

struated last week, the first time for eleven weeks, without pain, flow copious.

The diagnosis made at the time was that the swelling behind and to the left of the uterus was either a dilated Fallopian tube, which was suggested by the position of the tumour and the severity and persistence of the pain, or a hæmatocele from a ruptured extra-uterine gestation. The latter supposition was based on the history of amenorrhæa, followed by a sudden illness, attended with pain, faintness, and pallor. The course of the case seems to me to accord with this diagnosis rather than with the former. It is far from certain, but many cases have been published as "cures" of extra-uterine gestation by electricity in which the diagnosis rested on no better grounds. Had electricity been used in this case, it might perhaps have been erroneously credited with the cure.

The patient came again to the hospital, and was readmitted on February 9th, 1888 (the notes on this occasion were taken by Mr. C. J. Kirton, clinical clerk). She said she had been perfectly well since leaving the hospital until the last four months. She had menstruated regularly and painlessly, the last time being in October, 1887, after which she saw nothing until December 25th, when she menstruated, the flow being rather more copious, but otherwise as usual. Nothing like a membrane was observed in the discharge. In this interval she had noticed nothing that made her think she was pregnant. After December she saw nothing, and she then thought she was pregnant. About December 20th she began to have pain after passing urine. Throughout January, 1888, she had pain in the back and lower abdomen, chiefly on the right side, so bad as to oblige her to keep her bed; this pain she described as continuous, not paroxysmal, and not relieved by lying down. Her appetite became bad, and at times she felt faint.

On the morning after admission she was examined by the resident accoucheur. Her general condition at that time was not such as to suggest any imminent danger; she walked to and from the examination couch. The abdomen was tender on pressure, and there was a rounded swelling rising out of the pelvis as far as to a little below the umbilicus. On vaginal examination the cervix was found pushed forwards, and behind it was a large rounded swelling feeling very much like a retroverted gravid uterus. The sound entered $3\frac{1}{2}$ inches, in the normal direction. A distinct uterine *souffle* was heard over the abdominal swelling. The temperature was normal.

A little before one o'clock on February 10th the patient was suddenly seized with violent pain in the abdomen, so severe as to make her feel faint; she became distinctly pallid, broke out into a cold sweat, and her pulse became small, rapid, and weak. Dr. Herman saw her shortly before three o'clock. The symptoms clearly pointed to internal hæmorrhage, and the history and previous physical signs made it probable that this might be due to a ruptured extra-uterine gestation. Therefore at 3.20 P.M. (that is, as soon as the necessary preparations could be made) Dr. Herman opened the abdomen, first by a small exploratory incision about an inch in length, which gave exit to a quantity of fluid blood. The diagnosis being thus confirmed, the incision was extended to $2\frac{1}{2}$ inches. Much fluid and clotted blood was then expressed by pressure on the abdominal walls. Then a fetus of about four months' intra-uterine age, which was lying free (except for its umbilical cord attachment) among the bowels was removed. The placenta was found attached, at least mainly, to the right Fallopian tube. This was pulled up and removed, together with the ovary, the stump being tied with the Staffordshire knot. No attempt was made to search for or remove such part of the placenta as might not be attached to the tube. The peritoneum was then washed out with clean warm water. A large drainage-tube was put in, reaching to the bottom of Douglas's pouch, and the wound closed in the usual way. The pulse when the operation was begun was 150. After its completion (4.10 P.M.) 152.

In the evening (8.30 P.M.) the pulse had sunk to 138. The drainage tube was removed on the following day, but it appeared from the subsequent course of the case that this may have been rather too soon, for on the fifth day the patient complained of some abdominal pain, and the temperature rose to 100.5° . On the sixth day there was a discharge of dark bloody fluid from the wound, and the temperature on this and the following day reached 101. It then gradually sank, and after the fourteenth day did not exceed 99. On the eighth day a small drainage-tube was inserted. The discharge continued sanguineous for about five days, and then

became slight and purulent. The drainage-tube was gradually shortened.

March 17th. Patient got up.

March 30th. Discharged feeling quite well.

ON THE TREATMENT OF INJURIES OF THE ABDOMINAL VISCERA.

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THE freedom with which surgeons have been for some time dealing with disease of the abdominal and pelvic viscera with such remarkable success has had a considerable effect in stimulating surgeons to inquire whether it was not possible for them to take bolder steps in the treatment of perforating wounds of the abdomen, a class of injury hitherto most fatal in character, whether as the result of stabs or of gunshot wounds. Moreover, the dread of interfering with the peritoneum has, in a measure, passed away, since it has been found that if antiseptic precautions are duly taken, the peritoneum is as tolerant of treatment as any of the other serous membranes in the body.

With a view of inquiring more particularly into the nature of gunshot wounds of the abdomen, and the best methods of treating them, Dr. C. T. Parkes, Professor of Anatomy in the Rush Medical College, Chicago, performed a series of experiments upon dogs by inflicting upon them intentionally gunshot wounds. He operated in this way upon 39 dogs in all; the bullet was of large size—38 or 44 calibre—and the firearm possessed great penetrating and lacerating power. Several most important lessons have been taught by these experiments.

