

## JEJUNO-GASTRIC INTUSSUSCEPTION FOLLOWING GASTRO-ENTEROSTOMY AND VAGOTOMY\*

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JEJUNO-GASTRIC INTUSSUSCEPTION following operative procedures on the stomach is a rare complication justifying an individual case report. Credit for the first reported case is given to Bozzi,<sup>3</sup> in 1914, reference to which is quoted by Lenarduzzi.<sup>10</sup> Steber<sup>13</sup> reported the second known case in 1917. In 1948, Aleman,<sup>1</sup> while reporting an additional case, summarized 70 cases which he had been able to collect from the literature. Most of these were single case reports. Wisoff,<sup>16</sup> in 1953, in addition to reporting two cases, reviewed the literature. We have been able to find eight additional case reports<sup>2, 4, 6, 8, 9, 11, 12, 14</sup> published since 1949, making a total of 99 published cases.

In 1950, Vink<sup>15</sup> reported the seventh case to follow gastric resection and, in addition, has contributed one of the best discussions of the subject in the English language. Lavadia, Haynes and DeBailey<sup>9</sup> have reported the tenth case following gastrectomy, which was performed for carcinoma of the stomach. Our case is believed to be the 100th reported case of jejuno-gastric intussusception, and the first to follow gastro-enterostomy combined with vagotomy.

### CLASSIFICATION

The classification given in Aleman's excellent discussion has been generally accepted in the literature. Class I is an intussusception of the afferent loop of jejunum into the lumen of the stomach, and is also referred to as a descending intussusception.

Class II, which is the most common (accounting for 74 per cent of Aleman's series), is an intussusception of the efferent loop, and is also referred to as an ascending or retrograde intussusception. Class III, or combined type, is relatively rare and consists of a prolapse of both loops through the gastro-enterostomy stoma, and includes simple invagination. This was the type found in our case. Of the 29 cases reported since Aleman's series, 13 are known to be Class II and one a Class I. The intussusception in Classes I and II is actually a jejunojejuno intussusception which progresses to the point where a small or large portion of the intussuscepted bowel lines within the lumen of the stomach. Anatomically, there are variations of the Class III cases, depending on whether or not the actual line of anastomosis is invaginated into the stomach lumen. These have been indicated diagrammatically by Wisoff.<sup>16</sup>

These cases have also been classified, according to the clinical picture, as acute and chronic. A third classification, based on the time interval from the initial operation, is immediate or late. There can be any combination of anatomical type with a clinical picture that is acute or chronic, and a time interval from a few hours to many years after operation. Indeed, Coates<sup>5</sup> has reported a case which occurred 30 years after anterior gastro-enterostomy.

### ETIOLOGY

The genesis of this condition is generally considered to be functional or on a basis of

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antiperistalsis, but the cause or causes have not been agreed upon. It is certainly true that in none of the cases have there been present any of the pathologic changes associated with the more usual types of intussusception, such as tumor or ulcer. It is also probably significant that the most common type of jejuno-gastric intussusception is retrograde and involves the efferent loop. The combined type is considered by some authors to be a passive phenomenon. Gastric spasms, vomiting, stomach tube suction, or other factors lowering the pressure in the stomach have all been considered. Mechanical causes have also been suggested and among them are shortening of the mesentery of the jejunal loop, pressure from a short mesocolon, adhesions to the mesocolon, a sucking action of the stomach where the stoma is narrow, too large a stoma, jejunal stenosis with obstruction facilitating antiperistalsis, peptic jejunal ulcers, unduly long afferent loop, and other technical imperfections.

#### DIAGNOSIS

A patient with the acute type of jejuno-gastric intussusception presents a picture of high intestinal obstruction or ileus. Pain is a predominant feature, with vomiting which sometimes contains blood. An upper abdominal scar, or a history of having had a gastro-enterostomy or, less commonly, a gastric resection is, of course, invariably present and should suggest this diagnostic possibility. The chronic or, perhaps better termed, intermittent type suggests the picture usually associated with bleeding peptic ulcer. It may occur intermittently for a period of years, or may progress at any time to colicky pain and vomiting. Whereas the acute type usually involves a single loop, and usually the efferent loop of the gastro-

enterostomy, the chronic type may be any one of the three anatomical classes.

It is a truism, as in any of the more rare diseases, that one must think of the diagnosis to make it. Confirmation, however, should be obtained by barium studies of the stomach. A filling defect in the stomach with circular parallel striae, typical of Kerkring's folds, and originating in the stoma site, is pathognomonic. Formerly, the diagnosis was missed even after radiographic study. The typical roentgenogram is best demonstrated in the chronic or intermittent cases.

