JEJUNOGASTRIC INTUSSUSCESSION

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Retrograde intussusception of the jejunum into the stomach is well recognized as a rare complication of gastro-jejunostomy. Although, as Debenham (1935) pointed out, the operation was first performed by Wölfer as long ago as 1881, no case of retrograde intussusception seems to have been recorded until that of Steber in 1917. This was included in an article by Hamilton Drummond (1923), in which he reviewed 13 cases recorded to date and added one of his own. Since then the subject has been further discussed in many articles, notably those of Bettman and Baldwin (1933), Adams (1935) and Shackman (1940).

Until recently, however, little reference had been made to this condition complicating partial gastrectomy. Lundberg (1922) was the first to describe its occurrence, in a woman of 41, 10 years after resection of the pyloric end of the stomach supposedly for carcinoma. Smith (1955) reviewed 16 cases taken from the literature (13 of them within the last decade) and described a further case of his own. Lavadia et al. (1953) reported the first retrograde intussusception (with the possible exception of Lundberg's) to follow partial gastrectomy for carcinoma. It would thus appear that this complication, though showing a steady increase in recorded instances during recent years (related, no doubt, to the greater number of gastrectomies performed), is still rare, and the following case may therefore be of interest.

Case Report

A dock labourer, aged 47, was admitted at 6 p.m. on August 15, 1953, with epigastric pain and vomiting. He gave a 15-year history of indigestion due to gastric ulcer, for which partial gastrectomy had been done at another hospital in 1942. He was well for some seven years after operation and then began again to suffer from epigastric discomfort between meals, worse when anxious or constipated, but not severe enough to keep him from work. There was occasional 'acid' regurgitation, but no vomiting or bleeding. During this time he was on no special diet or medical treatment.

At 1 a.m. on the day of admission he was awakened by epigastric pain, which came on in spasms every five to 10 minutes. The pain was colicky, each attack being accompanied by a gurgle and relieved by vomiting. His bowels had not been open for two days and the previous evening he had taken three Beecham's pills, five milk of magnesia tablets and a Seidlitz powder. Only five hours before the onset of the patient's symptoms his wife had met with an accident and been brought to the casualty department with a fractured humerus.

On examination the patient looked ill and in obvious pain, with a dry, furred tongue. His temperature was 99.6°F., pulse-rate 80, respiration 20 and blood pressure 156/90 mm. Hg. His abdomen showed an upper right paramedian scar; there was epigastric guarding, but no tenderness or palpable mass, and peristaltic sounds were excessive. He was vomiting brown fluid which contained partly digested food. A provisional diagnosis of acute small-intestinal obstruction was made.

Treatment began with half-hourly aspiration through a Ryle's tube and dextrose saline by continuous intravenous infusion. An enema produced no faecal result. The patient's symptoms were much relieved, but next morning he still complained of short spasms of pain and the stomach aspirations were blood-stained. Laparotomy was therefore decided upon.

Operation (5 p.m., August 16).—Under general anaesthesia by Dr. Eve Hammer, an upper left paramedian incision was made. The previous operation was found to have been an antecolic Polya gastrectomy, the jejunum passing from lesser to greater curvature. Approximately 12 in. (30 cm.) of the efferent jejunal limb had intussuscepted in an anti-peristaltic direction into itself and through the stoma into the stomach, as shown in the diagram. The intussusception was easily reduced by pulling on the jejunum. The affected bowel appeared swollen and oedematous; neither stomach nor jejunum showed any sign of ulceration. No further procedure seemed necessary and

* Aleman (1948) states that Bozzi described the first case in 1914, but gives no reference to Bozzi's writing.
Diagram of intussusception as found at operation: 
G, gastric stump; D, duodenum; J, jejunum; 
A, apex of intussusceptum.

the abdomen was closed. The Ryle’s tube was 
taken next evening; thereafter the patient made 
a steady recovery and was discharged home on 
August 29.

Follow-up.—Fractional test meal two weeks 
later showed absence of free hydrochloric acid from 
all specimens. Radiography after a barium meal 
demonstrated a normally functioning stoma and 
the stomach was empty within one hour. When 
seen on September 24 the patient was well and 
ready to return to work.

