. Parkes, (Chicago.) <i>Ibid</i>	Male, 45	16 hours	Blush over right half of abdomen. Breathing entirely thoracic; the abdominal walls hard and motionless	Bullet wound 2 inches inside right iliac spine. Much fecal matter in wound. Bullet had just entered and left the abdominal cavity and buried itself in the thigh	Incision in median line, and large quantities of stinking ichor, fecal matter and food evacuated. Washing with weak boracic lotion. Intestine much inflamed. One large wound and sutured without difficulty. The whole intestinal tract examined, no further lesions found	Died 18 hours after operation	Apparently death was due to shock.
35	McGraw, quoted by C. T. Parkes. <i>Loc. cit.</i>	—	—	—	—	—	Recovered	—
36	—	—	—	—	—	—	—	—
37	Murphy, quoted by C. T. Parkes. <i>Loc. cit.</i>	—	—	—	—	—	—	—
38	C. T. Parkes, <i>Loc. cit.</i> J. I. Shelly, M.D., (Potomac.) <i>Annals of Surgery</i> , July 1887, p. 49	Male, 21	A few minutes	Six wounds, that is of both hands, right hip, and abdomen. Very pale; great pain in right iliac region	No wound of intestine. Bullet imbedded near the spine. Venous blood in peritoneum. Bullet had entered midway and a little below a line from umbilicus to right iliac spine, and had passed upwards and inwards for about 3 inches	Chloroform. Median laparotomy, no complete antiseptic could be provided. Intestines drawn out held in towels (not aseptic). Absorption of peritoneum dusted with iodoform. Abdomen wiped out with new sponges hastily cleansed in carbolic acid and rain-water	Recovered	Patient distinctly tuberculous with tubercles in the peritoneum and a cavity in right apex. No bad symptoms during convalescence, which was rapid.
39	A. E. Barker	Male, 23	3½ hours	Shock, slow diastolic pulse; great tenderness of abdomen	Bruise of liver and slight tearing of the omentum. Clots of blood, bullet and was removed from the latter	Median laparotomy under spray, etc. Thorough exploration of abdomen. Bullet and was found entangled with clots in omentum below colon: toilet of peritoneum	Recovered, no bad symptoms	The slow diastolic pulse probably a normal condition: it lasted all the time patient was in hospital.
40	A. E. Barker	Male, 37	5 hours	No shock: no pain: very little bleeding: nature of wound only discovered on enlarging bullet track	Double perforation of ileum 2 feet above caecum. Abdomen on right side contained much blood and clots: no faeces or gas	Wound much enlarged; perforation of parietal peritoneum sutured. Perforated portion of gut excised completely, and ends of bowel brought together by continuous suture of fine silk, reinforced by row of interrupted suture. Abdomen sponged out	Died	Peritonitis & pneumonia found post mortem but to a moderate extent. Suture of the bowel was perfectly competent, and sound union had taken place.
41	Dr. Sévastopoulo, (Constantinople.) <i>Bull. et Mem. de la Soc. de Chir.</i> , T. xiii, 1881, p. 273. Operation 1880	Male, 30	1 hour	Revolver wound (5 or 5.5 mm.) in middle of line joining right iliac (inferior?) spine and umbilicus. Fecal fluid in wound with blood, pressure caused escape of intestinal gas. Paleness. Patient cold, anxious	Oval wound of small intestine with a long loose flap of its wall. Wound too long to be sutured	No anaesthetic. No special preparation. Surgeon not supplied with usual instruments. Wound enlarged vertically 15 centimetres with scissors, cutting the whole depth of abdominal wall including peritoneum. One litre of blood escaped with clots from abdomen, the intestines followed soiled with faeces. Resection of a wounded portion of bowel's suture, one thread, retaining the coil near the wound	Recovered, no bad symptoms	Abdominal cavity washed out with carbolic solution, warm. Iodoform dressing of wound.

