abdominal pain in her right iliac region, left shoulder and arm. This pain diminished after a couple of hours but later again increased in severity. Pain remained agonizing during the night and extended from the right iliac fossa all over the abdomen. No vomiting occurred after the onset of severe pain. She was admitted to hospital at 8 p.m. on November 24th, 1905, when her condition was as follows: Temperature 98.3°, pulse 120, respirations 38. Her appearance was good; she complained of general abdominal pain but most severe about the umbilicus. Abdominal respiration was fair over the upper half which was also somewhat retracted, less marked over the lower half which was rather distended. Abdominal tenderness was general, but most pronounced just above the umbilicus. The liver dullness was normal.

Operation.

In view of the pain having been first felt in the right iliac fossa, the abdomen was opened, twenty-nine hours after the commencement of the acute illness, over the appendix. This appeared normal. Immediate epigastric incision was then made and the anterior wall of the stomach was found drawn up and adherent to the under surface of the liver by patches of recent yellow exudate through the interstices of which was escaping turbid fluid containing numerous food particles. These adhesions were broken down and a search instituted for the perforation, but it completely defied detection. The turbid fluid came welling up from the pyloric end of the stomach, and this, combined with the patches of lymph on the stomach wall, so effectually obscured the field that the search, which could not be prolonged on account of the fact that the patient's pulse and general condition were rapidly running downhill, had to be abandoned. The whole area of the stomach affected was therefore packed over with sterile gauze, the end of which was brought out at the upper angle of the abdominal wound. This was then closed after the peritoneal cavity, the soiling of which was partial, had been wiped clean.

For the first three days the dressings had to be frequently changed, on account of a greenish soakage. At the end of this time, under an anaesthetic, the gauze tampon over the stomach was removed with difficulty. No sooner had the last of it left the wound than 6 to 8 oz. of bile-stained fluid, containing small masses of curdled milk and glairy mucus, escaped. No subsequent plugging was used, and for an hour and a half after removal of the tampon she complained of pain in the left shoulder. At first the soakage from the wound was considerable, but the abdomen remained perfectly quiet, and she soon expressed herself as comfortable. For six days she was fed per rectum, but after this minute quantities of milk and water were administered by the mouth and gradually increased. Some of the curdled milk appeared at intervals in the discharge from the epigastric fistula, but gradually the quantity diminished, and discharge ceased on December 15th, three weeks after operation. She was dismissed, able to take ordinary diet, on February 2nd, 1906.

In dealing with the resulting peritonitis my earlier practice in perforation cases was to flush the abdomen regularly; but latterly this procedure has been abandoned, wiping alone being employed, except in widespread soiling. In extensive extravasation where fluid and food particles have got well below the transverse colon, then flushing with sterile salt solution is still employed in the following manner: A stab wound is made above the pubes and a Keith's drain lodged in Douglas's pouch. The sterilized end of the rubber tube from the irrigator, the glass nozzle having been previously detached, is then, guided by the hand, introduced through the epigastric incision into the abdominal cavity, which is then flushed from above downwards, the fluid emerging through the Keith's drain. This is carried out, the flexible tube being moved about to special pockets, until the fluid from the drain comes away clear, after which the epigastric incision is closed, with or without drainage according to circumstances. It is of paramount importance that the irrigating fluid should be of a proper temperature, otherwise shock will certainly be induced. The Fowler position and proctoclysis have so revolutionized the outlook in the acute abdomen, and have met with such wide acceptance, that no further comment need be made on this excellent method of after-treatment.

The routine performance of gastro-jejunostomy, at the same time as the perforation is dealt with, has been recently advocated with plausible but by no means convincing arguments. The aim of operation on a perforation is to avert death, and I feel convinced that the additional time necessary to make the short circuit will turn the scale against many cases requiring every particle of strength to stand even a short operation. The more rapidly the perforation and peritonitis can be dealt with compatible with efficiency the better the chance of recovery; and to lay it down that the performance of gastro-jejunostomy is an essential part of the treatment of a perforation seems to me fraught with the greatest danger. True, in certain early cases, gastro-jejunostomy may be

added to the operative treatment with safety and advantage, but it should be employed with the greatest discretion. An operation which is theoretically ideal and academic may be far from a life-saving one. Moreover, it seems now clear that gastro-jejunostomy should not be performed as a matter of routine even as a secondary operation, but should be reserved for those cases in which the perforation is so situated that its closure leads to pyloric obstruction or marked interference with the motor function of the stomach. That invagination and suture may lead to the disappearance of an ulcer is corroborated by Case No. 10, which died nine weeks after operation of pyaemia. At the *post-mortem* examination the pathologist could discover no trace whatever of the ulcer. So far two cases have come back with gastric symptoms after operation for perforation. In both the perforation was pyloric, and both have been relieved by gastro-jejunostomy.

