large refills (1,000 or even 1,500 c.cm.) are given at long intervals. In these cases the lung is completely collapsed and then allowed to re-expand before the next refill. I call these concertina cases, because the lung is alternately expanding and collapsing. As a rule in such cases the patient complains of dyspnoea and discomfort just after the refill; this is followed by a period of well-being, and this again by a period of increased symptoms before the next refill. Most of these patients lose weight; some, however, remain well, and this is usually because the disease is arrested and the treatment may safely be discontinued.

The difference between individuals is very considerable. I saw a patient recently who had been having 1,500 c.cm. of gas every five weeks. He had been having artificial pneumothorax treatment for over two and a half years, felt well, and was free from symptoms. The lung had completely re-expanded five weeks after the last refill; 600 c.cm. of air left a pressure of -6 cm. water, but it caused very good collapse. After two weeks there was not much re-expansion, but a week later the lung had expanded considerably. In this case to keep the lung at rest 500 or 600 c.cm. of gas should have been given every fortnight. However, as he kept so fit even when the lung was expanded it seemed that the disease was arrested, so I stopped the refills and he has remained quite well. On the other hand, absorption may be very slow. In one case there was practically no re-expansion of lung twelve weeks after the last refill and the lung had not completely re-expanded after six months.

X rays are of the very greatest value, but if not available an attempt must be made to ascertain the optimum degree of collapse from the signs and symptoms. If a patient says he feels ready for a refill it usually means that the interval between the refills has been left too long, for a refill should be given before the patient begins to feel the return of symptoms. Again, the temperature is often a guide. The chart shows a case in point.

R = Refill given.

The refill should have been given three days before, and when it was given too much gas was introduced and so a reaction occurred. Vital capacity is also of use in judging the optimum degree of collapse. After a refill the vital capacity is diminished, but if small refills are given the diminution should be very small. If the vital capacity is taken daily it will be found that at first it improves after a refill and then remains constant for a time. After this it will be found to diminish slightly, and the refill should be given before this diminution begins.

Adhesions may prevent a satisfactory collapse of lung, and may be so great that the treatment has to be abandoned. It may, however, be decided to continue the refills in the hope of stretching the adhesions and so making an efficient pneumothorax possible. In such cases very high pressures are not needed, for better results are obtained by giving frequent refills, leaving the intrapleural pressure constant and thus keeping a steady pull on the adhesions.

When fluid develops during pneumothorax treatment the gas is less quickly absorbed, so that the lung often remains collapsed for a long period without a refill. It is usually wise, however, to remove the fluid and replace it with gas, because if it is left adhesions are almost certain to form.

Sometimes, though only a partial pneumothorax is obtained owing to adherent pleura, it is sufficient to relieve the symptoms. Usually in such a case the pneumothorax cavity is gradually obliterated by contraction of the adhesions and increase of adherent pleura. In such cases the refills should be continued as long as possible, for the diseased lung becomes fibrotic and the patient often does very well. It is useless to continue the refills if there is so much adherent

pleura that an efficient pneumothorax cannot be obtained. It may happen during treatment that the disease begins to spread in the other lung, and in this case the refills should be stopped. The patient then usually improves, so that it may be said that the pneumothorax aggravated the disease. But cases are often to be met with in which the disease is spreading rapidly and steadily, and after an artificial pneumothorax has been induced there soon appears a spread on the other side. On stopping the refills, however, there is improvement on both sides, although the patient is kept on exactly the same treatment as before the artificial pneumothorax was started. It seems, therefore, that it is really the pneumothorax which checks the spread of the disease.

In conclusion, I should like to emphasize two points: (1) It should be remembered that the object of the treatment is to rest the lung, and that therefore the lung should be rested and not alternately collapsed and expanded. (2) It is not necessary to compress the lung fully; a very satisfactory collapse can be obtained with the intrapleural pressure still negative, and harm is often done by giving too large a refill.

TWO CASES OF INTESTINAL OBSTRUCTION.

BY

BERTRAM H. PIDCOCK, M.B., B.S.LOND.,

F.R.C.S.ENG.,

LATE RESIDENT ASSISTANT SURGEON, ST. GEORGE'S HOSPITAL.

I. *Strangulation through an Aperture in the Ligamentum Latum Uteri.*

THE unusual feature of the first case was the nature of the strangulating agent, and I can find no published report of a similar condition. Barnard¹ stated that herniae may occur into pouches in the broad ligament, and mentioned that a case of internal hernia of this type was exhibited in the museum of the London Hospital, but I have been unsuccessful in tracing it.