42	A. S. Priddy, M.D., (Keyville, Va.) <i>Journ. Amer. Med. Assoc.</i> , Nov. 19, 1887, p. 649	Male, 60	44 days	Severe shock, restless, anxious. Six-inch rent in the descending colon large enough to pass the hand, which was pushed into the rectum. Much fluid, but only a trace of feces in the abdomen. Intense tympanites	Expectant treatment to morning of Sept. 19th, when all the symptoms of severe peritonitis were present and patient was very weak. Then laparotomy median, careful antiseptic, complete examination of intestines, 6-inch rent in descending colon sutured with continuous catgut. Iodoform freely used over intestines. Abdomen washed freely with 1 to 1,500 hyd. bichlor. Abdomen drained with small tube. Operation lasted 55 minutes	Laparotomy: suture of intestine, cleansing of abdominal cavity Laparotomy: suture of stomach	Recoverd	Suffered much shock and nearly died from injudicious feeding, but ultimately recovered.
43	D. W. Dean, Records of St. Louis, City Hospital, unpublished	Male, 16	Not given	Condition very bad at time of operation	Injury of small intestine	Laparotomy: suture of intestine, cleansing of abdominal cavity	"	Stomach wound had entirely closed; extravasation of blood in meso-colon about 4 in. in breadth; slight peritonitis.
44	H. H. Muller, (not fully reported.) <i>Journ. Amer. Med. Assoc.</i> , Nov. 1887, (Table p. 579.)	Male, 17	3 days	Condition at time of operation good	Injury of liver and stomach	Laparotomy: suture of stomach	"	Operation unsatisfactory on account of inability to cleanse peritoneal cavity.
45	N. B. Carson, <i>St. Louis Courier of Medicine</i> , March 1887	Male, 25	6 hours	"	Wound of small intestine and mesentery	Laparotomy: suture of wounded viscera and resection of 2½ inches of intestine	"	Attempt was made to enter abdomen in median line, but prevented by old adhesions. Origin gunshot wound opened up. Patient recently seen in full work.
46	J. Prince, (not reported.) <i>Journ. of Amer. Assoc.</i> , November 1887, (Table p. 579.) Operation performed June 25, 1886	Male, 30	1 hour	"	Injury of ascending colon	Laparotomy: suture of wound in bowel	Recovered	Patient a negro lad. Operation done under difficulties.
47	J. Kollock, (Clerk.) <i>S. C. Medical News</i> , April 30, 1887, p. 480. Operation December 19, 1886	Male, 15	7 hours	Condition of patient at time of operation fair. Restless, anxious, much thirst, pulse weak; emphysema of external wound. Rectal temperature subnormal. Blood passed with a motion before operation. Faces escaped from wound	Perforation of ascending colon and of small intestine. Bullet entered left groin, emerged 1½ inch to right of umbilicus. Appendix epiploica was found bleeding and tied	Laparotomy: median 3 inches; suture of wounded intestines (after paring of edges) by Lembert's stitches. Feces removed from abd. cavity, which was then irrigated with hot carbolic water	Recovered, no bad symptoms	
48	M. Freyer, <i>Deutsche Med. Wochenschr.</i> , July 15, 1886	Male, 19	6 hours	Patient collapsed at time of operation	Injury of small intestine	Abdominal wound enlarged and intestine resected outside of cavity	Recovered	
49	J. W. Parham, <i>New Orleans Medical and Surgical Journal</i> , 1886-7, New Series, xiv, 305	Male, 34	2 hours	Patient suffering from shock	Injury of small intestine, ascending colon, and bladder	Laparotomy: suture of wounded viscera	Died	
50	Ditto, ditto.	Male, 22	3 hours	"	Injury of small intestine and external iliac artery	Exploratory laparotomy	"	Ball extracted from liver.
51	M. Pickett, <i>Med. Press.</i> , West A. I., <i>Huffdu.</i> , 1886, 5, 6, 1, p. 247	Male, 13	Not given	Patient's condition good	Wound of abdominal wall	Laparotomy	"	No bad symptoms.
52	N. F. Smart, <i>BRITISH MEDICAL JOURNAL</i> , Vol. 1, 1885, p. 379	Male, (?)	"	Patient suffered from shock	Wound of liver	Laparotomy	"	
53	J. W. Heddens, (St. Joseph, Mo.) <i>Annals of Surgery</i> , Dec. 1886, p. 528. From <i>Trans. Med. Assoc. State of Missouri</i> , Operation early in year 1886	Male, 34	"	Wound in epigastric region from pistol. Complained immediately of great pain in right side, shoulder, and back, with dyspnea	"	Laparotomy from wound downwards for ½ ins. Piece of cloth removed from abdomen, together with four ounces of blood. Antiseptic dressing	"	
54	I. H. Packard, <i>Medical News</i> , March 26, 1887, p. 339	Male, 33	Shortly after, about 1 hour probably	Marked collapse. Temperature 97.5, pulse 120, respiration normal. Food and some blood vomited. Bullet (calibre .38) entered 2 inches to left of umbilicus and 4 inch below it. No escape of faecal matter discovered, but blood was found in peritoneum	Eleven wounds of small intestine, one at ileo-caecal junction; all were ragged and varied in size. (Quantum torn and bleeding at one point. A large vein wounded at upper and right side of pelvis, (tied), found to be the external iliac, near Poupart's ligament	Antiseptic laparotomy in median line after wound had been enlarged. Peritoneal cavity irrigated with 1 to 15,000 hyd. bichlor. Intestines systematically examined, 11 holes sutured by Lembert's method; catgut testing of bowel resected with V-shaped portions of mesenteries. Lembert's sutures. Operation very prolonged, (probably over 2 hours.) Drain-tube in peritoneum	Death 14 hours after operation	Pulse fell alarmingly at one time during operation, but rose at once on irrigating the abdominal cavity with hot water. Sank steadily after operation. Slight evidence of peritonitis post mortem. No other wounds found.

