

3-1-2015

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## Recommended Citation

Chegondi, Madhuradhar; Loux, Tara; Totapally, Balagangadhar R.; and Burnweit, Cathy A., "Unusual etiology for upper gastrointestinal bleeding in a previously healthy child" (2015). *HWCOM Faculty Publications*. 46.

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## Unusual etiology for upper gastrointestinal bleeding in a previously healthy child



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### ARTICLE INFO

#### Article history:

Received 27 January 2015

Received in revised form

26 February 2015

Accepted 1 March 2015

#### Key words:

Paraduodenal hernia

Children

Upper GI bleed

### ABSTRACT

Paraduodenal hernia (PDH) is the most common congenital internal hernia and rarely presents in pediatric age group with acute abdominal symptoms. We report a six year old boy who has recurrent vague abdominal pain, vomiting for six months and massive upper GI bleed at admission, found to have left sided PDH and small bowel ischemia intraoperatively and underwent small bowel resection and PDH repair. He was discharged from hospital on day 6 postoperative day after uneventful course.

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### 1. Case

We report the case of a previously healthy six year old male who presented to the emergency department (ED) with epigastric pain and vomiting, initially food, then bilious material. On further questioning of his family, he had been having intermittent episodic abdominal pain resolved by vomiting over the past six months. Evaluation by his pediatrician on several occasions with blood work and abdominal radiograph had been unrevealing. On arrival, the patient was afebrile with stable hemodynamics, minimal epigastric fullness and tenderness on palpation. While in the ED, he had two episodes of large-volume hematemesis and became tachycardic. The surgical team was consulted, and fluid resuscitation with crystalloid was initiated, followed by transfusion of uncross-matched packed red blood cells when he continued to actively vomit bright red blood. Initial laboratory evaluation revealed a white blood cell count of 11,100/uL with 76% neutrophils, hemoglobin 11.7 g/dL, mildly

elevated total and direct bilirubin (4.0 and 2.4 mg/dL, respectively) with mild hepatic transaminitis (AST 78 and ALT 42 international units/liter) normal (22–44 and 12–34 international units/liter, respectively).

He was transferred to the pediatric intensive care unit (PICU) and started on pantoprazole drip and ice water gastric lavage through a nasogastric tube. He became agitated and continued to have active bleeding from the nasogastric tube without melena. The abdomen was noted to be increasingly distended with no other sites of active bleeding and no petechiae. He was intubated via rapid sequence protocol in preparation for upper gastrointestinal (UGI) endoscopy at the bedside. On endoscopy, no active bleeding source was identified, but there were some erosions in the gastric cardiac area. The esophagus and duodenum were normal in appearance. An octreotide drip was started. The patient had no further bloody output from the nasogastric tube. An abdominal ultrasound was done simultaneously to investigate the patient's distention, which showed ascites and dilated, thickened loops of bowel, thought to be secondary to high volume fluid and blood product resuscitation. Laboratory coagulation parameters showed mild coagulopathy, with elevated international normalized ratio (1.6) and low fibrinogen (180 mg/dL). Four units of cryoprecipitate and a dose of Vitamin K were given.

The patient's tachycardia and abdominal distention continued to worsen, so a computed tomography (CT) of abdomen was

Funding: none.

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performed, with representative images shown in Fig. 1. This study showed dilated, abnormally crowded, proximal jejunal bowel loops in the left upper quadrant with distorted mesenteric vessels, bowel distention and air-fluid levels. Poor contrast enhancement of bowel loops was felt to signal compromised perfusion. The presumptive diagnosis was left paraduodenal hernia with incarcerated, ischemic small intestine. The patient was taken to the operating room, and the intraoperative findings confirmed the CT scan suspicion. Unfortunately, approximately 125 cm of small bowel were gangrenous, beginning about 10 cm from the ligament of Treitz. Overtly gangrenous bowel was resected, with blind stapled ends left in an open abdomen. The abdominal fascia was closed, and the patient was returned to the ICU for continued resuscitation with a plan for a second-look laparotomy 48 h later. At the time of his second operation, the remaining small bowel was inspected, with no further ischemic lesions were found. A primary stapled anastomosis was created, and the abdomen was closed. By postoperative day 3 after the second surgery, the boy was extubated. The following day, he had return of bowel function, and oral feedings were started. He was transferred to the surgical floor and was discharged home on postoperative day 6. On follow-up, he continued to recuperate well, with appropriate catch-up weight gain.

