

Traumatic duodenal injury in children: A report of two cases

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ABSTRACT

Duodenal injury following blunt abdominal trauma in children is extremely rare. It commonly has a delayed presentation, thus leading to increased mortality and morbidity. We report two cases of isolated duodenal injury following blunt abdominal trauma in children.

Keywords: Children; duodenal transection; trauma.

INTRODUCTION

The duodenum is injured mostly due to crushing or shearing forces on the abdomen. The incidence of duodenal injuries due to blunt trauma is 1% to 4%.^[1] Duodenal injury comprises 0.2–3.7% of all trauma-related laparotomies.^[2] On an average, one to four other abdominal organ injuries are associated with duodenal trauma, which makes an isolated injury rare.^[2] The anatomical location of the duodenum makes the diagnosis of an isolated duodenal injury a difficult task. Due to its rarity and subtle clinical features, its diagnosis and management is often delayed.

We report two cases of isolated duodenal injury following blunt abdominal trauma.

CASE REPORT

Case 1– A two-year-old male was referred with abdominal pain and vomiting since the past three days. There was history of a fall while playing three days previously. He had tachycardia. There was no evidence of any injury externally. His abdomen was distended, tender, and guarded. An X-ray revealed free gas under the diaphragm. On performing lapa-

rotomy, there was complete transection of the fourth part of the duodenum (Fig. 1), with severe peritoneal contamination. Primary anastomosis with gastrojejunostomy was performed. The patient had an uneventful recovery.

Case 2– An eleven-year-old male was referred with pneumoperitoneum seen on computed tomography performed elsewhere. He had sustained direct trauma to the upper abdominal region due to the handle bar of his bicycle. He had tachycardia. There was no evidence of any injury externally. The upper abdomen was guarded and rigid. On performing exploratory laparotomy, there was a tear at the junction of the third and fourth part of the duodenum, involving two-thirds of the circumference of the bowel (Fig. 2). Primary suturing along with gastrojejunostomy was performed. The patient had an uneventful recovery.

DISCUSSION

Trauma of the duodenum is not common due to its deep, central, and retroperitoneal location.^[3] It is the fourth most commonly injured intra-abdominal organ.^[4] Differentiation between duodenal injuries is essential, given that duodenal hematoma and perforation require different treatments. Suspicion could be raised depending on the mechanisms of injury. In general, duodenal hematomas result from compression of the duodenum against the vertebral column, whereas perforations potentially develop from shearing forces or simultaneous closure of the pylorus and the fourth portion of the duodenum, resulting in increased intraluminal pressure and a “blowout.” The common mechanism of seat-belt compression with hyperflexion and distraction during deceleration in a motor vehicle crash compresses the fixed duodenum against the lumbar spine, leading to a high rate of injury.^[5] Our patients had a history of fall while playing and an injury due the handle bar of a bicycle.

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Submitted: 05.04.2016
Accepted: 10.11.2016

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2017;23(5):430–432
doi: 10.5505/tjtes.2016.66179



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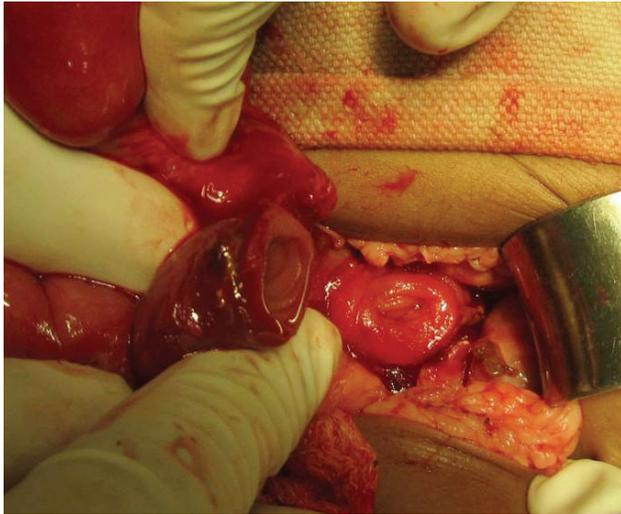


Figure 1. Intraoperative image showing complete transection of the duodenum.

