

DIVERTICULA OF THE JEJUNUM*

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THE basis for this paper is the presentation of the following case :

K. G., female, housewife, age sixty-three, was admitted to the service of Dr. J. H. Jopson with a history of having had pain in the stomach for the past fifteen or sixteen years. Pain was cramp-like in character, continued to move across upper abdomen and radiate to left shoulder blade. It would appear two to three hours after eating. These pains would come and last four to six weeks and disappear for a year or more, only to return. In October, 1922, she again began to suffer from her gastric pains. They were again of the same character as before. Since December, 1922, she began to have a feeling of fullness and frequency of vomiting. Vomiting would occur without relation to meals, being preceded by severe attacks of cramp-like pain.

During the interval between October and December, she was treated medically and considerably relieved until the present time. She has not lost weight.

Previous History.—She had several diseases of childhood; she can remember no other illness. She was operated upon by Dr. J. G. Clark for internal injuries following transverse presentation.

Family history is negative. She has five children living and well. Two children died, one of croup, another of diphtheria.

Physical examination revealed a female adult; about sixty years of age; head negative; chest and heart negative; Abdomen: Slight areas of tenderness in the epigastric region, a little to the left of the midline, slightly above the umbilicus. She had no gall-bladder tenderness. Kidneys were negative, as was the appendix. Pelvic examination was negative.

Urinalysis was negative for albumin and sugar. Microscopically showed occasional leucocytes and many squamous epithelium. Blood count showed 4,740,000 reds; leucocytes 6300 and 80 per cent. hæmoglobin. Differential blood count showed 42½ per cent. small lymphocytes, 1 per cent. large lymphocytes, 2 per cent. transitionales, 49 per cent. polymorphonuclears; 4 per cent. eosinophiles and 1½ per cent. basophiles. Feces was constantly positive for occult blood. Special examination of the blood revealed: Sugar 108—Creatinine 2.1;—Uric Acid 4.2,—Urea 23.

X-ray Examination.—Report from Doctor Campbell was as follows: "Stomach filled normally and showed no evidence of organic lesion. Greater curvature about 5 inches below iliac crest in the erect posture. No retention at the six-hour period, although peristalsis was sluggish and waves shallow. There is a retention of a portion of the barium meal in the small intestine, apparently near the duodeno-jejunal junction which is constant. (Fig. 1.) It may be due, either to a diverticulum at this location, or old inflammatory adhesions, or a perforated gastric ulcer. In the erect posture the entire colon lies below the iliac crest."

She was operated upon April 18, 1923. Findings at operation were as follows: The liver was ptosed, stomach markedly ptosed. There was an old healed constricting ulcer at the pylorus; stones size of grapes were in the gall-bladder; the jejunum was angulated about four inches, below its origin, due to the presence of a diverticulum extending behind the stomach and to the right of the ligament of Treitz, which on being dissected out from its position, to which it was adherent, measured approximately 1½

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inches in all diameters, being circular in shape, with very broad vessels, communicating by a wide opening with the jejunum on the antimesenteric border 4 inches below the duodeno-jejunal flexure. This explains the persistent shadow in the X-ray above the stomach. The diverticulum was thick-walled, and on section showed a mucosal lining and a fibrous outer coat.

Cholecystectomy and appendectomy were performed in the usual manner, the diverticulum was removed at its base, and this opening used in performing a posterior gastro-jejunosomy. Patient made an uneventful recovery and was discharged on the 9th of May, 1923.

From the articles by Balfour, Helvestine, Watson and others we have been able to collect thirty-three cases of diverticula of the jejunum. Of this