## 2. Discussion

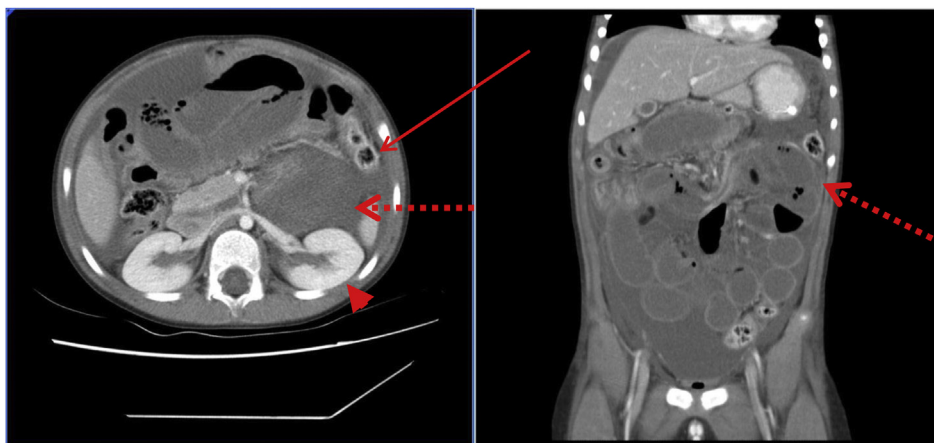
Paraduodenal hernia (PDH) is the most common form of congenital internal hernia [1]. Typically, it presents in adults between the third and fourth decades [1]. PDH develops during the midgut rotation, the result of inappropriate invagination of small bowel into an avascular, unsupported left mesocolon segment, which causes entrapment of the bowel between the posterior abdominal wall and the mesocolon [2]. Most patients are initially asymptomatic, but they may ultimately develop vague symptoms such as chronic relapsing periumbilical or epigastric pain, post-prandial nausea and vomiting [1], mimicking our patient's course. Due to partial bowel obstruction and spontaneous reduction of the hernia, pain is often intermittent, and affected patients can often be misdiagnosed with functional gastrointestinal problems [3]. Non-herniated small intestine can undergo volvulus, resulting in further bowel ischemia [4]. PDH is difficult to diagnose preoperatively, requiring a high index of suspicion. It is an uncommon cause of small bowel obstruction in the pediatric population with the diagnosis is often made intraoperatively or incidentally.

Radiologic studies may show subtle findings such as a localized cluster of bowel adjacent to retroperitoneal organs on CT and delayed passage of contrast with tapering of the bowel at the hernia orifice on barium follow-through study. Diagnostic yield is high if CT imaging done during an acute episode. The study then shows a sac-like mass above the level of ligament of Treitz, engorgement and twisting of the mesenteric vasculature, and displacement of the main mesenteric trunk. The hernia defect itself is usually not visible on CT [5]. In left paraduodenal hernias, bowel loops become entrapped between the descending colon and the kidney with stomach, pancreas and duodeno-jejunal junction displacement [6]. In a literature review of 32 patients with acute presentation, a perioperative diagnosis was made in 71% of cases by CT or barium study [7]. Due to its rarity and high mortality rate, immediate evaluation of the patient and early surgical intervention is of paramount importance to avoid life threatening complications [8]. With a 50% lifetime risk of incarceration and bowel strangulation, even incidentally found PDHs need to be corrected [1]. The definitive surgical management includes laparotomy, reduction of the contents and release of the hernia defect [9]. Minimally invasive management has been described, and in the current era of laparoscopic facility, it should be considered for a stable patient or an incidentally-diagnosed defect [10].

Upper GI bleeding in children can be due to multiple etiologies, including but not limited to reactive gastritis, peptic ulcer disease, variceal bleed and vascular malformations [11]. We did not find any previous report of upper gastrointestinal bleeding as the presenting factor in PDH. Our patient did have a history of intermittent abdominal pain and vomiting, at least one episode of which was bilious. His massive upper gastrointestinal bleeding at admission, however, led us down the pathway of diagnostic and therapeutic maneuvers for GI bleeding, which delayed the diagnosis of his condition.

## 3. Conclusion

Paraduodenal hernia, while an infrequent cause of pediatric bowel obstruction, is the most common form of congenital internal hernia. It should be considered in differential diagnosis in cases with chronic, intermittent abdominal pain of unknown etiology. Preoperative diagnosis is difficult and diagnostic yield is high if CT imaging done during an acute episode. Due to its rarity and associated high mortality rate, early surgical intervention is



**Fig. 1.** Abdominal computerized tomography scans on axial and coronal cuts demonstrating left-sided paraduodenal hernia. Long arrow → left colon, short arrow → left kidney, dotted arrow → incarcerated bowel.

important to avoid life-threatening complications. While upper gastrointestinal bleeding in a previously healthy child usually has a straight-forward differential diagnostic list, rare and life-threatening causes, such as seen in our patient, must be considered and treated rapidly to avoid diagnostic delay and potential loss of intestine.

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