In some of the cases recorded the patient was almost moribund when put on the table; but there ought never to be any question as to the propriety of operation—no matter how remote the chances of a successful result are, the patient ought to have the chance, for without operation the outcome is certain.

INTUSSUSCEPTION CONTAINING A SARCOMA OF THE INTESTINAL WALL: ENTER- ECTOMY: RECOVERY.

BY

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The following case presents some features so rare and interesting that we venture to consider the notes worth publishing:

History.

E. S., a boy aged 4½ years, was first seen at 9 p.m. on November 14th, 1908, when suffering from acute abdominal pain of a spasmodic character; between the spasms there seemed to be absolute freedom from pain—there was no vomiting, and nothing was to be felt in the abdomen; the attack lasted until 8 a.m. on November 15th. He was thin, pale and delicate-looking, and there was a previous history of abdominal pain and vomiting for two months, but otherwise he was quite well up to the time of this sudden attack.

On November 16th he was running about quite well.

On November 18th he had a similar attack, pain at intervals all day, vomiting frequently. Temperature, 100° F., pulse, 120. Nothing was felt in the abdomen. On November 19th the attacks of pain and vomiting continued; the temperature was normal, the bowels constipated. No blood, but a little mucus was passed with hard faeces without straining. Retraction of both testicles was marked throughout the attack.

From November 20th to November 23rd the patient was much better, having pain only at times; vomiting had ceased.

On November 23rd a lump was felt for the first time to the right of the umbilicus; the following day he was better and no lump could be felt.

On November 28th, at 5 a.m., he had another severe attack of pain with vomiting which was more or less continuous; for the first time he showed signs of being seriously ill; he was pale with anxious expression, tongue and lips dry, pulse rapid and feeble; examination of the abdomen was difficult, and the right rectus abdominis muscle was very resistant; the pulse was 132, and the temperature 98.4°; a small constipated motion was passed during the day. The pain was very acute and of a spasmodic character, the boy being literally doubled up with it. As the result of a surgical consultation an exploratory operation was performed.

Under A.C.E. a well-marked sausage-shaped mass was felt to the right of the umbilicus, freely movable, well defined, of doughy consistence, and just above and to the median side was another smaller mass.

Operation.

On opening the abdomen through the right rectus abdominis muscle a congested enteric intussusception was found, about 4 in. or 5 in. in length, with a tightly constricted neck, close to which a mass of enlarged mesenteric lymphatic glands was present. As reduction was impossible, and the patient's condition extremely grave, the whole of the intussuscepted gut was resected as rapidly as possible, one of the mesenteric glands removed, and a speedy end-to-end anastomosis of the divided ends of the gut by suture was performed. The abdomen was then filled with hot saline lotion and closed by through-and-through silkworm gut sutures.

After-history.

The patient rallied well from the operation, repeated saline injections into the bowel being administered. There was an action of the bowels on November 29th, at 10 a.m., after injection, and the pain was greatly diminished. The temperature rose to 102° F. shortly after the operation; the pulse remained at or about 130. The tongue was for several days dry and red, and the patient continued very restless and irritable, and slept badly. There was no further vomiting. Small quantities of milk and water were administered by the mouth after the second day, and gradually the unfavourable symptoms subsided. On December 6th alternate stitches were removed, and on December 7th, as he continued restless and crying for his friends, he was allowed to go home. After that his progress was uninterrupted.

Description of Parts Removed.

On examination of the specimen, the neck of the intussusception was found to be very tightly constricted, the cause being a puckered indurated growth, rather larger than a shilling, situated laterally in the wall of the small intestine just beyond the neck of the intussusception, effectually preventing any attempt at reduction. The total length of the gut resected was about 18 in. when unravelled.

On microscopic examination the growth proved to be (according to the report of the Clinical Research Association) a large round-celled sarcoma. The report reads as follows: "The mass is a malignant new growth invading the muscle coat of the intestine. It is composed of large round cells in a delicate stroma with very thin-walled vessels. We conclude that it is a round-celled sarcoma."