Discussion

Aetiology

Drummond (1923) put forward the suggestion 
that following gastrojejunostomy the acid stomach 
contents, emptied more rapidly than normal, cause 
irritation of the upper jejunum, resulting in forcible 
anti-peristaltic action which may lead to actual 
intussusception back into the stomach. This 
obviously cannot apply to post-gastrectomy 
patients, in whom there is usually achlorhydria, 
as in the present case; and against Drummond’s 
theory, too, Adams (1935) noted the absence of 
any record of anastomotic ulcer associated with 
intussusception. In this, however, he was mis-
taken, for Kopp in 1925 reported a case in which 
the intussuscepted portion of jejunum was resected 
and found to contain an ulcer, involving mucosa 
and submucosa of the ensheathing layer, while 
Drummond’s own patient perforated an acute 
peptic jejunal ulcer only three months after his 
retrograde intussusception.

In Blond’s (1928) view, the basis of these post-
operative complications was a ‘functional spasm of 
the anastomosis-bearing segment of stomach,’ 
and he supported this by evidence from a series 
of operations performed on dogs for a different 
purpose, namely, to work out a method for total 
duodenectomy. Of the animals who perished after 
the first stage of the operation (gastrojejunostomy 
and partial resection of the duodenum), a high 
proportion showed contraction of the stomal por-
tion of the stomach, with dilation of the fundus. 
In two dogs, each of which had undergone resec-
tion of the pyloric part of the stomach with end-to-
side anastomosis of stump to jejunum and had died 
respectively four and five days later, autopsy 
revealed intussusception of jejunum into stomach. 
A third dog, with a long-loop anterior gastro-
jejunostomy, which died 30 days after operation, 
was found to have two jejunal ulcers near the 
stoma, one of them perforated. Blond regarded 
intussusception and peptic jejunal ulceration as 
progressive stages in the post-operative disturb-
ance of function that begins with cramming of the 
sutured loop of jejunum in the spastic stomach 
segment. He suggested, moreover, that the inter-
ference with circulation to be expected in inter-
mittent ascending intussusceptions would provide 
a locus minoris resistentiae for the development of 
jejunal ulcer.

Von Brunn is quoted by Adams (1935) as com-
paring the disparity in size between stomach and 
jejunum with that between caecum and ileum, 
regarding this as a factor predisposing in both 
instances to intussusception; but this would not 
account for Debenham’s (1935) case, for example, 
in which a retrograde intussusception of the 
jejunum had not, at the time of operation, reached 
the stoma, and in the present case it is evident, by 
reference to the diagram, that the invagination 
began at a point in the jejunum beyond the 
anastomosis, and not at the stoma itself, being 
thus analogous with ‘ileo-colic’ rather than ‘ileo-
caecal’ intussusception. Furthermore, retrograde 
intussusception of the jejunum can occur without 
previous operation, as reported by Wu and Chang 
(1944), whose patient developed acute obstructive 
symptoms four hours after a meal of highly spiced 
food together with a pint of Chinese ‘white wine.’

The fact that most of the recorded cases involve 
the efferent limb of jejunum is simply explained 
by the greater mobility of this as compared with 
the afferent limb. It is noteworthy that in both
Wydler’s (1924) and Darling’s (1926) cases with intussusception of the afferent limb only, this was longer than usual, measuring 30 cm (1 ft.) and 2½ ft. (84 cm.) respectively.

According to Palmer (1954), gastroscopy has shown that in the post-operative stomach retrograde pouching of jejunal mucosa through the stoma is a very common finding, and this might well be the starting point of either acute or chronic intussusception. His own two cases, which belonged to the chronic recurrent form and were confirmed by X-ray, both followed subtotal gastrectomy and spontaneous reduction took place—one of the patients had seven attacks in all. This is interesting in view of Aleman’s (1948) explanation of the rarity of intussusception following partial gastrectomy (as compared with its incidence in gastrojejunostomy), namely, that counter-pressure against an invagination within the gastric stump after partial gastrectomy becomes greater than when the whole stomach is present, as is the case in simple gastrojejunostomy. Hence the tendency to retrograde invagination past the stoma is minimized, and if it does occur spontaneous reduction is more apt to result. It should be pointed out, however, that the chronic intermittent type of intussusception is also met with after gastrojejunostomy, as in Sibley’s (1934) case and Richardson’s (1953) two cases, all confirmed by radiography; while Cameron and MacFarlane (1935) described a patient, in whom an acute intussusception was found post-mortem, who had suffered from periodic gastric discomfort since gastrojejunostomy performed six years before, and these authors suggest that the chronic form may be commoner than is generally believed.