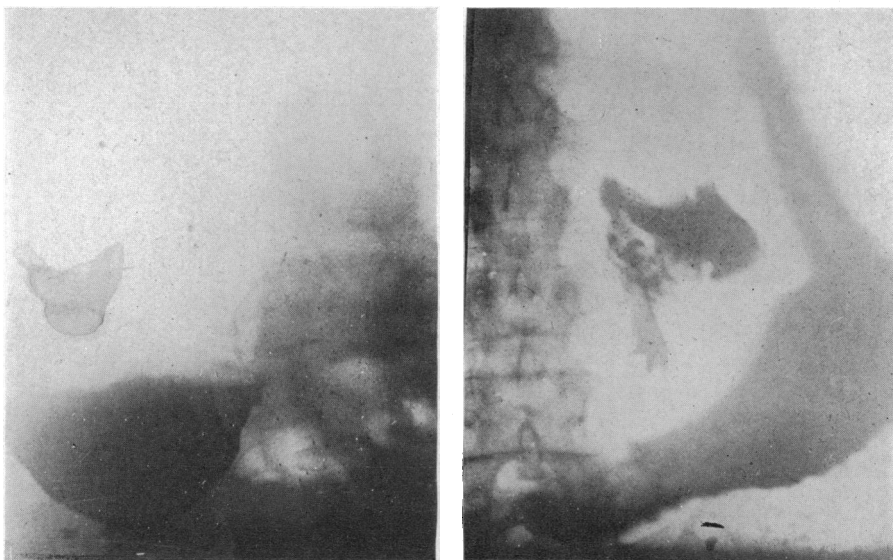


FIG. 1.—Congenital diverticulum of the jejunum in an adult female. It was associated with pyloric stenosis from ulcer, and calculous cholecystitis. Diagnosis of probable diverticulum by Dr. Campbell. Resection of diverticulum, gastro-enterostomy, cholecystectomy. Appendectomy. Recovery. (From Hospitals of the Graduate School, University of Pennsylvania.)

number twenty-one were discovered at necropsy, ten at operation, and no notation of how ascertained in the remaining two cases.

Diverticula may be classified as true and false. The histology of the true type consists of all the coats of the intestine, while the false type lacks the muscular layer. Where this fact was mentioned in the reported cases, there were three true diverticula and eleven of the false type of diverticulum. They were found on the mesenteric border in twenty-one cases and on the antimesenteric border in three cases.

Numerous etiological factors have been considered as responsible for their production. Klebs believed that traction on the intestine by the mesentery was the causative factor. Hauseman attributed them to increased intra-intestinal pressure from the accumulation of gas or fecal material. Graser, to venous congestion causing separation of the muscles of the intestine with a subsequent herniation of the mucosa. Roth considered fatty degeneration of the tunica

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TABLE I.

Reported by	Date	Ascertained	Age	Sex	Number	Type	Size	Location	Symptoms
Sir Astley Cooper	1844	Necropsy	50	Male	Multiple	False	Pea to walnut	Mesenteric	None.
Cornillon	1869	Necropsy	30	Female	Single	False	Hen's egg	Mesenteric	None.
Sir Wm. Osler	1881	Necropsy	65	Male	Multiple	False	Cherry to apple	Mesenteric	Complained of rumbling sounds and colicky pains after eating.
Moore	1883	Necropsy	40	Male	Multiple	True		Mesenteric	None.
Buzzi	1885	Necropsy	77	Male	Single	True	23 x 32 mm.	Mesenteric	None.
Buchwald and Janicke	1887	Operation	6	Male	Single	True		Mesenteric	Intestinal obstruction.
Virchow	1890	Necropsy	890	Male	Multiple	False	Hen's egg	Mesenteric	None.
Edel M.	1894	Necropsy	73	Female	Multiple	False	Walnut to apple	Mesenteric	None.
Seippel	1895	Necropsy	1895	Female	Multiple	False	Walnut	Mesenteric	None.
Latarjet and Murad	1914	Necropsy	50	Female	Single	?	2.5 x 5 cm.	Mesenteric	?
Braithwait	1918	Necropsy	45	Male	Multiple	?	Largest 2.5 cm. diameter	Mesenteric	?
Case	1920	X-ray and operation	61	Male	12	?	One 5 cm. diameter	?	Gastric discomfort and intestinal flatulence.
Case	1920	X-ray and operation	73	Male	?	?	?	?	Patient was operated on for gall-stones. Diverticulum not removed.
Terry and Mugler	1921	Found at operation for duodenal ulcer	59	Female	Multiple	?	?	?	1 1/2 years after operation for ulcer, developed intestinal obstruction due to enterolith in diverticulum.
McWilliams	1921	Necropsy	71	Male	Multiple	?	?	Mesenteric	?
MacKechnie	1921	Operation	43	Female	Multiple	False	Split pea to pig-con's egg	Mesenteric	Incomplete intestinal obstruction.
Good	1895	?	77	Female	Multiple	False	?	Mesenteric	None.