I have investigated the bodies of ten adult women, all probably parous, and in every case it was possible to stretch the round ligament forwards and to demonstrate a thin, apparently avascular fold of peritoneum joining it to the main part of the broad ligament. On no occasion did it require any real force to perforate this "meso-ligamentum teres" with my finger, and I can only suggest, as a possible cause of the condition described below, that, as the result of the recent pregnancy, all the structures connected with the uterus were in a relaxed state, and that in some manner a coil of gut had ruptured this meso-ligamentous fold, perhaps when passing into the inguinal sac. After reduction, the coil would be left lying under the round ligament, a condition favourable for an internal strangulation to occur at any moment.

Mrs. V., aged 35, was admitted to hospital with the following history. Fourteen days previously she had had a normal labour; the pregnancy and puerperium were also without abnormal incident. At 11 a.m. on the day of admission, while bathing her child, she was seized with sudden violent pain in the region of the navel. The pain was continuous and very acute. After two hours, vomiting began and recurred at intervals all the afternoon, but was at no time faeculent in character. The bowels were not opened during the day, and no flatus was passed after the onset of symptoms. She stated that a small hernia, never bigger than a pigeon's egg, had existed on her left side for three years; it had always disappeared spontaneously when she lay down. It was not present at the time of the examination, but from her description it was probably inguinal. With the exception of pleurisy two years previously the patient could recollect no previous illness.

On examination six hours later the patient was obviously extremely ill and suffering from severe collapse. Her temperature was 97.5° and the pulse rate 65 and very weak. She complained all the time of agonizing abdominal pain, and her face was cold and beaded with sweat. The abdomen was lax and no distension or visible peristalsis was noticed. Percussion demonstrated the presence of some fluid in the flanks, and on palpation slight tenderness and rigidity were discovered in the lower part of the left iliac fossa. No mass was to be felt. Per rectum the involuting uterus could be made out, but nothing abnormal was discovered.

The diagnosis was at first rather doubtful, and seemed to lie between an acute perforation and acute intestinal obstruction; but had peritonitis been present the lack of general rigidity at such an early period would have been difficult to explain. Acute intestinal obstruction seemed therefore to be more likely, due possibly to internal strangulation.

After restorative treatment had been given the patient's condition improved somewhat, the pulse quickened to 112, and it was thereupon decided to operate without further delay.

First Operation.

The abdomen was opened through a right paramedian incision, an assistant giving intravenous gum saline at the same time. Before incising the peritoneum a reddish-black mass was visible through this membrane, and, on opening into the peritoneal cavity, free blood-stained fluid escaped, the abdomen being apparently filled with dark plum-coloured coils of small intestine. The caecum was collapsed but otherwise healthy, and, on examining the pelvis, a band was immediately felt rather on the left side, anterior to the uterus. This was divided between forceps, thereby relieving the strangulated gut, and a small artery was distinctly seen in the centre of its cut surface. The affected coils, obviously on the verge of complete gangrene, were resected through the healthy gut above and below. As this left a margin of rather less than four inches of ileum below, the two cut ends were closed, and a lateral anastomosis with the caecum effected.

Further investigation showed the strangulating agent to be the left round ligament, one end being traced to the internal abdominal ring, and the other directly to the uterus. The ligament measured about four inches in length, and, before division, the middle two inches were quite free from the broad ligament, thus bridging over and strangulating the subjacent coils of intestine. There appeared to be no evidence of old pelvic inflammation, such as might give rise to an adventitious band simulating the round ligament. The abdomen was closed completely and the patient returned to bed, where treatment by means of glucose saline per rectum, pituitrin subcutaneously, and by radiant heat,

FIG. 1.—Anatomical features in Case I. A, Round ligament. B, Orifice through which intestine had passed. C, Internal abdominal ring

was carried out. The excised gut measured just over eight feet in length.

After operation the patient's condition was still very precarious, but the intravenous infusion of gum saline had almost certainly prevented her from dying in the theatre, and twenty-four hours later the general condition had greatly improved, the temperature having become normal and the pulse 80. Post-anaesthetic vomiting occurred only twice. By the fifteenth day convalescence was well advanced, and the bowels were being opened from one to three times daily. On the sixteenth day, however, the temperature rose to 103° and the patient vomited a quantity of undigested stomach contents. Vomiting recurred twice during the next twenty-four hours, and consisted of bile-stained fluid (about 15 oz.), the patient complaining now, for the first time, of pain in the lower part of the abdomen, where slight tenderness and rigidity were found on examination. Three enemata were given during this period, with a poor result on each occasion, and, as the patient was not relieved and her temperature remained high, it was decided to operate again in case of leakage at the line of anastomosis, or of partial obstruction caused by a kink.

Second Operation.

This time a left paramedian incision was employed. The peritoneum showed marked oedema, and a localized abscess was found lying partly in the pelvis between coils of intestine lightly matted together. After the pus had been swabbed out it was seen that, although no definite kinking had occurred, the area of the anastomosis, together with some tags of omentum, was firmly adherent to the first incision. No obvious leakage had taken place. The omentum was freed, but it would certainly have been dangerous to separate the adherent gut; a drainage tube was therefore inserted into the abscess cavity, and the abdomen closed.

