

Isolated Jejunal Perforation Following Bicycle Handlebar Trauma in an Adult: A Case Report

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Abstract

Isolated small bowel injury due to blunt abdominal trauma is uncommon and may present a diagnostic challenge, particularly when early clinical findings are subtle. Delayed diagnosis can result in severe complications, such as peritonitis, sepsis, intra-abdominal abscesses, and multiple organ failure. We report the case of a 50-year-old man who presented to the emergency department with abdominal pain after a bicycle accident involving direct handlebar impact to the anterior abdominal wall. Physical examination revealed abdominal tenderness, guarding, and rebound tenderness. Contrast-enhanced abdominal computed tomography revealed free intraperitoneal air, mesenteric fat stranding, and minimal free fluid, suggesting perforation of a hollow viscus. Emergency laparotomy revealed a full-thickness jejunal perforation approximately 130 cm distal to the ligament of Treitz without associated solid organ, colonic, or major mesenteric injury. The perforation was primarily repaired, and the patient recovered uneventfully. The patient was discharged on postoperative day 7 without complications. This case highlights the importance of maintaining a high index of suspicion for isolated small bowel perforation after bicycle handlebar trauma in adults and emphasizes the role of early surgical intervention when clinical and radiological findings suggest intestinal injury.

Keywords: Bicycle handlebar injury, blunt abdominal trauma, emergency laparotomy, hollow viscus perforation, jejunal perforation, small bowel injury

Introduction

Isolated small bowel injury following blunt abdominal trauma is rare but clinically important because delayed diagnosis may lead to significant morbidity and mortality rates. Although solid organ injuries are more frequently encountered after blunt abdominal trauma, hollow viscus injuries, particularly small bowel perforations, may be difficult to detect during the early phase of evaluation in the emergency department. Patients may initially present with stable vital signs and nonspecific abdominal findings, leading to delayed recognition of intestinal injuries (1,2).

The small bowel is vulnerable to blunt trauma through several mechanisms, including sudden compression of bowel loops between the abdominal wall and vertebral column, rapid deceleration forces, and shear stress on relatively fixed intestinal segments. The jejunum and terminal ileum are particularly susceptible because of their relative fixation points (3,4). Bicycle handlebar injuries represent a specific form of localized blunt abdominal injury. These injuries are commonly described in children but are relatively rare

in adults as well. Despite their apparently minor external appearance, handlebar impacts can cause serious intra-abdominal injuries, including bowel perforation (5,6).

Computed tomography (CT) plays a central role in the evaluation of hemodynamically stable patients with blunt abdominal trauma. Findings such as free intraperitoneal air, unexplained free fluid, bowel wall thickening, reduced bowel wall enhancement, mesenteric fat stranding, and mesenteric hematoma may suggest bowel or mesenteric injury (7-9). However, some cases may still require surgical exploration for a definitive diagnosis. In this report, we present the case of an adult patient with isolated jejunal perforation following bicycle handlebar trauma and discuss the diagnostic challenges and clinical importance of early surgical management.

Case Report

A 50-year-old man presented to the emergency department after a bicycle accident. The patient reported falling while riding a bicycle, during which the bicycle handlebar struck

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his anterior abdominal wall, causing a laceration. The patient complained of abdominal pain, particularly in the umbilical region.

On admission, his general condition was moderate, and he was conscious and well oriented. His blood pressure was 120/85 mmHg, and his pulse rate was 96 beats/min. Abdominal examination revealed tenderness in the periumbilical region of the abdomen. Guarding and rebound tenderness were also observed. No obvious signs of major external trauma were noted, apart from localized abdominal tenderness. Laboratory evaluation showed a white blood cell count of 13,230/mm³, hemoglobin level of 15.3 g/dL, hematocrit of 44.4%, and platelet count of 257,000/ μ L. Contrast-enhanced abdominal CT revealed free intraperitoneal air adjacent to the anterior hepatic surface and Morrison's pouch (Figure-1). Mesenteric fat stranding, heterogeneity, and minimal free fluid were observed in the lower abdominal quadrants (Figure-2). Minimal air locules were also observed anterior to the sigmoid colon. These findings were suggestive of intestinal perforation. Based on the patient's physical examination findings and radiological evidence of hollow viscus perforation, an emergency exploratory laparotomy was performed.

