

Instruments left in the Peritoneal Cavity : the effects and results of this accident as shown by an analysis of 44 hitherto unpublished cases.*

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My interest in cases in which solid objects have been unintentionally left in the peritoneal cavity was aroused by having on two occasions to operate for their removal. I may state that in both these cases the solid body in question had been inserted into the abdomen by someone else, and that to the best of my knowledge I have never yet left an instrument in a patient's peritoneal cavity.

The first case was one in which there was spontaneous partial extrusion of a pair of hæmostatic forceps from the peritoneal cavity through the cervix.

A patient, aged fifty, was sent to me because her doctor had found a sharp foreign body in the canal of the cervix. She had consulted him on account of constant pelvic pain. The history given was that nineteen years before she had had a laparotomy performed, in the country, for a "tumour," but no details could be obtained. Seven years after this she was delivered of a full-time child without difficulty, and had had moderate health, except for one attack of severe abdomino-pelvic pain which subsided under treatment with hot fomentations. The abdominal pain, with nausea and vomiting, gradually increased in severity for several years, and for these symptoms she had a second operation performed in a county hospital 18 months before I saw her. She was informed that the adhesions in the lower abdomen were so dense that nothing could be done, therefore the operation was abandoned and the abdomen closed. The pain and sickness increased, and six months later an offensive vaginal discharge commenced. The bowels were relaxed with frequent desire to defæcate, and there was frequency of micturition.

When I first saw her she looked toxæmic and wasted. The abdomen was distended, and there was a tender mass below and to

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the left of the umbilicus. There was a hernia of the old laparotomy scar. On vaginal examination, a pointed metallic instrument could be felt protruding through the cervix for 4 cm. from the external os. The body of the uterus was bulky, and situated in the middle line. There was a mass on the left of, and above, the uterus, continuous with the tender area on the abdominal wall. The X-ray photograph showed a Spencer Wells hæmostatic forceps, with the handles towards the left iliac fossa and the points in the cavity of the pelvis.

It was obvious that any attempt to remove it by traction on the pointed end would lacerate the uterus severely, and possibly also damage the ureters. I, therefore, opened the abdomen, and was faced by a mass of very dense adhesions. With difficulty I reached the forceps; the points had eroded the uterus 5 mm. above the level of the bladder reflection; the handles had eroded the wall of the pelvic colon, and were lying inside the lumen of the gut. The forceps was removed and a panhysterectomy performed, in order to get rid of the infected uterus, and to give free drainage to the fæculent abscess that the forceps was lying in. Owing to the large deficiency in the gut wall, and the infiltration of the surrounding tissues, it was difficult to suture the hole in the colon, but finally the edges were united, and it was not thought necessary to do a colotomy. Large drainage tubes were inserted through the vagina, and through the abdominal incision.

The patient stood the operation well, but a fæcal fistula formed at the end of a week, and was still discharging six weeks later. She then commenced to have peculiar attacks of collapse with cyanosis, loss of consciousness, and vomiting. The first attack came on after eating eggs, which had been sent to the hospital, and she stated that she had never been able to eat eggs, as they had previously affected her in a similar manner. It was suggested that the attacks were anaphylactic in origin. In one of these attacks the patient died some six weeks after the operation.

The specimen shows a uterus 11 cm. long. Perforating the peritoneal covering of its left anterior surface is the pointed end of a Spencer Wells forceps, which emerges into the canal of the cervix and then protrudes 4 cm. into the vagina. The whole forceps measures 12 cm. long and is of the usual pattern now in use.

This case is a rare one, because of the extrusion of the forceps through a tough, thick-walled organ like the uterus. I have found no record of any other case in which this happened. It is also uncommon because of the long period that the foreign body remained in the peritoneum. It must have been left there either 1½ or 19 years before, and the longer time is suggested by the history that the pain persisted and increased after the first opera-

tion, and was unchanged by the second. The existence of such dense adhesions at the second operation that it was soon abandoned also suggests that the inflammatory focus was already there. Also, if the forceps was left in at the second operation, it should have been finally found above the adhesions that the second operator did not separate, and not low down. It is a question that cannot be settled, but it seems probable that the instrument remained in the peritoneum for 19 years.

The second case was one in which a bone penholder was passed into the vagina by a patient who was unable to withdraw it. It remained in the peritoneal cavity from 8 a.m. on January 2nd, 1915, till 4 p.m. on January 5th, 1915. Even under anæsthesia no scar could be seen in the vaginal vault, or on the fundus of the uterus when the abdomen was opened. The penholder, with the ink stains still showing well, was found entirely wrapped up in omentum. I ligatured off the omentum containing the penholder, and closed the abdomen. The patient made an uninterrupted recovery.

