Imaging Depiction of Retrograde Jejunogastric Intussusception

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Abstract Retrograde jejunogastric intussusception is an unusual long term complication of gastro-jejunostomy or Billroth-II reconstruction. Acute and chronic forms have been well recognised with the acute form being fatal without timely surgical intervention. The imaging findings are diagnostic, and an established emergency imaging protocol would be very useful for clinical decision making, as the clinical features are usually ambiguous. We present the systematic imaging description in a case of retrograde (type II) jejunogastric intussusception with strangulation following gastric bypass procedure.

Keywords Intussusception 1 · Retrograde jejunogastric 2 · Strangulation 3

Introduction

Jejunogastric intussusception (JGI) following gastric bypass surgeries is an unusual postoperative complication with a reported incidence under 0.1 % [1]. Early diagnosis is the key to prompt surgical intervention (within 48 h), which is the only method to reduce the high mortality rate (10–50 %) usually associated with this complication [2, 3]. Following an initial description of the entity [4], numerable reports and only a few short series exist in the contemporary medical literature. Strangulation of the intussusceptum is, however, a rare secondary complication. We present a case of retrograde (type II) jejunogastric intussusception with strangulation following the gastric bypass procedure.

Case Report

A 70-year-old male patient was admitted to the emergency department of our tertiary care hospital following multiple episodes of abdominal colic over the preceding week. Pain was associated with recurrent vomiting of altered blood mixed with undigested food material. The patient had undergone a gastric bypass procedure in a peripheral hospital, but was unable to provide any documentation of the exact procedure performed. On physical examination, epigastric fullness with a median epigastric surgical scar measuring 8 cm was noted. Associated diffuse abdominal tenderness was also present. No feature supporting the clinical suspicion of bowel obstruction could, however, be noted on plain abdominal radiography (erect anteroposterior view), and a contrast study with oral water-soluble iodinated contrast (Gastrograffin study) (Fig. 1) was performed. The upper GI series of the study revealed the distended contrast-filled stomach showing intraluminal tubular filling defect, the outer surface of which showed the concentric striations of valvulae conniventes suggestive of intussuscepted jejunal loops. Ultrasonography of the stomach showed gastric distension with intraluminal aperistaltic jejunal loops (Fig. 2). Absence of mural vascularity, on color Doppler, in the intussusceptum raised a suspicion of strangulation. A computed tomography was, therefore, performed, which showed a markedly distended, fluid-filled stomach reaching approximately up to pelvic brim. Classical swirling appearance of intussuscepted loops was seen within the body of the stomach with the mesenteric core including central fat and vessels being pulled along with intussuscepted bowel loops (Fig. 3). No wall enhancement was noted in intussuscepted loops, confirming the suspicion of strangulation of intussusceptum.

After initial resuscitative measures, an emergency laparotomy was carried out. The per-operative findings confirmed with the imaging features. The stomach was distended with presence of posterior gastrojejunostomy through which the efferent jejunal loops were entering into

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Fig. 1 Barium meal study, radiograph obtained in AP projection demonstrates presence of jejunal loop (*open arrow*) identified by valvulae conniventes, in side distended stomach (*solid arrows*)

the gastric lumen (Fig. 4). The wall of the intussusceptum revealed ischemic changes in the form of severe edema, petechial bleed, and thrombosed vascular plexus. Reduction of the intussusception was done, followed by resection of the gangrenous segment and end-to-end jejunal anastomosis. The patient had an uneventful postoperative recovery and was discharged as per protocol. The patient was asymptomatic on regular interval of follow-up.

Discussion

Retrograde JGI is a rare complication after gastric bypass surgeries. The association of this entity has been described with most types of gastroenteric anastomoses, except Billroth I procedure. The first case of retrograde JGI following

Fig. 2 Transverse ultrasonographic image through the epigastrium revealed distended stomach. The lumen of the stomach is filled with jejunal loops (*arrow*) encircling a mesenteric core

Fig. 3 Axial contrast enhanced CT scan shows dilated non-opacified bowel loops (*arrowhead*) with central mesenteric core in contrast filled dilated stomach. No evidence of wall enhancement of intussuscepted loops was noted, consistent with ischemia. Contrast opacification is noted in the distal loops

gastrojejunostomy was reported in 1911 by Bozzi [4], but the etiology remains poorly understood till date [5]. Two major hypotheses are those of the functional and mechanical causes, respectively, former being the more widely accepted one. According to this theory, the disordered motility with functional hyperperistalsis triggered by spasm or hyperacidity in a hyper-reactive postoperative stomach causes a positive superior pulsion-type effect on the efferent jejunal loops [6], which, therefore, prolapsed back into the gastric lumen. Mechanical factors include adhesions leading to intussusception of a more mobile segment into fixed segments, a long mesentery, gastric derangements, and sudden increase in abdominal pressure [3, 6]. In the present case, however, no such mechanical factors could be assessed on surgery, as the anastomotic site was healthy and clear of any adhesions. The initial acute colic, preceding abdominal

Fig. 4 Per-operative photograph showing long segment of gangrenous intussuscepted efferent loop (*arrows*). Resection and end to end anastomosis of this segment was done

distension in our patient, moreover points toward the functional cause being more likely. Retrograde peristalsis has been implicated in causation of most other types of intussusceptions and may very well be augmented in postoperative cases with altered anatomy. The clinical picture in most cases of JGI is usually nonspecific, and the possibility of intussusception may not even be considered. The dominant symptom is pain, occasionally associated with nausea and vomiting. Patients may present with high intestinal obstruction or severe hematemesis due to ulceration, secondary to bowel wall ischemia [7]. Although our patient had bowel strangulation and ischemia, no hematemesis was reported. This was probably due to thrombosis of most vessels, as noted on surgery.

Imaging remains the mainstay for evaluation and initial diagnosis of such cases. Plain radiography may occasionally reveal the gastric fluid level with a filling defect. A homogeneous density may be seen in the left upper quadrant that represents small bowel in the stomach [8]. A water-soluble upper GI contrast study is however the investigation of choice and reveals a “coiled-spring” appearance (of the jejunal intussusceptum) within the stomach. Ultrasonography and CT scan examinations were however performed in the present case to confirm the diagnosis and evaluate for the suspected strangulation. These are usually not required after a properly performed UGI series with water-soluble oral contrast. Upper GI endoscopic examination is diagnostic and has been proposed to therapeutic, by manual relocation of the bowel loops. In cases where strangulation and bowel ischemia exists, surgery is the only option, as the ischemic bowel has to be resected [2]. The widely accepted anatomical classification, proposed by Shackman in 1940, distinguishes three categories of jejuno gastric intussusception: type I, afferent loop intussusceptions (antegrade); type II, efferent loop intussusception (retrograde); and type III,

mixed type. Type II is the most common (80 %) with two other types accounting for 10 % [9]. In the case presented, type II jejuno gastric intussusception was documented.

Apart from reporting a rare entity of postoperative retrograde jejuno gastric intussusception, the present report stresses on an imaging algorithm including an oral water-soluble contrast study for initial diagnosis, followed by advanced imaging modalities such as ultrasonography and CT scan to evaluate bowel ischemia. This can enable the triage between patients who can be managed conservatively with an attempt of endoscopic relocation and those mandating immediate surgical intervention.

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