#### TREATMENT

The treatment of jejuno-gastric intussusception is always surgical. Simple disinvagination is usually possible, but not always sufficient in itself to maintain the reduction or prevent recurrences. Some surgeons have attempted to prevent recurrences by fixing the jejunal loops to each other, or to the colon or mesocolon with or without entero-enterostomy. If the condition follows a simple gastro-enterostomy, the best treatment is gastric resection if the patient's condition permits. In either situation, re-doing the anastomosis should always be considered. Of course, if there is gangrenous bowel, resection will be necessary. The high mortality associated with this condition is usually owing to the poor preoperative condition of the patients, and the rate is directly proportional to the length of time since the onset of the acute condition. Within 48 hours the mortality rate is 10 per cent; after another 48 hours it rises to 50 per cent (Vink<sup>15</sup>).

#### CASE REPORT

*History.* A 62-year-old farmer was admitted to the Orthopedic Service on May 26, 1953, with the chief complaint of pain in the left hip of 6 months' duration. The patient had had occasional pain since

FIG. 1. Gastro-intestinal series before first operation, frontal projection, showing complete obstruction by cicatrizing duodenal ulcer with hypotonic, dilated stomach.

FIGS. 2 and 3. Gastro-intestinal series after first operation, frontal and lateral projections, showing intussusception of anastomotic jejunal loops obstructing jejunum and distal loop.

FIG. 4. Gastro-intestinal series after first operation, three-hour film, demonstrating complete obstruction.

JEJUNO-GASTRIC INTUSSUSCEPTION

FIG. 1.

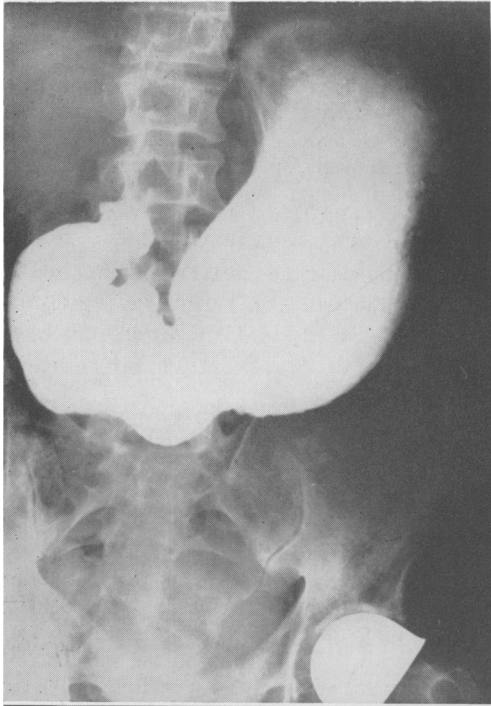


FIG. 2.

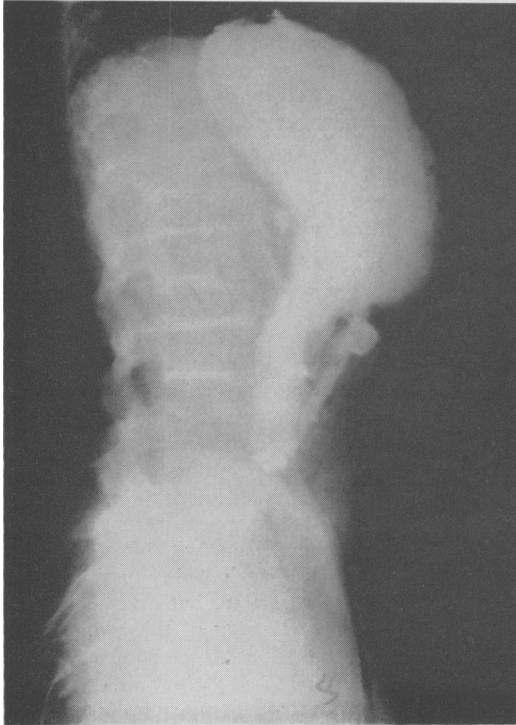
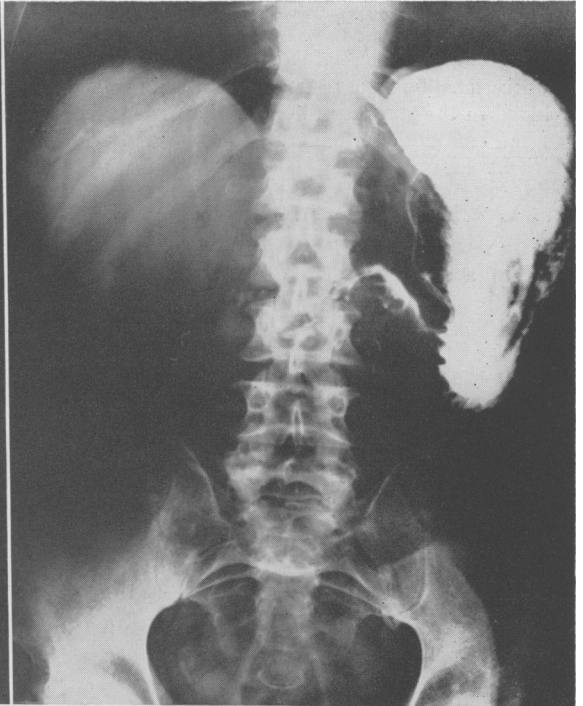