In discussing these cases with my colleagues I found few of them had had experience of this accident, nor could I find much about it published, except one very valuable article by Crossen, and a few cases that had been published because they had given rise to legal proceedings.

In considering a question like the present, where negligence on someone's part comes in, it is obvious that the great majority of cases that are not the subject of legal action will never find their way into the literature at all. To get details of the unpublished cases I sent inquiries to surgeons in all parts of Great Britain. No names were asked for, but in order to obtain full, although anonymous, records, I posted printed inquiry forms with printed reply envelopes.

I wished primarily to find out what risk there is to a patient if an instrument is allowed to remain, say five or six days, in the peritoneal cavity. Such a question may be of importance if the loss of the instrument is not noted till the patient has recovered consciousness; if already suffering from such a degree of shock from operation that undoing the closed laparotomy incision may be attended by grave risk; and if it is desired to confirm the diagnosis and locate the instrument by radiography before proceeding to open up the incision. Secondly, after about what interval of time does the foreign body usually commence to cause symptoms, if its loss is not noted? Thirdly, what is its usual effect on surrounding viscera?

Crossen (*Amer. Journ. Obstet.*, 1909, Vol. 1, and also "Operative Gynæcology," 1915, p. 589) gives a short tabular summary of

50 cases that he collected from the literature from 1880 to 1907. In these 50 cases the articles left behind are : forceps, 41 ; drainage tubes, 3 ; rings, 2 ; Nélaton catheter, glass irrigator, scissors, " piece of instrument," and pair of spectacles, one each. The total of 51 instruments in 50 cases is explained by two pairs of hæmostatic forceps being left in one patient by Kosinski.

Many of the cases abstracted by Crossen are incomplete, and essential details are lacking, but an examination of his collected cases shows that some 24 certainly, or probably, lived ; 13 died, and in 13 the details are inconclusive. The period the foreign body remained in the peritoneal cavity in the cases that recovered varied from a few hours to 10½ years, but it is of interest that in only 7 out of the 24 was the period over one year. The foreign body was removed by a subsequent laparotomy in 10 cases ; removed through a sinus or abscess in seven cases ; passed spontaneously *per rectum* in four cases ; removed by colpotomy in two cases ; and one was found in the bladder. In four of the non-fatal cases and two others it is stated that serious damage resulted to surrounding viscera.

Including a few cases in which foreign bodies had been passed into the peritoneal cavity either *per vaginam* or *per rectum*, I received the details of 39 cases ; there are three specimens bearing on the subject in the Museum of the College of Surgeons, making 44 with the two cases recorded in detail above. The foreign bodies found were 29 artery forceps, two retractor blades, two glass rods, two bone knitting-needles, two hairpins, and drainage-tube, towel-clip, uterine dilator, piece of needle, pin, bone penholder and stone one each.

Of the 44 patients, 11 died, giving a mortality of 25 per cent. In these 11 fatal cases the foreign body is stated to have been present : several years (three cases) ; seven years (one case) ; two years (one case) ; one year (one case) ; five months (one case) ; three weeks (one case) ; and twice " unknown." In all cases, except those in which the details are wanting, severe ulceration or erosion of the surrounding viscera was present.

Of the 33 patients who recovered, cases are given in which the foreign body remained in the peritoneal cavity 7, 12, 15 and (?) 19 years. Of the 33 cases, 26 were treated by a second operation, and in the remaining seven the instrument was passed through a sinus or *per rectum*. The operations were performed within a few hours (five cases) ; within 48 hours (four cases) ; within a few weeks (eight cases) ; and the remaining nine during periods ranging from six months to many years.

A consideration of the details of the cases seems to show that, as would be expected, the best result is obtained by an immediate removal of the foreign body, if the patient's general condition will

permit of a second operation. But if the loss of instrument is not noted at once, or if the patient's general condition contra-indicates an immediate second operation, there does not seem to be any grave risk in leaving it inside for a few days. A solid metal instrument does not seem to cause the onset of peritonitis as rapidly as a blood-soaked gauze sponge; and a consideration of the cases does not indicate that the viscera suffer any severe damage within a few days. A striking fact is the protective action of the omentum in surrounding the foreign body and shutting it off from the rest of the peritoneal cavity. This is well shown in the second specimen exhibited to-night.