It is a curious fact that no local lesion (apart from jejunal ulcer) has ever been found as a possible cause of jejuno gastric intussusception. Retrograde intussusception elsewhere in the gastrointestinal tract has, on the other hand, been reported in a number of instances as showing some local cause (benign or malignant neoplasm, foreign body, Meckel’s diverticulum), the same being true of the much more frequent forward intussusception (Akehurst, 1955).

There are three points in the present case history that may be significant in relation to aetiology: first, the four years of epigastric discomfort preceding the acute illness could be explained as due to a mild degree of the ‘chronic intermittent’ intussusception already mentioned; secondly, the patient’s acute symptoms started within a few hours of his wife’s accident; and, thirdly, he had just dosed himself with laxatives in excess of his usual habit (which was, to take three Beeham’s pills every few days). The emotional and medicinal stimuli to peristalsis, combined with a tendency to jejuno gastric pouching, might well account for the frank intussusception that ensued.

**Diagnosis**

Adams (1935) states that pre-operative diagnosis, though rarely made, is possible, depending on the rule ‘Where haematemesis or obstructive symptoms appear after gastro-enterostomy, think of intussusception.’ That this applies also to Polya and related types of gastrectomy is illustrated by the present case, in which both obstructive symptoms and haemorrhage occurred, the haemorrhage at a somewhat late stage. In this patient 11 years elapsed between operation and intussusception, but in recorded cases the period has varied from six days (Lewisohn, 1922) to 19 years eight months (Bansmer, 1954), with an average of seven years.

Adams further gives a triad of signs which, if found in a case of acute intestinal obstruction, are diagnostic of retrograde intussusception: (1) an epigastric scar; (2) visible peristalsis from left to right; (3) a palpable mobile swelling about the mid-abdomen; but of these only the first is consistently present, and after a high gastric resection the mass may be hidden beneath the thoracic cage, as in Grimes’s patient (1949).

The importance of early diagnosis was shown by Bettman and Baldwin (1933), who found that of 15 patients operated upon within 48 hours of onset one died, whereas of 10 operated upon after 48 hours five died. In the present case the stomach aspirations did not become blood-stained until 34 hours after the onset of symptoms; it would, therefore, seem undesirable to await this feature before deciding to operate, and a patient with acute obstruction following gastrojejunostomy or partial gastrectomy should undergo laparotomy without delay.

Von Brunn (1924) claims to have been the first to use radiography in the diagnosis of jejuno gastric intussusception; in his patient, a woman six months pregnant who had previously undergone gastrojejunostomy, he describes a characteristic ‘fan-shaped’ pattern of the filling defect caused by the jejunal loop lying in the stomach, with flattening of the greater curvature, obliteration of the stoma and failure of contrast medium to reach the intestine. Adams, writing in 1935, was opposed to using contrast radiography in acute cases: ‘It is scarcely feasible in those with obstructive symptoms, while to use it where ulcer might be the cause of haemorrhage would be rash.’ Moreover, the barium meal may even be misleading, as it was in Grimes’s (1949) case, which showed a deformity suggestive of a penetrating ulcer at the junction of jejunum with stomach. Aleman (1948), however, found that, although only 18 cases from the literature had been examined.
with radiopaque media, the diagnosis was made as a result in 14, and on review could have been made in three more. His own patient was diagnosed in the second attack by barium meal, the first attack (a typical acute one, six years before) having settled spontaneously without operation. Smith (1955) recommends that barium meal examination and gastroscopy should be used routinely where intussusception is suspected on the ground that they provided confirmation in six of his series. There is, then, a strong argument for the use of radiography when facilities are readily available, but operation should not be delayed for this purpose where a reasonable diagnosis can be reached on clinical evidence alone.

Treatment

The mortality in, unoperated cases of acute jejuno-gastric intussusception approaches 100 per cent.; indeed, all such cases so far reported have died, but this excludes those milder attacks in which spontaneous reduction occurs and which more properly belong to the chronic recurrent type distinguished by Palmer (1954). Since it is not possible to foretell whether spontaneous reduction will take place, all are agreed that, once the diagnosis is made, the correct treatment is laparotomy and reduction of the intussusception; occasionally resection of irreducible or gangrenous jejunum is necessary.