FIG. 3.



FIG. 4.

(See legend on facing page.)

childhood, but during the past few months had been completely disabled.

In addition to some dyspnea of 7 years' duration, the review of systems revealed that this patient had had occasional bouts of epigastric pain, with streaks of blood in the stool for the past 3 years. He had had an episode of vomiting 1 year previously, which his local physician had attributed to a gall-bladder disturbance. Although he stated his appetite was good, he later admitted that he had voluntarily restricted his diet markedly to very bland foods to avoid abdominal distress. His average weight for a number of years had been between 145 and 150 pounds.

*Physical Examination.* The patient appeared to be a weather-beaten, chronically ill white male, weighing 143 pounds. Except for atrophy of the left testicle, significant physical findings on admission were limited to the left hip. The hip was in a position of slight flexion and adduction, with marked pain on either active or passive motion in any direction.

*Laboratory Findings.* The admission blood count was within normal limits. The urinalysis was essentially negative, with a specific gravity of 1.021. The serology was negative; N. P. N., 36 mg. per cent; and total proteins, 7.4 Gm. per cent with a normal A-G ratio. The electrocardiogram on June 5, 1953, was normal.

*Roentgenogram.* The roentgenogram of the chest showed moderate pulmonary emphysema and fibrosis. The roentgenogram of the left hip revealed a mushrooming of the head of the femur with advanced hypertrophic changes.

*Course in Hospital.* On June 19, 1953, a vitalium cup anthroplasty was performed for the disease of the left hip. His immediate course was uneventful. On July 31, after a short course of oral cortisone given to assist in his rehabilitation, the patient complained of epigastric pain. The cortisone was discontinued, but during the next week the patient vomited twice. A gastro-intestinal series on August 10 revealed almost complete pyloric obstruction (Fig. 1). The stomach was emptied by Levin tube suction and a first day Sippy regimen instituted.

During the next 10 days the patient's diet was gradually increased to a fifth day Sippy, and he improved generally. However, bedtime aspirations of the stomach ranged from 200 to 500 ml., with occasional values as great as 750 ml. His weight remained stationary and he continued to have some epigastric pain, particularly at night. Preparation for operation was begun on September 8, with continuous gastric suction and parenteral alimentation.

Abdominal exploration on September 11 revealed massive inflammatory reaction of the first

portion of duodenum, with fixation both to the pancreas and to the hepaticoduodenal ligament. Because of the patient's poor physical condition, and since it was apparent that freeing the duodenum would be a long, tedious and hazardous undertaking, gastroenterostomy with vagotomy was decided upon. Generous segments of both vagus nerves were removed. A posterior gastroenterostomy was performed through a rent in the left side of the mesocolon, utilizing a short loop of proximal jejunum and the most dependent portion of the stomach exactly along the greater curvature. A continuous lock-stitch of #000 chromic catgut was used for the inner layer, and interrupted #0000 cotton for the outer seromuscular row of sutures. The edges of the rent in the mesocolon were tacked to the stomach wall above the anastomosis. The abdominal wound was closed in layers.

The patient's immediate postoperative course was satisfactory. On the third day large amounts of bile were noted coming from the Levin tube, but no peristalsis could be heard on auscultation of the abdomen. A trial of oral fluids with his tube clamped was not tolerated. It was also noted that the daily volume of aspirated gastric secretions increased abruptly from 440 ml. on the third postoperative day to a volume ranging from 1700 to 3300 ml.

