

Perforated Gastric Ulcer: An Unusual Cause of Peritonitis in Children

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Abstract

Perforated gastric ulcer is a particularly rare cause of peritonitis in children. Only few cases have been reported in the literature. It is a serious emergency condition which can be overlooked leading to life-threatening consequences. We report a case of a 12-year-old girl who presented with acute abdominal pain and signs of peritonitis. Surgical exploration found a gastric perforation on the anterior side of the antrum. Primary repair of the perforation was performed after thorough decontamination and taking biopsies from its edges. The post-operative period was uneventful. *Helicobacter pylori* test was negative. Histopathology result was suggestive of ulceration in the gastric wall and did not isolate *H. pylori*. Gastro-duodenal ulcer perforation should be considered in the differential diagnosis of children presenting with acute abdomen, especially when imaging showing pneumoperitoneum.

Keywords: Children, gastric ulcer, perforation, peritonitis, pneumoperitoneum

INTRODUCTION

The causes of peritonitis in children are dominated by perforated appendicitis, and in case of pneumoperitoneum, we rarely evoke perforated peptic ulcer as a source of free air in the peritoneum.

Acute presentation of gastro-duodenal ulcer is seldom seen in children, and perforation is its most serious and life-threatening complication.^[1,2]

The purpose of this article is to present an adolescent patient with an inaugural gastric ulcer perforation and to shed light on this unusual aetiology of peritonitis in children.

CASE REPORT

A 12-year-old girl presented with acute-onset abdominal pain of 2 days' duration. The pain was initially aching on the epigastric part of the abdomen, constant and stabbing, which became very severe and generalised in nature. It was associated with few episodes of bilious vomiting. There was no history of any drug intake, neither stress situation nor trauma.

On physical examination, the patient was looking septic with poor general condition. He had fever at 38.7°C, tachycardia

and polypnea. The abdomen was slightly distended with generalised tenderness in all its quadrants.

Laboratory studies showed a white blood cell count of 12,010/mL, with a neutrophil predominance (10,840/mL) and a C-reactive protein level of 53 mg/L. The blood ionogram was correct. The erect abdominal radiography showed pneumoperitoneum [Figure 1]. Ultrasound was not very helpful and showed only fluid in the abdomen. Computed tomography of the abdomen confirmed pneumoperitoneum and demonstrated generalised peritoneal fluid, which was more abundant above the transverse colon [Figures 2-4].

Intravenous rehydration was started, and broad-spectrum antibiotics (ceftriaxone-metronidazole) were administered before surgery. Pneumoperitoneum and the more concentrated peritoneal fluid above the transverse colon suggest a gastro-duodenal origin of the peritonitis. Laparotomy was thus performed with an upper abdominal median incision. A large

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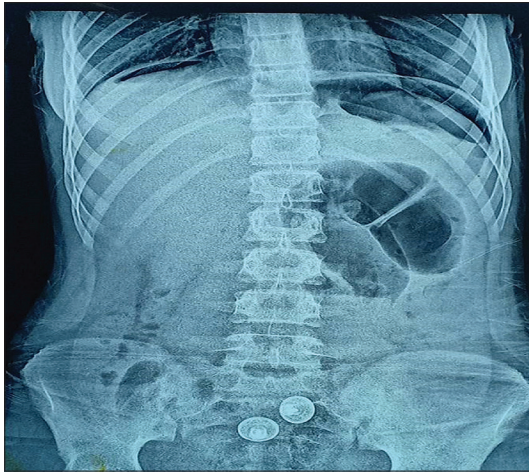


Figure 1: Erect abdominal X-ray covering the lung bases showing pneumoperitoneum beneath the right and left hemidiaphragm. Short segment of adynamic ileus (sentinel loop)

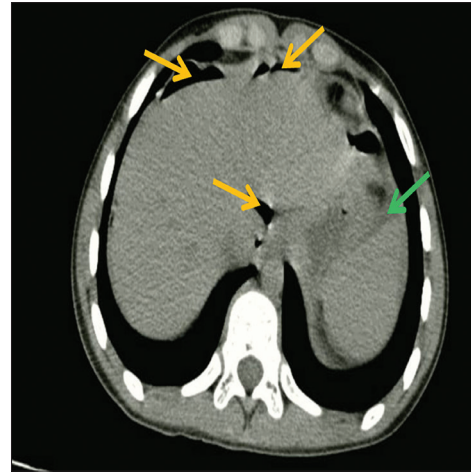


Figure 2: Axial non-contrast computed tomography of the abdomen showed several locules of free intra-peritoneal air within the upper abdomen, with a large amount of free air along the anterior aspect of the liver surface (yellow arrow) with peri-splenic ascites (green arrow). Normal appearance of the liver and spleen

