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Retroperitoneal Hematoma Secondary to Isolated Mesenteric Injury Following Bicycle Handle Bar Impact: A Case Report

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ABSTRACT

Bicycle handlebar injury is a common mechanism of causing intra-abdominal trauma, especially in children. However, cases of retroperitoneal hematoma due to this mode of injury are quite uncommon and hence, are rarely reported. We hereby present a case involving a 12-year-old boy who underwent an emergency exploratory laparotomy following a bicycle handlebar injury, which uncovered a significant retroperitoneal hematoma resulting from mesenteric and vascular injury. Clinical findings of hemodynamic instability, along with appropriate imaging studies and prompt interventions, facilitated the diagnosis and necessary management. This case report, highlighting an unusual occurrence that could lead to increased morbidity and mortality if not managed promptly, underscores the potential for retroperitoneal hematoma resulting from bicycle handlebar injuries.

1 | Introduction

Bicycle handlebar injury occurs when the handlebar of the bicycle strikes to cause an impact on the body. This mechanism of injury is responsible for a significant number of thoracoabdominal injuries in children, with more than a third of them requiring surgical intervention [1]. The most common among them involve intra-abdominal organ injuries, traumatic abdominal wall hernias, and bladder rupture [2–4]. However, retroperitoneal hematoma has rarely been reported in bicycle handlebar injury [5]. Bleeding into the space behind the peritoneal cavity, referred to as retroperitoneal hematoma, is an obscure and underdiagnosed condition due to the late manifestation of signs and symptoms until significant blood loss has occurred [6]. Here, we present a case of 12-year-old boy brought to the emergency department with the alleged history of bicycle handlebar injury who underwent emergency exploratory laparotomy that revealed massive retroperitoneal hematoma secondary to mesenteric/vascular injury with intra-peritoneal extent.

2 | Case History/Examination

A 12-year-old boy presented to the emergency department with right upper quadrant pain, 7 h after sustaining blunt trauma due to a bicycle handlebar to the right side of his abdomen, which was continuous in nature and associated with two episodes of non-projectile vomiting. The vomitus was non-bile-stained with the presence of undigested food particles. There was no history of head injury or loss of consciousness. On primary survey, he was able to articulate well and had no signs of respiratory distress. But he had features of shock with a blood pressure of 90/50 mmHg and a heart rate of 135 beats per minute. The rest of the vitals were within the normal range. He had a Glasgow

Summary

- Although injury to the abdominal wall, solid and hollow visceral organs following bicycle handlebar accidents has been reported, retroperitoneal bleeding is rare.
- A high index of suspicion for these internal injuries, even with seemingly minor external impact, is key to timely diagnosis and management.

Coma Score (GCS) of 15 with bilateral equal pupils, reactive to light, and there was not any active external bleeding. Extended Focused Assessment with Sonography for Trauma (eFAST) scan yielded positive in the hepatorenal pouch of Morrison.

He was resuscitated with intravenous fluid, and transfusion with two units each of packed RBC, Fresh Frozen Plasma (FFP) and platelet concentrate was begun. Bedside abdominal ultrasound showed around 200 mL collection in the hepatorenal pouch of Morrison, likely hemoperitoneum, with no gross injury to any solid viscera. After that, a secondary survey was done, which was insignificant. However, on physical examination, there was the presence of rigidity and tenderness over the right upper quadrant with sluggish bowel sounds. Apart from this, no abnormal findings were noted.

3 | Methods

Initial investigations revealed hyperglycaemia (166 mg/dL; normal range being 70–140 mg/dL), leucocytosis (39,490/cu mm; normal range being 4000–11,000/cu mm) and increased prothrombin time (20 s; normal range being 9–11.8 s). Serial hemoglobin monitoring revealed a fall from the initial value of 11.8 to 8.6 g/dL (normal range being 11.5–15 g/dL) over 4 h. Chest x-ray showed a fracture of the right 11th rib. Likewise, a CECT (Contrast Enhanced Computed Tomography) of the abdomen and pelvis, as shown in Figure 1, revealed a large mesenteric hematoma measuring 11.2×7.9×13.7 cm with active extravasation (denoted by contrast blush), abutting bowel loops, duodenum, and right kidney, and compressing the renal vein and inferior vena cava with mild hemoperitoneum, with no features of solid or hollow viscous injury.