During exploration, approximately 200 mL of hemorrhagic fluid mixed with intestinal contents was observed in the abdominal cavity. A full-thickness perforation was identified in the jejunum, approximately 130 cm distal to the ligament of Treitz (Figure-3A and 3B). No additional injuries to the colon, solid organs, or mesentery were detected during the systematic exploration. The perforated jejunal segment was primarily repaired, and the abdominal cavity was thoroughly irrigated with warm saline (Figure-3C and 3D). After hemostasis was achieved, a silicone drain was placed in the pelvis, and the abdominal wall was closed in a layered fashion.

The patient was followed up in the intensive care unit on the first postoperative day and was subsequently transferred to the surgical ward after clinical stabilization. Oral liquid intake was initiated on postoperative day 3, and solid food intake was initiated on postoperative day 5. Bowel function returned without any difficulties. The drain output remained non-pathological and was removed on postoperative day 6. The patient was uneventfully discharged on postoperative day 7. At the outpatient follow-up visit on postoperative day 12, the abdominal sutures were removed, and complete clinical recovery was achieved.

Discussion

Isolated small bowel perforation following blunt abdominal trauma is an uncommon but potentially life-threatening condition. Because early symptoms may be nonspecific,



Figure 1. Axial abdominal CT image demonstrating free intraperitoneal air adjacent to the anterior hepatic surface and Morrison's pouch, suggestive of hollow viscus perforation.



Figure 2. Axial abdominal CT image showing mesenteric fat stranding and minimal free fluid in the lower abdomen, supporting the diagnosis of intestinal perforation.

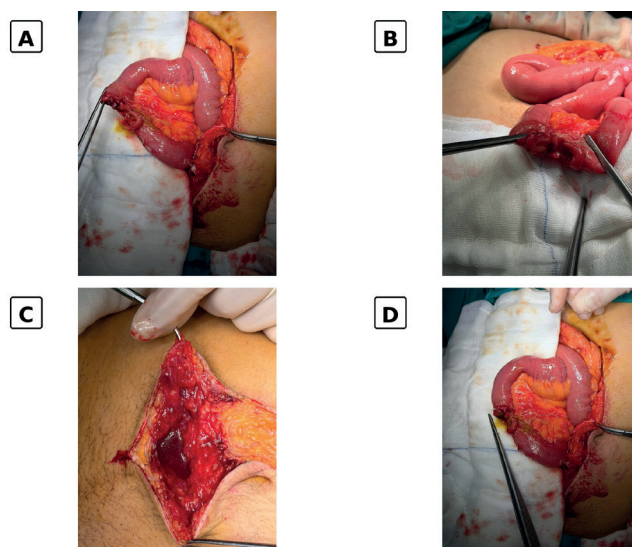


Figure 3. Representative intraoperative image. (A, B) Exteriorized jejunal segment and operative field demonstrating the site of injury and contamination. (C, D) Operative appearance during exploration, irrigation, and primary management of the injured jejunal segment.

diagnosis can be challenging, especially in hemodynamically stable patients. Delayed diagnosis increases the risks of generalized peritonitis, sepsis, intra-abdominal abscesses, and prolonged hospitalization (1,2).

Bicycle handlebar trauma is a distinct mechanism of blunt abdominal injury. In this mechanism, a relatively small surface area transfers a localized force to the abdominal wall, resulting in the compression of intra-abdominal organs. Although such injuries are more frequently reported in pediatric patients, they can also occur in adults (5,10). In adults, stronger abdominal musculature and different patterns of bicycle use may partially reduce the frequency of these injuries. However, as shown in the present case, direct handlebar impact can still cause clinically significant intestinal perforation.