It became apparent that our difficulty was something more than simple edema of the anastomosis, although at no time did the patient have evidence of an acute abdominal condition or signs of toxicity. A barium roentgenologic examination of the stomach indicated obstruction, not only to the efferent loop of the anastomosis, but also of the antrum of the stomach distal to the site of anastomosis (Fig. 2 to 4). We postulated a mechanical type of obstruction, necessitating re-exploration, although an exact diagnosis was not made. Abdominal exploration on September 29 revealed extensive adhesions posterior to the mesocolon which were freed in order to expose the anastomosis. The adhesions themselves, however, did not appear to be causing the obstruction, and there was no kinking or twisting of the jejunum. After separating the mesocolon from the stomach, it was demonstrated that the stoma site itself, including approximately 5 cm. of each arm of the jejunal loop, was intussuscepted into the lumen of the stomach. This intussusception could be reduced by traction, but due to the extensive edema and thickening of the jejunal wall and the persistent angulation remaining after the reduction, it was thought best to take down the anastomosis. The involved portion of the jejunum was resected, and end-to-end anastomosis performed. A somewhat longer loop of jejunum was now brought up anterior to the colon, and a gastro-

jejunostomy performed, utilizing, however, the same opening in the stomach on its greater curvature. The suture technic was the same as that used previously. A small, plastic nasal tube inserted into the stomach prior to operation was threaded through the anastomosis into the distal jejunal loop. As an additional safeguard to insure an avenue of alimentation, a Stamm type of jejunostomy was performed through a small stab wound, utilizing the distal jejunum. The patient withstood the somewhat lengthy procedure well, and his postoperative course was normal. On the second postoperative day fluids were given through the plastic nasal tube into the efferent jejunal loop and the diet gradually increased by mouth. During the second postoperative week the jejunostomy was used to give a high protein supplement in addition to his oral intake. The jejunostomy tube was finally removed on November 16, following which the fistula closed promptly. He was transferred to the Orthopedic Ward on November 19, 1953, in good condition. A gastro-intestinal series in January 19, 1954, showed a normally functioning gastro-jejunostomy.

#### DISCUSSION

This patient developed pyloric obstruction from a previously undiagnosed duodenal ulcer, possibly precipitated by the cortisone given to assist in his rehabilitation following an arthroplasty of the hip. His somewhat prolonged conservative treatment was based on the hope that his general condition and nutrition could be improved, rather than with any idea of avoiding ultimate surgical therapy. This hope did not materialize, but very little ground was lost. The ultimate choice of operative procedure was dictated largely by the pathologic condition found on exploration. Although we consider a 75 or 80 per cent resection as the operation of choice in the surgical treatment of duodenal ulcer, experienced surgeons, even if they are not in the group which considers vagotomy the preferred operation, will resort to vagotomy and gastro-enterostomy in situations where undue risk would be associated with gastric resection.

After development of the high obstruction, which from a study of its course apparently occurred on the fourth postoperative day, the persistence of conservative

measures was felt justified on the basis that the failure of the stomach to empty might be explained by an unusual delay in the subsidence of edema about the anastomosis, plus an ileus and atony of the stomach secondary to vagotomy. Preoperative diagnosis of the complication was not made, largely because a diagnosis of jejuno-gastric intussusception was not thought of and, also, because the roentgenologic findings were not typical.

As previously indicated, there is no agreement as to the cause of jejuno-gastric intussusception. In this particular case, it is felt that a contributing factor, at least, was the fact that the stomach was markedly dilated and atonic at the time of the gastro-enterostomy. The site of the anastomosis was apparently not a factor, since the same gastric opening was utilized when the anastomosis was performed again without further complication. At this time the stomach had partially recovered its tone and diminished in size. The involvement of both loops of jejunum in the intussusception is rare, but fits with Aleman's statement that the combined loop type is usually closely associated in time with the original operation on the stomach.

The fact that we were able to maintain this patient's fluid and electrolyte balance within normal limits, and to limit his weight loss to three pounds during the crucial period, were factors in his recovery.

#### SUMMARY

1. A case of jejuno-gastric intussusception following gastro-enterostomy and vagotomy has been reported. This is believed to be the 100th reported case of jejuno-gastric intussusception, and the first such case to have followed gastro-enterostomy combined with vagotomy.

2. This complication was successfully treated by secondary operation, at which time the rare type of combined loop intussusception was recognized. The posterior gastro-enterostomy was taken down, and an

anterior gastro-enterostomy performed, utilizing the same stomach opening.

3. The literature on the subject has been reviewed, with a discussion of the diagnosis, etiology and treatment of the condition.

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