



Isolated Traumatic Rupture of Duodenum

Authors

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Abstract

Isolated duodenal perforation (IDP) in pediatric trauma is rarely reported. Since most of the children with blunt trauma are managed expectantly, timely diagnosis is imperative to avoid morbidity and mortality. Isolated duodenal injury is an uncommon finding, accounting for about 3 - 5% of abdominal trauma, mainly resulting from both penetrating and blunt trauma and is associated with significant mortality (6 - 25%) and morbidity (30 - 60%)^{1,2,3}.

Keywords: blunt trauma abdomen, duodenal injury.

Case Presentation

A 9year old boy presented to our hospital 6hrs after he fell from his bicycle and sustained blunt injury to his abdomen. The handle of the bicycle had struck his abdomen. At admission, he was conscious, with a GCS of 15. He complained of pain all over abdomen which was more on left side. On examination, his pulse was 98/min, blood pressure was 100/70 mm Hg and he was afebrile. Abdominal examination revealed distension with tenderness present in all over abdomen. There was rigidity present with absent bowel sounds.

Chest radiograph was normal and did not show any evidence of pneumoperitoneum. Abdominal ultrasonography revealed presence of mild to moderate haemoperitoneum.

A contrast enhanced CT scan with oral and intravenous contrast showed evidence of pneumoperitoneum with contrast leaking freely into peritoneal cavity s/o hollow viscus perforation (duodenal perforation).

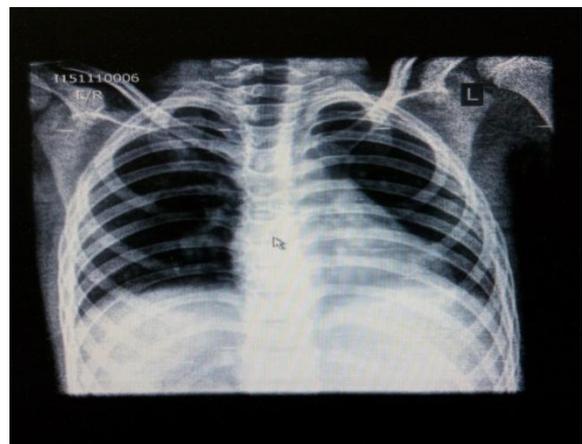


Fig 1: chest radiograph

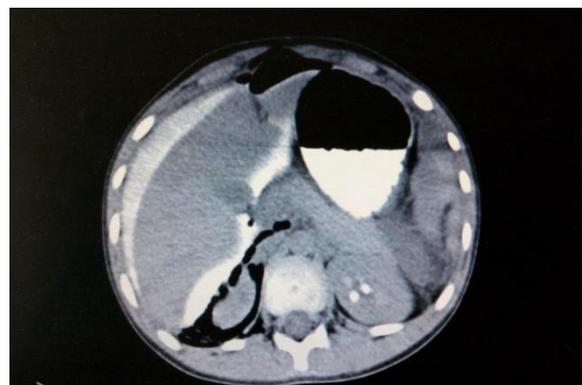


Fig 2: CECT Abdomen with oral and IV contrast

The patient was taken up for emergency exploratory laparotomy. There was nearly 1000 mL of bile stained fluid present in abdominal cavity. Duodenum was mobilised using Kochersmaneuver. There was a full thickness perforation of size 3cms present in 2nd part of duodenum. A thorough exploration of abdominal cavity was done and no other injury was found. After thorough lavage with saline, duodenal perforation was closed in 2 layers with an intra abdominal drain placed adjacent to the trauma site. A 12F feeding jejunostomy tube was placed and a nasogastric tube was placed in stomach. In the post-op period patient was started on TPN and continued for 5days. From 2nd day onwards gradual enteral feeding was started through the jejunostomy tube. From 7th day onwards he was gradually shifted to oral feeds. Patient recovery was unremarkable and was discharged on 14th day and remains well till date.