Cases of Abdominal Section, etc. (continued).

No.	Operator and Reference.	Age and Sex.	Time after Injury.	Special Symptoms.	Nature of Intra-peritoneal Injuries.	Treatment.	Result.	Remarks.
55	Dr. Lange, <i>Med. News</i> , Nov. 26, 1887, p. 680. Operation Oct. 13	Male, 14	24 hours	No shock. Pulse 112 to 120. No pain but marked tenderness on pressure to the left. Some tympanites and abdominal wall was tense	No. 22 pistol ball entered 1 1/2 inch below navel, and 1 inch to left. Seven perforations of small intestine. Three pairs one single. Four ounces of brown fluid found in the peritoneum, no faeces	Laparotomy at once in a line with the bullet wound. Wounds closed with gut in 6 instances, one was already closed firmly	Recovered without a bad symptom	Bullet not found.
56	R. T. Manly, (<i>N. York.</i>) <i>Medical News</i> , Sept. 24, 1887	Male, (?)	2 hours	Abdomen greatly distended, evidently by fluid	Double perforation of descending colon. Wound of inferior mesenteric artery	Laparotomy in middle line: exit 3/4 gall. of blood. Bleeding was from branch of inferior mesenteric artery which was ligatured. Perforations closed by Lembert's sutures	Recovered	Bullet not found. Good union did not take place in abdominal incision.
57	C. E. Case, (<i>Tecoma.</i>) <i>Medical News</i> , Sept. 24, 1887, p. 379	Male, young	—	—	Pistol ball .32 calibre entered 2 inches and to right of umbilicus, emerged 3 inches to the right of the spine	Laparotomy antiseptic. Considerable quantity of blood in peritoneum.	"	Convalescing at time of report, which is very short.
58	J. M. Fox, (<i>Philadel.</i>) <i>Medical News</i> , Nov. 12, 1887, p. 568	Male, 18	3 1/2 hours	General condition fair. Temperature 98.5, pulse 110, slight fulness of abdomen, pain dull in umbilical region	Bullet wound 3 inch below and 1 1/2 inch to left of umbilicus. Wound of omentum of transverse colon of jejunum, mesentery of liver. Bullet lodged in back. No faecal escape. Intussusception of ileum noticed and reduced at operation	Median laparotomy from 2 1/2 in. above to 4 in. below the umbilicus. Considerable quantity of blood in abdomen. Lembert's suture. Warm hy. chl. solution used for cleansing. Abdomen washed out with warm water. Rubber drainage-tube. Operation lasted 1 hour 10 minutes	Recovered, no bad symptoms	Drain-tube removed on July 5th.