Dr. Parkes says: "There was not manifested in any case any recognisable evidence of shock aside from that following great loss of blood. The transit of the bullet made no noticeable impression upon the pulse or respiration. In every instance where signs of severe prostration became manifest through change in respiration or weakening of pulse, there was found profuse hæmorrhage to account for such condition."

Intense and prolonged shock has always been recognised as one of the most marked symptoms of a perforating wound of the abdomen. By these experiments Dr. Parkes finds himself unable to disassociate this symptom from the condition caused by severe internal hæmorrhage. He tabulates the following conclusions:—

1. Hæmorrhage following shot wounds of the abdomen and intestines is very often so severe that it cannot be safely controlled without abdominal section.
2. Extravasation of the contents of the bowel after shot injuries thereof are as certain as the existence of the wound.
3. No reliable inference as to the course of the bullet can be made from the position of the wounds of entrance and exit.
4. The wounds of entrance and exit should not be disturbed in any manner, except to control bleeding or remove foreign bodies when present.
5. Several perforations of the intestines close together require a single resection including all the openings. Wounds destroying the mesenteric surface of the bowel always require resection.
6. The best means of uniting the wounded intestine after resection is by the use of fine silk thread, after Lembert's method.
7. Wounds of the stomach, small perforations, and abrasions of the intestine can be safely trusted to the continued catgut suture.
8. Every bleeding point must be ligatured or cauterised.
9. Primary abdominal section in the midline gives the best command over the damage done, and furnishes the most feasible opening through which the proper surgical treatment of such damage can be instituted.

Supposing we have before us a wound of the abdominal parietes, the first thing that we shall wish to know is, Does it penetrate? and, if so, are any of the viscera wounded? What symptoms can we rely upon as diagnostic of a wound of the viscera? If the wound is due to a bullet, and supposing it to have passed out, the experiments teach us that we can really form very little idea of its track by comparing the position of the wounds of entrance and exit.

Dr. Parkes remarks: "Nothing can be more uncertain and erratic than the track of a missile through the body."

Sir William Mac Cormac, in speaking of wounds of the bowel,

says: "When the injured intestine is prolapsed through the wound, or the contents of the tube escape externally, the diagnosis is clear; but these occurrences are the exception. Tympanites and discharge of blood *per anum* are valuable symptoms when present; but neither may appear directly after the injury. Emphysema, when it occurs in the wound neighbourhood, is said to be pathognomonic. Shock and pain vary so much as to afford no useful guidance."

On the other hand, the experiments show us that it is nearly certain that if there is penetration there will be injury to the contents. Now, nearly all cases of injury to the intestines prove fatal, and the mortality is due either to hæmorrhage or to septic peritonitis; hence the necessity of a diagnosis without delay. If we are prepared to act upon the probability that, if there is perforation there will also be a wound or wounds of the viscera, can there be any valid reason against our determining the fact of penetration by probing the wound? Heretofore, when the treatment of this class of injuries was merely of an expectant nature, the rule undoubtedly was not to interfere with the wounds, except to arrest hæmorrhage or to remove a foreign body; but when the knowledge is critical, can any harm be done by inserting a perfectly clean aseptic probe? This, I presume, we should do, taking at the same time every precaution that was possible not to disturb the parts unnecessarily, feeling sure that, if we waited for symptoms to develop—or, in other words, for symptoms of septic peritonitis to commence—it would then be too late for an operation. The urgency of an operation is also pressed upon us by the fact, illustrated in these experiments, that when a blood-vessel in the abdominal cavity is wounded, it continues to bleed, the blood poured out does not coagulate, nor does the vessel contract or retract, so that death from hæmorrhage can easily follow the injury of a very small vessel.

This excessive and persistent hæmorrhage from small vessels in the closed cavity of the abdomen is illustrated in another class of cases—namely, in the intraperitoneal hæmatocele following rupture in cases of tubal pregnancy.

Mr. Lawson Tait writes in the JOURNAL, March 13th, 1886: "In my experience of intraperitoneal hæmatocele, amounting to something like fifty-three or fifty-four cases, when I have verified the condition, either by *post-mortem* examination or *ante-mortem* abdominal section, the only cause of the condition was the rupture of a tubal pregnancy. In these cases there was a more or less extensive hæmorrhage, occasioned by the rupture of small vessels within the abdominal cavity."

When, however, the abdomen is opened and air admitted, the blood coagulates, the vessels contract, and the natural hæmostatic efforts are called into play. Hence, in the future in these cases, if we hope to save life, we must operate at an early period. There is also another reason forcing us on to the operation. Supposing the intestine to be wounded, there is the certainty of extravasation of its contents, which is equally sure to be followed by septic peritonitis.