For ten days much pus was discharged from the wound, accompanied by the usual intermittent pyrexia, but the general condition of the patient had improved considerably. Fourteen days after the second operation a large right perinephric abscess had to be evacuated, and from this time onwards convalescence was without further incident. All the wounds healed up, and the patient was discharged exactly two months after admission.

II. Strangulated Retroperitoneal Hernia.

The condition found in the second case was possibly similar anatomically to that first described by Treves²—namely, hernia through the mesentery between the ileo-colic and superior mesenteric arteries, an example of which was published recently by Rock Carling and Mervyn Jones.³

With the exception of the case of the right duodenal pouch, this appears to be the only area in the mesentery of the small intestine which would favour the occurrence of an "idiopathic" hernia, in that its texture at this part has been shown in many cases to be much weaker than that of the rest of the fold, on account of the almost total absence of lymph vessels and fat. In addition, the presence of an arterial arcade would certainly help in the formation of a ring or neck, as emphasized by Waldeyer⁴ in his description of the mesenterico-parietal fossa, and as occurs also in many

of the other retroperitoneal fossae, described fully by Brösike,⁵ Jonnesco,⁶ and Treitz.⁷

Treves² states that in one subject examined by him, a man of 52, the area he describes was actually cribriform, there being about twenty small holes grouped together within the arterial boundaries. In the present instance, however, I particularly noticed the relatively high position of the neck of the sac, and this, together with the fact that the ileo-colic artery was not definitely proved to be a posterior relation, suggests that the true condition was a fossa dipping behind the concavity of the superior mesenteric artery, enlarging downwards and to the left behind the peritoneum, into which intestine had herniated.

Such a state of affairs would approximate to a hernia into the fossa of Waldeyer,⁴ but involving the right leaf of the mesentery instead of the left. I do not know whether such a fossa has been described, but no mention of its occurrence has been found in the exhaustive work of Moynihan and Dobson⁸ on this subject.

Mr. O., aged 37, a healthy working man, was admitted to hospital, having been taken suddenly ill eight hours previously with symptoms of rapidly increasing abdominal pain, vomiting, and collapse. The pain, which for a short time was colicky in character, started in the umbilical region, and quickly became continuous, generalized, and very severe. Vomiting had occurred several times, and on the last occasion, shortly before admission, was apparently becoming faeculent. There had been no motion of the bowels or passage of flatus since the onset of symptoms. No history of previous illness of any importance or of abdominal injury could be obtained, and up to the time he was taken ill the patient performed his usual work as a horse cleaner.

On admission he was suffering from shock. He wore an anxious expression, his temperature was 97°, and his pulse rate 90 and of a "running" type. Cyanosis was absent. There was little movement of the abdomen on respiration and no visible peristalsis was seen. Palpation revealed slight rigidity of both the upper and lower abdomen, and there appeared to be a diffuse fullness below the umbilical region, which was very tender and resonant on percussion. Rectal examination gave no further information; the hernial rings were clear, and the urine normal. A diagnosis of acute intestinal obstruction was made.

Operation.

Under general anaesthesia the abdomen was opened through a paramedian incision. A small amount of clear fluid escaped and slightly distended small intestine presented in the wound. Collapsed gut, however, was soon found at the ileo-caecal valve, and was traced for a short distance upwards, where it was seen apparently to enter into a sac. Further examination revealed the following condition. The superior mesenteric artery, after crossing the duodenum, occupied a rather unusual position, lying a little over an inch away from the posterior abdominal wall between the layers of the mesentery. In that part of the mesentery between the artery and its root, just below the duodenum, was an orifice directed upwards and to the right; the superior mesenteric vessels formed its anterior boundary, whilst behind were the structures of the posterior abdominal wall at a point about the position of the right side of the body of the third lumbar vertebra. The ileo-colic artery was not identified. Through this aperture small intestine had passed, and was lying in what

FIG. 2.—Hernial Sac in Case II. A, Superior mesenteric artery. B, Sac, indicated by the dotted line.

appeared to be a retroperitoneal sac, or possibly free in the retroperitoneal tissue—a point on which it was difficult to be certain. The extruded gut extended down behind the peritoneum below the promontory of the sacrum, and, by pressure from below combined with gentle traction above, about three feet of ileum were drawn out without much difficulty, examination of the site of constriction showing nothing more than slight ecchymosis of the surface, most marked on the entering loop. There was also considerable oedema of the affected mesentery, and commencing distension of the lately incarcerated intestine. The mouth of the sac admitted the tips of four fingers, but no attempt was made to close it by suture owing to the proximity of the large vessels, and, moreover, it appeared to collapse to a mere slit when the fingers were withdrawn.

The patient made an uninterrupted recovery and was discharged from hospital on the twenty-second day.

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