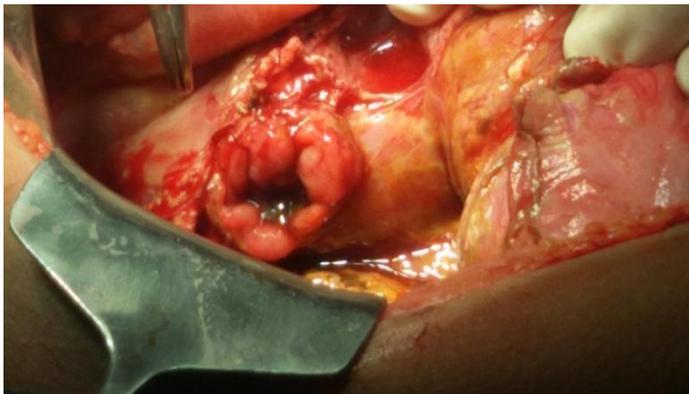


Fig 3: Intra operative image showing full thickness perforation



Fig 4: Duodenal perforation closed in 2 layers using vicryl and silk sutures

Discussion

Isolated Duodenal Perforation (IDP) in pediatric trauma is scarcely reported. Only isolated cases of IDP following blunt abdominal trauma exists in the literature reviewed^{4,5,6}. Du Bose et al. in 2008 reported a series of five adult cases of IDP, which was the largest series so far in the literature⁷. Concomitant injuries are more common, and overall outcome depends on the nature and the severity of these injuries.

Road traffic accidents are the most common mode of blunt injury to the duodenum⁸. In addition to this, other peculiar mechanisms commonly encountered in children are falls, bicycle handlebar injuries, child abuse, and playground accidents^{9,10,11}. IDP following blunt trauma abdomen (BTA) may occur as a result of “crush injury” or “distraction injury”. The duodenum may get crushed between spine and other hard objects like handlebar or a steering wheel¹². In our case, the duodenum got crushed between the spine and bicycle handle.

Presentation in IDP may be nonspecific initially. Specific signs of perforation may appear late. Symptoms may be mild at the outset and range from mild to severe upper abdominal pain with recurrent vomiting. There are reports of patients with milder symptoms having been discharged from the emergency department only to be readmitted a few hours later as the symptoms worsened^{13,14}. An in-depth review of the literature on IDP showed vomiting and abdominal pain, localized to the right upper abdomen, being the most prevalent symptom¹⁵.

Abdominal radiograph and sonography may not be useful in diagnosis of IDP due to its retroperitoneal location¹⁶. The role of early CECT abdomen with oral contrast at this point is crucial. When multi-detector CT is used, sensitivity of 88–93 % can be achieved for detecting bowel injuries in patients with blunt trauma¹⁷. However, such sensitivity and specificity data of CT in diagnosis of isolated duodenal injuries do not exist in current literature due to its uncommon occurrence¹⁵. Duodenal perforation is suggested if

there is a retroperitoneal collection of contrast medium, extra-luminal gas, or a lack of continuity of the duodenal wall¹⁵. Since majority of blunt trauma cases in children with stable hemodynamics are managed expectantly, clinical correlation with mentioned CECT features can help surgeons in early decision-making. We retrospectively correlated the clinical symptoms and learned that an early CECT would have helped us in early exploration of this case.

In most of the cases where the perforation is less than 50 % of the circumference, simple duodenorrhaphy is adequate⁹. In addition to primary repair, feeding jejunostomy or a gastrojejunostomy may be added to safeguard the repair⁷. For perforation sizes that preclude a primary repair, techniques like jejunalserosal patches and pedicled mucosal flap with jejunal or gastric island flap have been described in experimental setting with minimal impact in actual clinical setting¹². Another technique with Roux-en-Y duodenojejunostomy has been described with encouraging results in clinical setting as well¹⁸. Irrespective of the technique used, the outcome however also depends on the timing of intervention. It has been noted that in duodenal perforation with concomitant injuries, a delay of more than 24 h has a poor outcome⁹. Thus, early recognition of this rare injury is necessitated for a better outcome.

Conclusion

In conclusion, blunt duodenal trauma remains a relatively rare diagnosis among the pediatric population, accounting for 3 to 5% of all abdominal injuries.

In view of its rarity, a high index of suspicion is necessary to diagnose IDP in children. Since most of the children with BTA are managed conservatively, presence of clinical indicators like upper abdominal pain, vomiting, and raised leukocyte count should prompt an early CECT of the abdomen.

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Abbreviations

IDP - Isolated Duodenal Perforation

CECT- Contrast-Enhanced Computerized Tomography

BTA - Blunt Trauma Abdomen