The frequency with which this accident occurs came as a surprise to me. I received details of 39 fresh cases by post, and 51 forms were not returned to me at all, in spite of the fact that I especially asked for the form to be returned with a negative on it and sent a stamped addressed envelope to ensure its remaining anonymous. It seems reasonable to think that a large proportion of those 51 unreturned forms must have given details of fresh cases if their recipients had returned them. Again, it should be noted that only surgeons on the larger hospitals were circularized, and if the records of cases operated on in cottage hospitals, naval and military hospitals, etc., could be obtained it is probable that my numbers would be largely increased.

Most of the cases in which any date was given occurred within the last 15 years, so that my inquiries show that, quite roughly, at least 40 of these accidents have occurred in 180 months, or, in other words, once in every $4\frac{1}{2}$ months a patient is exposed to this unnecessary risk in Great Britain alone. It is therefore desirable to consider what can be done to diminish the risk of this accident.

I have deliberately avoided so far all reference to sponges and swabs, and definitely asked that these should not be included in my inquiry form. But it is worth while emphasizing the protection given by the use of 6 or 12 yard rolls of gauze for packing off intestines and sponging, instead of using large numbers of small pieces of gauze. In counting a large number of swabs by an assistant or nurse, the margin of human error exists, and this can be avoided and time saved by the use of rolls of gauze as continuous sponges.

Regarding instruments, the same principle can be applied, and the numbers of instruments in use, especially Spencer Wells forceps, reduced to a minimum, an extra supply in a separate package being kept in the operator's bag for emergencies. Also any instrument brought near the abdomen while the peritoneum is open should measure 6 inches in length--an exception to this rule must be made in the case of needles. To conform with this ideal

I never use towel clips—it is quite easy to fix all towels by two stitches, one at the pubes and one at the upper end of the incision. Again, it is quite easy to fix efficiently the rubber sheeting, towel, or whatever is used to protect the edges of the abdominal wall by pieces of sheet lead, 3 inches broad and 12 inches long, which can be bent round the edge of the wound. This method has long been used by Oldfield and other members of the Leeds school. The use of a Reverdin needle not only saves time but largely reduces the number of small needles in use. A Reverdin of suitable shape can be used satisfactorily except at the bottom of a deep wound. In the Trendelenburg position instruments tend to roll down towards the incision and the use of an instrument tray (such as that suggested by Bonney) with a large flange will prevent this. While operating, all hæmostatic forceps should be replaced by ligatures as soon as possible, instead of leaving them attached to bleeding points at the edges of the wound or within the peritoneal cavity. No instrument that has loose parts which are liable to become detached should be used.

In the following list the details are given as far as possible in the words used by the reporters of the case. The kind of instrument and the position where found, the nature and date of the first operation, the symptoms produced, the treatment adopted and the condition of the viscera disclosed, together with any note of special interest, such as the presence or absence of a sinus in the abdominal wall, whenever such details have been reported.

1. Short Spencer Wells forceps. Among small gut. Hysterectomy, several years before. Symptoms unknown. Gut ulcerated. Whole of forceps lying in cavity of gut. No external sinus. Enterostomy. Death.
2. Short Spencer Wells forceps. Laparotomy, several years before. Symptoms unknown. Gut ulcerated. Whole of forceps lying in cavity of gut. No external sinus. Enterectomy and anastomosis. Death.
3. Small Spencer Wells forceps. Among intestines. Ruptured gastric ulcer, many weeks before. Symptoms: fæcal fistula in cæcal region. Ulceration of ascending colon. Extraction through fistula. Death from peritonitis.
4. Small Spencer Wells forceps. Partly in peritoneal cavity and partly in bladder. Ovariectomy, five months before. Symptoms: like stone in bladder. Bladder perforated and very dense adhesions present. Point of instrument seen during cystoscopy. No external sinus. Laparotomy. Death from peritonitis.
5. Six-inch Spencer Wells forceps. Among small gut. Laparotomy, several years before. Symptoms: acute obstruction. Two or three adjacent coils of small gut ulcerated. No external

sinus. Resection of gut. Ring carcinoma of pelvic colon also found and so colostomy performed at same time. Death.

6. Five-inch artery forceps. Among small gut. Gastroenterostomy, two years before. Symptoms: pain increased by taking food. Instrument detected by radiogram. Gut perforated. No external sinus. Double resection of small gut. Death.

7. Spencer Wells forceps. ? position. Appendectomy. ? date. ? symptoms. ? treatment. Probably no sinus present. Death.

8. Five-inch Spencer Wells forceps. Among small gut. Ruptured ectopic pregnancy three weeks before. Symptoms: fever, pain. Mass in pouch of Douglas. Intestine damaged. No external sinus. Resection of small gut. Death.