Small bowel injuries after blunt trauma may occur due to compression, deceleration, or shearing mechanisms. Compression of the bowel between the handlebar and vertebral column may result in contusion, hematoma, ischemia, or full-thickness perforation. Shearing forces may also affect the mesenteric border of the intestine and contribute to bowel-wall disruption. Relatively fixed intestinal segments, such as the proximal jejunum and terminal ileum, may be more vulnerable to these mechanisms (3,4).

In the present case, the patient presented with localized periumbilical tenderness, guarding, and rebound tenderness. These findings are clinically important because they suggest peritoneal irritation. Although the laboratory findings were not specific, leukocytosis indicated an inflammatory response. The most decisive diagnostic findings were obtained from abdominal CT, which revealed free intraperitoneal air, mesenteric fat stranding, and minimal free fluid. These findings, together with the patient's physical examination, strongly suggested intestinal perforation and justified emergency surgical intervention.

CT is the imaging modality of choice for hemodynamically stable patients with blunt abdominal trauma. Direct signs of bowel injury include extraluminal air, extraluminal contrast leakage, and discontinuity of the bowel wall. Indirect signs include free fluid without solid organ injury, bowel wall thickening, mesenteric fat stranding, mesenteric hematoma, and reduced bowel wall enhancement (7-9). However, CT findings may be subtle or nonspecific during the early period. Therefore, clinical evaluation remains essential, and a normal or equivocal initial CT scan should not completely exclude bowel injury when abdominal signs persist or progress (11).

The management of blunt small bowel perforation depends on the patient's hemodynamic status, presence of peritonitis, and radiological findings. Surgical exploration is indicated in patients with generalized peritonitis or clear CT evidence of hollow viscus perforation (7,12). Primary repair is usually appropriate for small, isolated perforations when bowel viability is preserved and there is no extensive tissue

loss or contamination present. Segmental resection with anastomosis may be required in cases of devitalized bowel, multiple perforations, or extensive mesenteric injury.

In our patient, the perforation was isolated, the bowel wall was viable, and no additional intra-abdominal injuries were detected. Similar isolated jejunal perforations after non-penetrating abdominal trauma have been reported, but they remain uncommon and may be overlooked when early clinical findings are limited (13). Therefore, primary repair was successfully performed. The patient had an uneventful postoperative course and was discharged on postoperative day 7, supporting the favorable outcomes associated with early diagnosis and timely surgical intervention. The importance of avoiding delays in trauma laparotomy has been emphasized in previous trauma outcome studies (14).

This case emphasizes that seemingly minor bicycle accidents should not be underestimated. The absence of severe external injuries does not exclude significant intra-abdominal pathology. Standard trauma surgery references similarly emphasize that clinical judgment, serial examination, and prompt operative management are essential in suspected blunt abdominal trauma (15). In patients with abdominal pain after handlebar trauma, especially in the presence of tenderness, guarding, rebound tenderness, or suspicious CT findings, clinicians should maintain a high index of suspicion for hollow viscus injuries.

Conclusion

Isolated jejunal perforation after bicycle handlebar trauma is rare in adults but may lead to serious complications if the diagnosis is delayed. Abdominal tenderness, guarding, rebound tenderness, free intraperitoneal air, mesenteric fat stranding, and unexplained free fluid should raise suspicion of intestinal perforation. Early recognition and timely surgical exploration are critical for preventing morbidity and achieving favorable outcomes in such cases. This case highlights the need for careful clinical assessment and appropriate radiological evaluation in adult patients presenting with abdominal pain after bicycle handlebar trauma.

Ethics approval: Not applicable for a single case report according to local requirements; however, institutional policies were followed.

Informed consent: Written informed consent was obtained from the patient for the publication of this case report and accompanying images.

Conflict of interest: The author(s) declare (s) no conflict of interest.

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