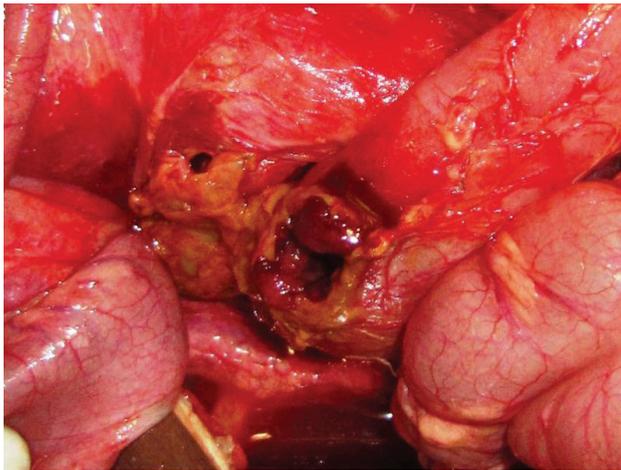


Figure 2. Intraoperative image showing tear in the duodenum involving two-thirds of the circumference.

Abdominal pain is the most common symptom. At the time of injury, patients with duodenal injury usually experience sharp mid-epigastric pain, which is followed by signs of chemical peritonitis within the next few hours.^[1] The severity of signs and symptoms can vary considerably. The mechanism of injury (acceleration and deceleration impact) along with upper abdominal tenderness and tachycardia should raise a high index of suspicion. Both our patients had tachycardia with a guarded and rigid abdomen.

Plain radiographs of the abdomen are useful when free gas is present in the retroperitoneum adjacent to the right psoas muscle around the right kidney or anterior to the upper lumbar spine. Contrast-enhanced computed tomography of the abdomen with oral and intravenous contrast media is highly sensitive for detecting small amounts of retroperitoneal air, paraduodenal hematoma, or extravasated contrast from the duodenum. Occasionally, contrast-enhanced computed tomography may reveal negative findings when performed early

or suggest subtle findings such as small amounts of unexplained fluid or unusual bowel morphology due to paraduodenal hematoma.^[2] On performing computed tomography, our first patient showed free gas under the diaphragm and second patient showed pneumoperitoneum.

The treatment of duodenal injuries depends on the level of damage and grade of injury. Caution must be taken to exclude other associated injuries because in 20% of the cases, duodenal injuries are associated with damage to the pancreas.^[3] Patients with duodenal hematoma can be conservatively managed (89% to 94% of cases), and duodenal hematoma resolves with nasogastric decompression and parenteral nutrition. Approximately 72% to 80% of duodenal lacerations and higher grade injuries can be repaired with primary suture, and 20–28% require a complex procedure.^[3] The most common surgical technique in the treatment of duodenal lacerations is primary suturing. Another alternative is primary suture of the defect with pyloric exclusion and gastroenterostomy. This technique is applied in case of serious duodenal injuries or delayed diagnosis. In case of complete duodenal transection, primary suture can be performed if there is little tissue loss; in cases when the ampulla of Vater is not involved and if the damage can be closed without tension. Duodenopancreatectomy is the only option in cases when duodenal injury is associated with uncontrollable bleeding from the pancreas or when duodenal injury is combined with damage of the distal part to the common hepatic duct or pancreatic duct.^[3] Both our patients had duodenal transection and were managed with primary anastomosis and gastrojejunostomy.

The complication rate after duodenal injuries can be up to 20%, and an operative delay of more than 24 h has been reported to increase the complication rate to 43%. The mortality rate in patients with duodenal injuries is reportedly between 8.3% and 19%. The mortality rate directly related to duodenal injury is generally lower and is the result of duodenal dehiscence, uncontrolled sepsis, and multiple organ dysfunction syndrome.^[3] Both our patients had an uncomplicated postoperative course and were asymptomatic in the follow-up.

Conclusion

The diagnosis of isolated duodenal injury can be difficult owing to its rare occurrence, its anatomical location, and the absence of specific signs and symptoms. A high degree of suspicion must be maintained for diagnosing the injury early. Primary anastomosis is generally sufficient and may require additional procedures that are tailored according to individual requirements.

Conflict of interest: None declared.

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OLGU SUNUMU - ÖZET

Çocuklarda travmatik duodenal transeksiyon: İki olgu sunumu

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Çocuklarda künt abdominal travma sonrası duodenal yaralanma son derece seyrek görülmektedir. Genellikle geç dönemde ortaya çıkar ve mortalite ve morbiditenin artmasına yol açar. Künt abdominal travma sonrası çocuklarda oluşan iki izole duodenal yaralanma olgusunu bildiriyoruz.

Anahtar sözcükler: Çocuklar; duodenal transeksiyon; travma.

Ulus Travma Acil Cerrahi Derg 2017;23(5):430–432 doi: 10.5505/tjtes.2016.66179