9. Four-inch Spencer Wells forceps. In left half of pelvis, handles pointing downward. Ovariectomy, seven years before. Symptoms: fever, emaciation. Discharge from faecal fistula in left iliac fossa for six months. Sinus explored and instrument removed. A portion of one handle of the forceps could not be found. Death.

10. Towel clip 3 in. long. Position not stated. Laparotomy, one year before. Symptoms ? Found at autopsy. Royal College of Surgeons Museum, 2393.I.

11. Hairpin. Lower abdomen. ? passed in per vaginam. Symptoms: pelvic peritonitis. Laparotomy for purulent peritonitis. No obvious damage to viscera. Royal College of Surgeons Museum, 2343.I. Death.

12. Three-inch Spencer Wells forceps. Below umbilicus in middle line. Ovariectomy, six weeks before. Symptoms: point of forceps palpable through scar. No damage to viscera. Forceps found wrapped in omentum. No external sinus. Removal by laparotomy. Uneventful recovery.

13. Small Spencer Wells forceps. Position unrecorded. Removal of tumour (probably renal), eighteen weeks before. Symptoms: rectal pain and sinus. Passed spontaneously per rectum. Recovery.

14. Spencer Wells forceps. Upper abdomen. Ovariectomy, several weeks before. Symptoms: hard mass in upper abdomen. Adhesions but no erosion of viscera. No external sinus. Laparotomy. Recovery.

15. Five-inch Spencer Wells forceps. Pelvis. Salpingo-oöphorectomy, seven years before. Symptoms: abdominal and rectal pain. Passed spontaneously per rectum. Ulceration of rectum. Recovery.

16. Small Spencer Wells forceps. Pelvis. Panhysterectomy, a few hours before. No symptoms. Radiogram taken. No damage to viscera. Removal per vaginam. Recovery.

17. Five-inch artery forceps. Among intestines. Cæsarean section, 48 hours before. No symptoms. No damage to viscera. Radiogram taken because instrument missed after operation. No external sinus. Removal. Recovery.

18. Seven-inch Spencer Wells forceps. Upper abdomen. Radical cure of ventral hernia, four months before. Symptoms? Ulceration of bowel. No external sinus. Enterectomy. Recovery.

19. Artery forceps. Pouch of Douglas. Ovariectomy, six hours before. No symptoms. No damage to viscera. Instrument missed after operation and palpated by bimanual examination. Removal. Recovery.

20. Nine-inch Spencer Wells forceps. Pouch of Douglas. Sub-total hysterectomy, seven years before. Symptoms: pelvic pain. Ulceration of vagina. Points of forceps palpable on vaginal examination. No abdominal sinus. Extraction per vaginam. Recovery.

21. Small Spencer Wells forceps. Pelvis. Ileo-colostomy, six months before. Symptoms: left iliac pain. Passed spontaneously per rectum. No abdominal sinus. Complete recovery.

22. Spencer Wells forceps. Attached to omentum. Ovariectomy, 24 hours before. No symptoms. No damage to viscera. Loss of instrument noticed soon after abdomen closed. Removal. Recovery uneventful.

23. Kocher's artery forceps. Among small gut. Operation for perforated duodenal ulcer, three weeks before. No symptoms. Two inches of instrument lay inside lumen of gut. Instrument only discovered by accident during radiogram of bismuth meal. No sinus. Removal. Suture of bowel. Complete recovery.

24. Eight-inch Spencer Wells forceps. Lower abdomen. Hysterectomy, twelve days before. No symptoms. Forceps missed after operation, but patient too ill for immediate search to be made. No sinus. Radiogram on tenth day. Removal by laparotomy. No damage to viscera. Uneventful recovery.

25. Six-inch artery forceps. Pelvis. Ovariectomy, nine months before. Symptoms: febrile convalescence, recurrent abdominal pain, rectal pain and discharge. Passed spontaneously per rectum. Rectum ulcerated. No abdominal sinus. Recovery.

26. Small Spencer Wells forceps. Right iliac region. Removal of broad ligament cyst, ten days before. No symptoms. Forceps missed three hours after operation. Radiogram taken. No sinus. Removal. No damage to viscera. Recovery.

27. Eight-inch Spencer Wells forceps. Pelvis. Salpingectomy, four years before. Symptoms indefinite. Abdomen examined on account of hæmatemesis, and forceps felt through wall of lower

abdomen. Radiogram taken. Removal. Severe adhesions present, but no erosion of viscera. No sinus. Recovery.