If, then, we decide to operate, we choose the middle line, and leave the bullet or knife wounds alone. We should choose the middle line, because here the edges of the wound can be kept in good apposition, because the linea alba is less vascular than other parts, because the section of it unites very readily, because there is a less thickness of parts to cut through than if we attempted to divide the muscular walls themselves, and, lastly, because an incision through the linea alba gives us more room and greater freedom of manipulation than any other form of incision. Having opened up the abdomen we next proceed to examine the intestines, and if we found only a linear clean-cut wound, we should sew it up by either a continuous or Lembert's suture with fine silk; ascertain that there was no bleeding vessel left untied, then proceed to wash out the cavity with a warm boric or other antiseptic solution, and close the wound. But if the wounds of small intestine were due to a bullet, and were several in point of number, if near together, it will be evident that a resection of the injured gut will have to be carried out.

This has been done in several instances, and quite recently Mr. Barker reported a case in the JOURNAL, March 17th, 1888, when he says: "The wounded gut having been excised, the margins of the bowels were united 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 the serous and muscular coats just at the edge, the needle coming out at the cut margins at each stitch. 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. This was done on November 21st. The man died on the fifth day, when it was found that 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 watertight."

Dr. Parkes thought that the Lembert suture alone was quite as efficacious as the more complicated forms of suture, which all require much time and patience to introduce. He describes that the chief difficulty is always to be found at the mesenteric border, where it is difficult to get the serous surfaces in contact owing to the separation of the layers of the peritoneum just before enclosing the bowel, forming thus a triangular space where the bowel may be said to be not covered by peritoneum.

The cavity of the abdomen must be thoroughly well cleansed, and in these cases there is this difference between operations undertaken for disease and those necessitated by injury. When abdominal section is performed for disease, a simple washing out will suffice; but if there has been a wound of the intestines there will also have been fæcal extravasation, and hence there will be greater trouble in the washing out, and some sponging will be possibly unavoidable. Sponges once used to remove fæcal extravasation should not be used again in the same operation. In bringing the edges of the abdominal parietes together, it is recommended that the sutures should be passed through the entire thickness of the walls, including both peritoneum and skin, and everything between them; drainage-tubes do not seem to be invariably necessary. When in Paris, attending the Congress of Surgery, held in March last, I witnessed M. Pozzi, when closing the abdomen after an ovariectomy, first sewed the edges of the peritoneum together by a continuous catgut suture; then in like manner the muscular aponeurotic walls; then he included in his interrupted sutures the thickness of the walls external to the muscular coat. He described this in a paper at the Congress, as giving excellent results as regards a firm and unyielding scar. For the different forms of suture that have been recommended for wounded intestine, I would refer to Sir W. Mac Cormac's monograph on *Abdominal Section*, 1887.

In conclusion, I submit that if a person is now brought to hospital with a penetrating wound of the abdomen, laparotomy should at once be undertaken on the grounds that if no viscera are found wounded, the patient's condition has not been greatly altered, and if the intestine is wounded, we are quite sure that septic peritonitis would speedily bring about a fatal termination; but of course all such operations should be undertaken as grave and serious measures, and every antiseptic precaution should be taken to ensure a satisfactory result.

On the other hand, with reference to soldiers in the field, the question is somewhat different, and I cannot help feeling greatly the force of some remarks of M. Delorme, a French army surgeon at the Val-de-Grace, who, in a paper read at the late Congress, says, when contrasting the case of the wounded soldier with that of the wounded citizen: "Suffering from intense shock, often moribund, he has at first to wait for many long hours before he can be removed, and then not until he has been subjected to some rough and improvised carriage can he receive the aid of the ambulance surgeon, who will have none of the nice appliances of the operating theatre, but merely such as are barely sufficient for the common operations of field surgery. There would not be the quietude necessary for carrying out a delicate and prolonged operation. The very excitement of the combat has affected all alike; time presses. Absorbed as he is by hundreds of cases urgently demanding his aid, the utility of which in their cases is undoubted, can he be blamed who, in circumstances so wretched and unfavourable as these, does not stop to hunt after a wounded intestine?"

However, at first the same objection was brought against antiseptic surgery in the field, yet Russian and German surgeons overcame the difficulty in their last war, and English army surgeons since then have done the same with considerable success. Let us, therefore, hope that, under its salutary influence, army surgeons will yet find a way to succour their comrades, even though they be afflicted with a penetrating wound of the abdomen.

Note.—Works referred to: *Gunshot Wounds of the Small Intestines*. By C. T. Parkes, M.D., Professor of Anatomy, Chicago.—*On Abdominal Section*. By Sir Wm. Mac Cormac, F.R.C.S.—*Troisième Congrès Français de Chirurgie*: "Extirpation Complète d'un Kyste Hydatique du Foie." By M. Pozzi, de Paris. "Les Plaies de l'Intestin par les Projectiles de Guerre." By M. Delorme, du Val-de-Grace.—B. M. J., March 13th, 1886, and March 17th, 1888.