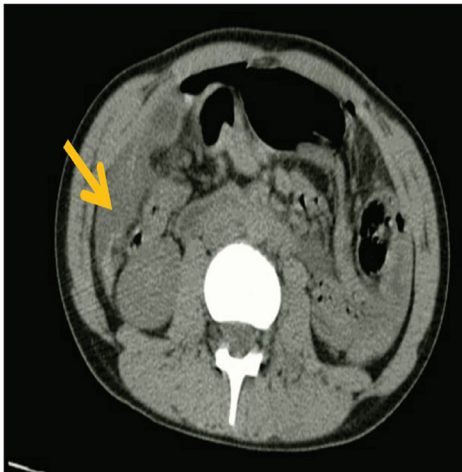


Figure 3: Axial view of contrast computed tomography scan: Free intra-peritoneal fluid in right para-colic gutters (yellow arrow)

amount of serous, non-purulent fluid was observed in the abdomen. A gastric perforation of nearly 1.5 cm was identified on the anterior side of the antrum [Figure 5]. Duodenum and other intestinal structures were normal. A bacteriological sample of the peritoneal fluid was performed revealing a poly-microbial flora. The perforation was closed after through decontamination and taking biopsies from its edges, using two overlapping layers of separate absorbable sutures [Figure 6]. Abdomen was closed after washing and placing drains.

The post-operative period was uneventful. Intravenous antibiotics were continued and omeprazole infusion was started. The nasogastric catheter was removed on the post-operative day 4, and oral nutrition was gradually reintroduced without any issue.

A *Helicobacter pylori* serum antibody test which was done post-operatively was negative. Histopathology result of the perforation edges biopsy was suggestive of non-specific acute inflammatory changes and ulceration of the gastric wall without metaplasia. It was negative for *H. pylori*.

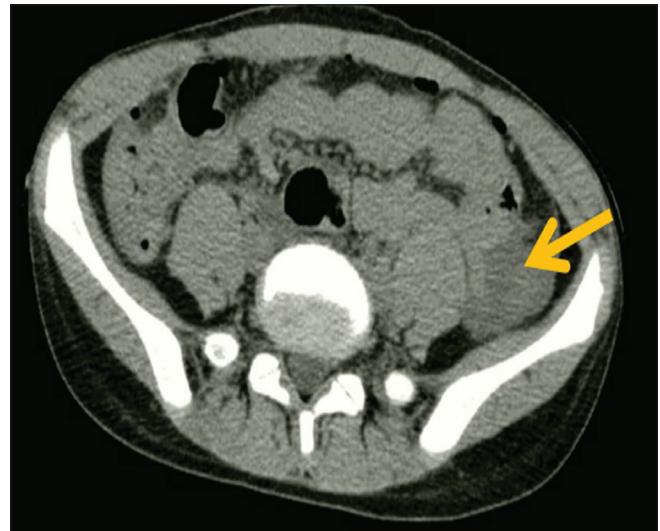


Figure 4: Axial view of contrast computed tomography scan: Free intra-peritoneal fluid is seen also in the left iliac fossa (yellow arrow)

On the post-operative day 8, the patient was discharged home on oral omeprazole 60 mg daily for a total of 8 weeks. She underwent an upper endoscopy 2 months later, which demonstrated postsurgical changes at the perforation site, but was otherwise normal. It confirmed the healing of the ulcer. No *H. pylori* was found on histopathological examination.

The patient is being followed also at the paediatric gastroenterology department of our hospital. She was doing well on couple of follow-up visits.