28. Five and a half inch artery forceps. Pelvis. Hysterectomy, a few hours before. No symptoms. Forceps missed two hours after operation. Removal by laparotomy. No damage to viscera. Recovery.

29. Four and a half inch artery forceps. Lower abdomen. Ovariectomy, four hours before. No symptoms. Forceps missed three hours after operation. Removal by laparotomy. No damage to viscera. Recovery.

30. Flange of a Berkeley retractor. Lower abdomen. Hysterectomy, twenty-four hours before. No symptoms. Instrument missed after operation. Radiogram taken. Removal by laparotomy. No damage to viscera. Recovery.

31. Blade of retractor 3 ins. long. Loin. Hysterectomy, fifty-four hours before. No symptoms. Radiogram taken. Removal by laparotomy. No damage to viscera. Recovery.

32. Artery forceps. Lower abdomen. Laparotomy, twenty-four hours before. No symptoms. Removal by laparotomy. No damage to viscera. Recovery.

33. Drainage tube $2\frac{1}{2}$ ins. long. Partly in bladder and partly in peritoneal cavity. Hysterectomy, twelve years before. Symptoms: leucorrhœa, for 12 years, cystitis for three weeks. Removal by suprapubic cystotomy. Ulceration of bladder. No abdominal sinus. Recovery.

34. Glass rod 4 ins. long. Recto-vesical pouch. Colostomy, four and a half months before. Symptoms were referred to a large wound in the buttock. Removal during an operation for excision of rectum. Dense adhesions but no serious erosion of viscera. Recovery.

35. Flanged glass tube 2 ins. long. Under right rectus muscle. Operation for relief of ascites, fifteen years before. Symptoms: none except ventral hernia. The tube is still there and the patient in good health. The ascites is cured. No external sinus present.

36. Hairpin (straightened). Passing from rectum and transfixing the Fallopian tube. ? passed into rectum. ? two months before. Symptoms: dysmenorrhœa, rectal pain. Removal by laparotomy. Peritonitis round tube. Ulcer in rectum. No abdominal sinus. Recovery.

37. Five-inch bone knitting-needle. Left iliac fossa. Pushed through uterus, fifteen months before. Symptoms: abdominal pain, increased by movement. Radiogram taken. No sinus. Removal by laparotomy. Knitting-needle surrounded by omentum. No damage to viscera. Recovery.

38. Uterine dilator 8 ins. long. Below liver. Pushed through

uterus four days before. No symptoms. Radiogram taken. No sinus. Removal by laparotomy. No damage to viscera. Recovery.

39. Bone knitting-needle 10 ins. long. Pouch of Douglas. ? pushed through vagina. Symptoms: intestinal obstruction. Removal by laparotomy. No damage to viscera. No sinus. Recovery.

40. Piece of steel needle, 1 cm. long. Appendectomy, two years before. Symptoms: persistent abdominal sinus. Sinus opened up and needle removed. Recovery.

41. Pin. Back of broad ligament. No previous operation. ? Swallowed. No symptoms. Removed during ovariectomy for ovarian cyst. Slight adhesions, but no damage to viscera. No sinus. Recovery.

42. Stone. Lower abdomen. Stone was accidentally forced through the rectum three days before. Symptoms: Pain. Removal by laparotomy. Royal College of Surgeons Museum 2310.I. Recovery.

43. Four-and-a-half-inch forceps. Left iliac fossa, perforating uterus. Two laparotomies. ? Eighteen months, or ? 19 years. Symptoms: Pain, diarrhoea, leucorrhœa. Radiogram taken. Removal by abdominal hysterectomy and suture of colon. Severe ulceration of colon present. No abdominal sinus. Sudden death six weeks later, as recorded in detail above. Royal College of Surgeons Museum.

44. Bone penholder 6 in. long. Above umbilicus, wrapped in omentum. Pushed through vagina three days before. Symptoms: Pain. Removal by laparotomy. No damage to viscera. Uneventful recovery. University College Hospital Museum.

45. Five-inch Spencer Wells forceps. At level of umbilicus. Laparotomy for intestinal obstruction two weeks before. No symptoms. Loss of instrument noticed when arranging operating bag ten days after operation. Radiogram taken. Removal by laparotomy. Severe adhesions and ulceration of small bowel in two places. Death. (Report of this case received subsequent to the paper being read at the Royal Society of Medicine.)