more than half an inch from the first, and just below the cecum. At first it was thought that the latter viscous had been wounded, but this was not so. The bullet then had only just entered and left the abdominal cavity in the fold between the anterior wall and iliac fossa, a strip of peritoneum only half an inch broad separating the two wounds. It was a question then whether the intestine was wounded, but this was soon set at rest when the adjacent coils were drawn out, two wounds being found in one coil which exactly corresponded to those in the peritoneum, against which it had rested when the bullet was fired. These wounds were round, with slightly bruised edges, from which the mucous membrane did not protrude. They bled freely, but no faeces escaped from them, the bowel appearing to be quite collapsed on either side. Fearing that to simply suture these two wounds would seriously narrow the lumen of the bowel, I at once excised a wedge-shaped portion of the gut, including the injured part. The bowel was first thoroughly emptied by pressure, seized on either side in the mesenteric attachment, and two cuts were made with a scissors, reaching to the mesenteric half an inch broad at the injured aspect, was removed, the mesentery being only slightly notched. The parts having been now thoroughly cleansed, the serous surfaces of the mesenteric notch were brought together by a continuous suture on both sides, and the cut edges of the bowel having by this means been apposed on their proximate aspect, they were united by a continuous suture of fine silk, taking up only the serous and muscular coats just at the edge, the needle coming out on the cut margin at each stitch. This suture was begun at the mesenteric aspect of the bowel, and went completely round the latter, care being taken that while it brought the edges into contact, it should not narrow the lumen of the bowel.

A second row of interrupted silk sutures was now introduced to reinforce the first. These took up the serous and muscular coats just beyond the first row, and, when secured, the latter was completely hidden. There was no difficulty in controlling the contents of the bowel with the fingers, or in suturing the bowel without contamination of the stitches. All the coils of small intestine within reach were now drawn out of the abdominal wound, and were searched for further injury with a negative result. They were then washed with sublimate solution, 1 to 1,000, and

before they were returned the abdominal cavity was thoroughly sponged out, special attention being given to the flanks and the recto-vesical pouch. When every thing appeared quite clean the intestines were returned, and the wound was closed in the usual way with silk, a drainage-tube being left in the track of the ball, and reaching well into the abdomen. A salicylic wool dressing completed the operation, which had lasted one hour twenty-nine minutes. The patient bore it very well, and did not suffer from shock. The next day he was fairly comfortable, only complaining of pain in the wound; but he was very thirsty, and ate a great deal of ice. Pulse 115, temperature 99° to 101°. He vomited occasionally, but only a little odourless, white fluid. He was kept well under the influence of morphia. There was no distention of the abdomen. His urine required to be drawn off every six hours; it was high coloured, and very acid. On the second day after operation he seemed very well, but could not retain anything taken by the mouth; he had been having peptonised suppositories every six hours. Pulse 120, temperature 101° to 102°. On the third day he seemed much better, but still vomited occasionally, though only the ice water and a little mucus. Pulse 120, temperature 101.2° to 101.8°. He was able to pass water himself, and also passed flatus. The wound was dressed for the first time under the spray, and the drainage-tube was shortened. On the fourth day he was still better, though the pulse remained at 120, and the temperature varied from 101.8° to 101°. But towards evening the fluid, which he still occasionally brought up in small quantity, began to have a feculent odour, and to become yellow. The abdomen, too, was more tense than before, and the patient did not look so well. I therefore began to fear that there might be some obstruction of the bowel near the seat of operation, or possibly some collection of matter, though there was no dullness of the abdomen anywhere. In consultation with my colleagues it was determined to release the stitches in the wound, and explore it with the finger. This was done at midnight, but no collection was found, and the sutured part of the bowel was felt to be in a satisfactory condition. The next morning (fifth day) he seemed weaker, though not so sick; but his strength was improved by injection of stimulants in the afternoon. His temperature had risen somewhat to 101.6° to 102.6°, and the pulse was 130. During the night he became weaker, though less sick, and at 4.45 he died quietly (sixth day).