The mesenteric lymphatic glands were too deeply placed to remove *in toto*, considering the serious condition of the patient, which precluded any lengthy operative procedures. Added to this they had all the appearances of being tuberculous, and malignancy was unsuspected; nor was the

Diagrammatic representation of intussusception and growth. A, Neck of intussusception; B, growth in wall of intussusception; C, intussusciens; D, apex of intussusception; E, enlarged mesenteric lymphatic glands; F, mesentery.

growth discovered until subsequent examination of the resected intussusception; this alone prevented easy reduction, as the condition of the gut wall was merely that of congestion.

The patient is at the present time in fairly good health, though a resistance can be felt in the situation of the mesenteric glands, and his recovery has not been quite as perfect as one would expect in an ordinary case. His digestive functions remain good, but the ultimate prognosis one must consider very grave.

A NOTE UPON THE EMBRYOLOGICAL AND PATHOLOGICAL SIGNIFICANCE OF CERTAIN FOLDS IN THE ANAL CANAL.

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In a recent paper Dr. Arthur Keith, discussing the development of the proctodaeum, stated that—

In two cases, both females, the epithelium of the proctodaeum had budded out irregularly, so as to form diverticula, some of which projected for some distance into the perineal tissue, and undoubtedly correspond to certain diverticula which are found in the anal canal opening under the folds which join together the upper ends of the columns of Morgagni.

He is good enough to attribute to me the credit of pointing out these said diverticula.¹ I, however, have to thank Mr. F. C. Wallis, of Charing Cross Hospital, for having directed

my attention to the existence of these strange test-tube-like projections.² He attributes certain cases of rectal discomfort to the fact that these valvular folds uniting the upper end of the columns of Morgagni and the diverticula become inflamed and painful, the sinus doubtless acting as an efficient culture chamber for micro-organisms.

Mr. Keith was good enough to permit me to carry out some research work upon the subject in his laboratory.

Morgagni's original description of the anal canal gave little or no help. The most complete description of the anal canal is to be found in *Traité d'Anatomie Humaine* of J. J. Jonnesco and Charpey. Of the columns of Morgagni they say:

They have a triangular base below, which inclines to either side and is continued into the free border of the valves of Morgagni. The summit tapers off, and is lost in the rectal mucous membrane.

There is, therefore, no mention of any folds uniting the summit of the columns.

My work, under Mr. Keith's supervision, consisted of cutting sagittal sections through the pelves of some six fetuses of ages varying from 2 months to full time. Without exception, in every specimen the columns of Morgagni were united by folds of mucous membrane both above and below. In other words, the anal canal was surrounded by a series of depressions which were bounded above and below by valve-like flaps of mucosa and on either side by elevated ridges, which were the columns of Morgagni. One series of sections from a hydrocephalic female fetus of 6 months seemed to offer some clue to the solution of the problem. In this I was fortunate enough to find a distinct

Fig. 1.—A, Rectum; B, anal canal; C, remnant of proctodaeal membranes; D, vagina; E, bladder; F, cavity of uterus; G, peritoneum; H, os pubis; J, ext. sphincter. Dotted lines indicate portion from which sections were cut.

remnant of the proctodaeal membrane; 6 mm. from the skin margin was a perforate septum across the lumen of the anal canal forming a circular shelf, of varying width, around the bowel; it was clearly an imperfect proctodaeal membrane, which had persisted in a fetus that, save for the hydrocephaly, was perfect.

Had the septum been complete the condition would have been one of imperforate anus, in which the rectum ended blindly at the site of a fully-developed proctodaeum.

Below this imperfect rectal septum the anal canal was perfect, the columns and lower valves of Morgagni being well developed, the upper ends of the columns, however, disappearing under the membranous remnant. On microscopic examination it was seen that above the mucosa of the rectum was of the usual type, below the stratified epithelium of the anal canal is found. The septal shelf itself had different coverings above and below—the upper or rectal surface being clothed with the usual columnar rectal mucous membrane, exhibiting crypts and goblet cells, whilst the under or anal surface was covered with stratified epithelium. Between these two epithelia was fibrous tissue with a few muscular fibres, but no definite offspring from the regular muscle coats of the rectum. The circular muscular fibres of the rectum were aggregated to form the internal sphincter exactly at the level of the imperfect septum; below the circular muscular coat was continued, between the external sphincter and the anal submucosa, to the skin margin.

This fact is not easy to explain, for it is not easy to see why the internal muscular coat, a derivative of the splanchnic layer of the mesoblast, should come to occupy a position between epiblastic epithelium and the external