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Author	Year	Case No.	Sex	Number	Location	Operation	Notes	Anti-mesenteric to which was attached access. pancreas	Other
Hansemann	1896	14	Male	Single	?	Necropsy	?	Anti-mesenteric	?
	1896	?	Male	Multiple	?	Necropsy	?	Mesenteric	?
	1897	73	Male	Multiple	?	Necropsy	Pea and walnut	Mesenteric	?
Nicholls	1899	65	Female	Multiple	?	Necropsy	Pea to walnut	Mesenteric	?
Fischer	1900	?	?	Single	?	?	Bean	?	?
Gordinier and Sampson	1905	46	Female	Multiple	False	Operation	?	Mesenteric	Intestinal obstruction.
Taylor and Larkin	1910	68	Female	Multiple	False	Necropsy	Pea to walnut	Mesenteric	Symptoms of ulcer were relieved by anterior gastro-jejunostomy.
Balfour	1913	62	Male	Multiple	?	Observed at operation for gastric ulcer	Hazel to walnut	Mesenteric	X-ray showed shadow simulating that of a perforating gastric ulcer. Died ten days after posterior gastro-jejunostomy.
Akerlund	?	?	?	?	?	Necropsy	?	?	Abdominal pain, loss of weight and "run down" condition.
Hunt and Cook	1921	54	Male	Single	?	Operation	?	?	None.
Hunt and Cook	1921	44	Male	Single	?	Necropsy	Walnut	?	None.
Helvestine	1923	70	Male	Multiple	?	Necropsy	?	Mesenteric	None.
Helvestine	1923	59	Female	Single	?	Necropsy	?	Anti-mesenteric	None.
Sheppe	1924	75	Male	Multiple	False	Necropsy	?	?	None.
Watson	1924	73	Male	Single	?	Operation	?	Mesenteric	Abdominal pains and chronic obstruction.
Baastrop	1924	?	?	?	?	X-ray and operation	?	?	None.

muscularis a sufficient cause, while Sudsiki believed diminished resistance of the connective tissue about the veins was a predisposing factor. Helvestine believes there are three factors operating conjointly in the formation of acquired diverticula: 1. Traction by mesenteric vessels or traction following adhesions. 2. Degeneration of intestinal muscularis. 3. Intra-intestinal pressure.

It is more frequently observed in individuals past the fiftieth year of life. In this series seventeen of twenty-six previously recorded ages were past fifty and of the seventeen, nine, or slightly more than fifty per cent., were found in individuals between seventy and eighty years of age. One case, that of Buchwald and Janicke, was six years old and one of Hansemann's cases was a boy of fourteen. There were nineteen males and ten females. The size varied from that of a pea to an apple. They appeared as single diverticula or multiple.

The symptoms may be acute or chronic. The acute symptoms are usually those of acute intestinal obstruction. This condition existed in the cases of Buchwald and Janicke, Gordinier and Sampson, and Terry and Mugler and in each case a diverticulum containing fecal material or an enterolith was the cause of the acute intestinal obstruction. Four of the cases presented the symptoms of chronic intestinal obstruction. They complained of loss of weight, abdominal pain, and some constipation. Three cases presented other pathological conditions, two associated with ulcers of the stomach and duodenum and one with gall-stones.

Balfour was forced to do an anterior gastro-enterostomy in a case of gastric ulcer because of adhesions between the diverticulum of the jejunum and the colon. Terry and Mugler operated on a case for duodenal ulcer and one and one-half years later operated for acute intestinal obstruction caused by an enterolith in a jejunal diverticulum. A patient, reported by J. I. Case, was operated upon for gall-stones and a large diverticulum of the jejunum confirmed, which had previously been diagnosed by X-ray examination.

But three previous cases were diagnosed before operation by means of X-ray, two by Case and the other by Baastrup.

The surgical treatment consists of the choice of three procedures, first, inversion of the sac; second, resection of the sac, and third, where the involvement is extensive, resection of the affected portion of intestine.

Conclusions.—It is evident from the analysis of the previously reported cases and our own that diverticula of the jejunum may cause symptoms acute and chronic, but that no definite symptom complex can be attributed to their presence. Also that pathology of the stomach, gall-bladder and duodenum may be associated with this condition and only by means of a careful gastro-intestinal X-ray study may it be revealed before operation.

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