The *post-mortem* examination was made by Mr. Bilton Pollard, whose notes contain the following facts. The small intestines were very much distended, especially in the umbilical region; there was no gas, lymph, or pus anywhere in the abdominal cavity, but the coils of the bowel in the distended area were slightly greasy. The large intestine was not at all distended, and seemed out of the area of inflammation, which had affected the small intestine solely. The latter in the neighbourhood of the wound was more adherent than elsewhere. The portion of bowel sutured, which was in the ileum about three feet from the cæcum, was in a perfectly satisfactory condition. Union had taken place thoroughly between the cut ends, and the bowel was not obstructed in any way. Tested with considerable pressure it was perfectly air and water tight. There were about two drachms of blood-stained fluid in the recto-vesical pouch, about half a drachm in the right flank, and three drachms in the left. There were a few spots of extravasated blood in the omentum, which occupied its normal position, but was adherent to the edge of the wound by recent lymph. There was much hypostatic pneumonia in both lungs, especially on the right side; the other organs were healthy.

It will be seen from these notes that the cause of death was a very moderate amount of peritonitis limited to the small intestine, and in addition no doubt the hypostatic pneumonia told unfavourably. Indeed, there was so little to be found in the abdomen indicating peritonitis, except the distended coils of bowel, that there was some hesitation in accepting this as the cause of death. But the absence of any other lesion except the pneumonia, left no alternative. A septic condition, in the ordinary use of the term, did not exist; the spleen was quite normal and other evidences also failed; in short, one turned away from this necropsy with an intensified feeling of disappointment, because the patient had so very nearly recovered.

These two cases appear to me to possess each its own special interest. In the first there can be but little doubt that a fatal peritonitis would have occurred had not the bullet, its wad and the clots which surrounded it, been removed from the folds of the omentum by abdominal section. Again, laparotomy enabled us to exclude from consideration all other injuries of viscera, without subjecting the patient to any special risk in exploration. The case is also of interest in being the first successful laparotomy for gunshot wound of the abdomen recorded in this country. I trust it may encourage other surgeons to very prompt action in similar cases, so that the conclusions arrived at in America as to the propriety of immediate laparotomy in all cases where penetration of the abdomen is proved, may be justified by our experience too.

The second case, although a source of the keenest disappointment to me, has in no wise shaken my belief in the rule that every case of the kind should be treated immediately by abdominal section; indeed, it strengthens that belief in every way. What little peritonitis there was no doubt started from some spot in the peritoneum not thoroughly cleansed from matters escaped from the wounded bowel. Whether a more perfect antiseptics could have been carried out by a median incision and irrigation may be a question of opinion, but I am strongly inclined to think that it could, though at the time I decided that the extra time and strain upon the patient's powers involved in a double incision and its concomitants would be too dear a price to pay. That the median incision should be the rule in the vast majority of such wounds of the abdomen I am convinced, and this view will be shared by everyone who carefully studies the literature of the subject. This literature is now becoming a large one. Sir William Mac Cormac's classical monograph sufficiently attests this by the numerous cases there quoted. But even in the short interval of only a few months which has elapsed since he published his collection of thirty-two operations for gunshot wound of the abdomen, almost an equal number of cases have been put on record, chiefly in America, and numerous discussions have taken place on this subject. These cases I have been at the pains to collect and tabulate. A study of the results of these operations is most encouraging. They show a greatly lessened mortality, year by year, and also that much more desperate cases may be saved by surgical interference than has hitherto been supposed. I give them as fully as is possible in such a table, and allow them to speak for themselves with only one comment. It will be seen that whereas out of the 32 laparotomies for gunshot injury of the abdomen included in Sir W. Mac Cormac's list, only 7 recovered, there are here collected 26 fresh cases of the same kind, with 16 recoveries and 10

deaths. Combining the two tables, we have 58 cases with 23 recoveries and 35 deaths. The numbers start in this table where Sir W. Mac Cormac's end, that is at 32.