DISCUSSION

The positive diagnosis of acute peritonitis is easy and is essentially based on the clinical examination. On the other hand, the aetiological diagnosis is not always obvious and

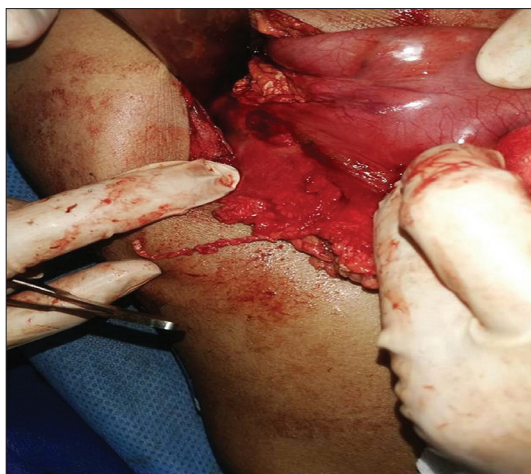


Figure 5: Intraoperative view showing a gastric perforation of nearly 1.5 cm on the anterior side of the antrum

should focus on the patient's history to guide the diagnostic approach.

In children, peptic ulcer can be primary associated with Zollinger–Ellison syndrome or secondary to an ulcerogenic agent (*H. pylori*), mucosal injury (non-steroidal anti-inflammatory drugs) or physiological stress such as burns and head trauma.^[1,3] *H. pylori* infection is detected in 90% of perforations in the paediatric age group.^[4] Our patient did not have any of these conditions.

This disease can be seen at any age, but it becomes more frequent after the age of 12 years^[5] and it is more common in male adolescents. A 20-year experience study of 52 perforated peptic ulcer cases in children published by Hua *et al.* showed that more than 80% of patients were male and 90% were adolescents (aged 14–18 years).^[6]

Perforation is a rare complication of gastro-duodenal ulcer disease compared to adults. It is almost never an inaugural presentation and is mainly located on the duodenum.^[7] Our observation is distinguished by the inaugural character of the perforation and by its gastric location. Peptic ulcer perforation is uncommon in children and is rarely suspected as a cause of acute abdomen.^[1,8] With the advent of potent medications, acute presentation for peptic ulcerations or their life-threatening complications, such as bleeding and perforation, are seldom seen.^[2]

Ulcer perforation is revealed by the signs of acute peritonitis. They are not specific but reflect the severity of this complication: impaired general condition, painful abdomen, signs of shock (tachycardia, hypotension and oliguria) and hyper-leucocytosis. The presence of a pneumoperitoneum on the erect abdomen X-ray should suggest this aetiology.

The treatment of ulcer perforation is surgical repair of the gastric defect. It must be urgent after a short preoperative preparation of the patient as this complication can quickly

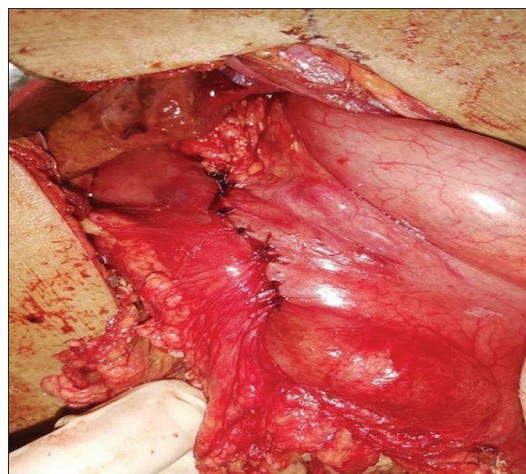


Figure 6: Intra-operative view at the end of surgery after closure of the perforation

be life-threatening. The major challenge is to identify pre-operatively the aetiology of a peritoneal syndrome because the surgical approach depends on it.

Where available, laparoscopy allows a surgeon to make the diagnosis and to treat the lesion at the same time, with less postoperative pain, less morbidity and a short hospital stay. Because of the absence of a technical platform allowing a laparoscopic approach in this context of emergency, we were forced to perform a laparotomy in our case. Simple closure of the perforation with or without omentopexy is one of the most commonly used techniques.^[9]

In these patients, to reduce the risk of ulcer recurrence and its complications, proton pump inhibitors are recommended for 8 weeks, combined with antibiotic treatment of *H. pylori* if detected.^[10]

An endoscopic examination should be performed post-operatively to better explore and control the surgical site and to identify other possible underlying lesions that may predispose to perforation recurrence.^[10]

CONCLUSION

Gastro-duodenal ulcer perforation in children is a rare situation but must be kept in mind of any surgeon while confronted to a peritoneal syndrome. Pneumoperitoneum is a common radiologic finding in these cases. It is a surgical emergency which can be quickly life-threatening. Treatment is surgical repair of the gastric defect ideally done by laparoscopy. Post-operative investigations must focus on finding the underlying cause. If *H. pylori* is detected, it must be treated correctly to avoid recurrence.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients

understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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