There is less agreement about the best way to prevent recurrence or, indeed, as to whether any further measure is needed. Recurrence of this complication after operative reduction is exceptional: the only instances reported, so far as the writer is aware, are those of Baumann (1919), Hublin (1951), Douglas (1954) and Burdman (1954), the last case having recurred twice. All these followed gastrojejunostomy. In Douglas's patient on the first occasion, after reduction of the intussusception, the efferent loop of jejunum was sutured to transverse colon for about 3 in. in an attempt to prevent recurrence; five months later, at the second laparotomy, no trace of this attachment remained. Hublin's case showed an enterointer-anastomosis one hand's breadth in size; it was narrowed by a few stitches, but this did not prevent a return of the intussusception three years later: on each occasion the descending portion of jejunum had actually passed through the enterointer-anastomosis aperture and along the ascending limb into the stomach. Drummond (1923) wrote that there was no known method of preventing recurrence, but in his own case he operated again 16 days later and converted a long-loop gastrojejunostomy into one with no proximal loop, hoping in this way to lessen the chance of the intussusception recurring.

Adams (1935) also did not consider any further step desirable, although in his patient, after reducing the intussusception, he stitched the efferent jejunal limb to the short afferent loop, which was relatively fixed at the duodenojejunal flexure, but, as he pointed out, in several cases enterointer-anastomosis had already been done at the original operation, so that mere suturing together of afferent and efferent limbs was unlikely to prevent recurrence. Indeed, Hublin (1951) describes three cases, besides that mentioned above, in all of which the descending limb was invaginated retrograde through the enterointer-anastomosis and 'passed through the ascending limb into the stomach, that is to say, in the direction of the normal peristalsis . . . seized by the normal peristalsis and carried on by it,' indicating that the enterointer-anastomosis itself contributed towards the intussusception. Hublin's practice was to suture the ascending and descending loops of intestine to each other beyond the enterointer-anastomosis for a length of 15 to 20 cm.

More elaborate procedures described by Maingot (1953) include undoing the gastrojejunoanastomosis, followed by partial gastrectomy. This was carried out, for example, by Butler et al. (1945), Bansmer (1954) and Johnson (1955). In all these cases some type of gastrojejunal anastomosis was used. But unless performed by the Billroth I method (often unsuitable to these patients, most of whom have had duodenal ulcers), gastrectomy is clearly no guarantee against future intussusception, for this complication has occurred after practically every other type of gastrectomy (Smith, 1955). Sibley's (1934) patient, a woman aged 70 who had suffered from chronic intermittent intussusception for eight years following gastrojejunoanastomosis for pyloric ulcer, was completely relieved of her symptoms by disengaging the gastrojejunoanastomosis and performing gastroduodenostomy at the site of an hour-glass contracture that had developed near the pylorus. Richardson's (1953) second case, a woman of 33 with chronic jejunal prolapse visible through the gastrooscope, was successfully treated by Billroth I partial gastrectomy.

Although recurrence has not yet been recorded in cases of intussusception following partial gastrectomy, Aleman's views (discussed above) on the effect of a small gastric stump in counteracting any tendency to retrograde intussusception caused Lavadia et al. (1953) to suggest that if their patient came back with recurrence of symptoms further resection of the gastric stump would be indicated. It seems unlikely that this would achieve its object, since intussusception has taken place even after 'subtotal' and 'five-sixths' gastrectomies (McNamara, 1944; Grimes, 1949; Welbourn, 1955).

On the evidence one is led, then, to conclude
that after reduction (or resection) of the intussusception no other procedure is required.

Summary

The case is described of a man who developed acute retrograde jejuno gastric intussusception 11 years following partial gastrectomy for gastric ulcer. The intussusception was reduced at laparotomy, from which the patient made a complete recovery.

The aetiology, diagnosis and treatment of this condition, which more frequently complicates gastrojejunostomy, are discussed. Besides the acute intussusception, a chronic intermittent form has been recognized and confirmed by barium meal examination and gastroscopy.

Unoperated, the acute form is fatal, but recovery is the rule if early operation is undertaken. No method has been shown to prevent recurrence, which, however, is rarely seen after simple operative reduction.

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