THE GOULSTONIAN LECTURES ON INSANITY IN RELATION TO CARDIAC AND AORTIC DISEASE AND PHTHISIS.

Delivered before the Royal College of Physicians of London.

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LECTURE II.—AORTIC VALVE LESIONS.

OF cases of aortic valve lesion, the chief and predominating condition, I make four sub-groups: (1) aortic stenosis; (2) aortic regurgitation; (3) aortic semilunar valve disease, with no very marked local signs, and aorta not very much affected, if at all; (4) disease of aortic valve and arch.

First Sub-group: Stenosis of the Aortic Ostium.—Of eight cases, varying in age at death from 24 to 47 years, the average was almost 40, only one being young. At death the insanity had lasted from nine months to sixteen years in different cases. The relation, in time of incidence, of heart disease to insanity was difficult to appraise in several cases; distinctly prior in some, it was distinctly subsequent in others. Naturally, these cases were not all pure examples of aortic stenosis; in two there was also aortic incompetency, as well as aneurysm of thoracic or of abdominal aorta, and in three others—at least at one period or at several periods—slighter mitral incompetency was added.*

Of these patients, three were monomaniacs, in one of whom the heart disease distinctly preceded the mental; in the others the order of incidence was doubtful. In the first-mentioned of these (with aortic aneurysm a complication) at first the delusions were of persecution, for example, "was plotted against; conspired against by women, illegally detained and ill-treated;" and thereafter with hallucinations of hearing. Finally, with advancing disease of heart and aorta came delusions of direct bodily injury and persecution, producing horrible pain compared to "electric batteries playing on him."

Of the others, one—a deteriorated wreck of former mingled hypochondriacal and expansive monomania, become demented—often screamed shrilly, was rambling, incoherent, paroxysmally excited and noisy, and on some of these occasions suddenly destructive; finally he uttered merely a jargon, a medley of words. The other, a subject of mingled expansive and persecutory monomania (with imbecility), and hallucinations of all the special senses except of touch; together with the advancing heart disease, pulmonary congestion, and recurring attacks of dysenteric diarrhoea, became deluded as to poison in the food, and as to influences of a hostile kind brought to bear upon his bodily state and health.

* *Heart.*—Average, weight 13.51 ozs. av. Aortic valves variously diseased, thickened, atheromatous, rigid, deformed, stenotic. Mitral valve similarly diseased in some, but less in degree, and the aperture in some widened. The pulmonary and tricuspid valve much less often and much less severely affected than the preceding. Muscle of heart often friable, flabby, or pale. Left ventricle markedly hypertrophied in most, and in some distinctly dilated also; the other cardiac chambers only in a few distinctly dilated, or hypertrophied, or both. Coronary arteries atheromatous in some. The aorta in several aneurysmally pouched; more or less atheromatous, nodular, rugose, calcareous; irregular elevations, yellow patches, puckers, and wavy markings studding the inner surface.

Brain.—In some of general paralysis; in others slightly wasted.

Spleen.—Average weight 8.9 ozs. av. In many, firm, coarse, fibrotic; capsule often irregularly thickened, opaque and adherent, or pigmented; occasionally cicatrised.

Kidneys.—Average weight of each 4.93 ozs. av.; often more or less granular; some partially destroyed by old local lesions. Of the larger kidneys, some were pale-yellow, firm; a few were pale, homogeneous, fatty.

Liver.—Average weight 54 ozs. In some slight cirrhosis; frequently "hepatic venous congestion;" patchy opacity or thickening, cicatricial, or adhesions of capsule.

Lungs.—Usually old pleuritic adhesions; frequently hypostatic oedema, congestion, or even pneumonia; occasionally carnification, brown induration, or cirrhosis of lungs, cured phthisis, caseous bronchial glands.

¹ In the reprint of the article published in the JOURNAL (May 11th, 1887), Sir W. Mac Cormac added two cases, making a total of 32.