Due to the hemodynamic instability of the patient, alongside the interventional radiologist at our center being less comfortable with pediatric patients, an upfront surgical intervention was planned. An emergency exploratory laparotomy was performed, and intraoperative findings of a massive bilateral (right > left) zone II retroperitoneal hematoma, as shown in Figure 2, with active arterial bleeding from one of the branches of the superior mesenteric artery supplying the ascending colon, were noted, which was then ligated, alongside a much smaller hemoperitoneum counterpart. There was no solid or hollow viscous injury. A 24 French (Fr) intra-abdominal drain was placed in the hepatorenal pouch of Morrison.

4 | Conclusions and Results

On the third postoperative period, the patient developed features of hospital-acquired pneumonia, which gradually settled down with intravenous (IV) piperacillin-tazobactam for 10 days. The abdominal drain was removed on the 10th postoperative day. On subsequent evaluation, tachycardia subsided with a heart rate of 90 beats per minute, blood pressure of 110/80 mmHg, oxygen saturation of 95% in room air, and his abdomen was soft and non-tender. Also, his hemoglobin levels rose to 10.7 g/dL, so he was shifted out from the ICU after 5 days and was discharged on the 12th postoperative day,

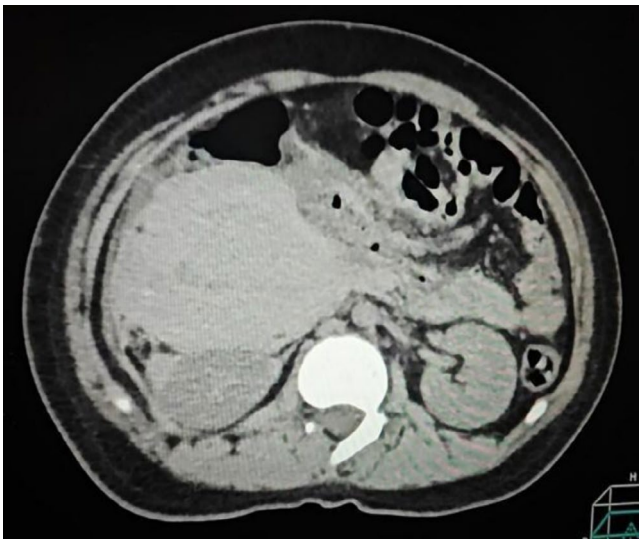

FIGURE 1 | CT (Computed Tomography) scan imaging showing a large hyperdense lesion noted in the right hypochondrium and prerenal region, with a tiny contrast blush in the anterior aspect of the lesion.

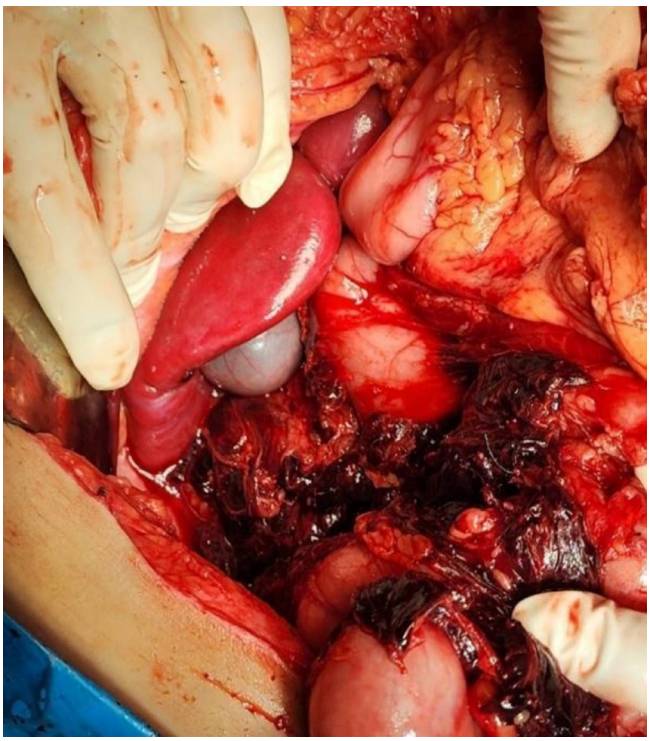

FIGURE 2 | Intraoperative findings of Zone II retroperitoneal hematoma (approximately 200 mL of blood clots) with intact liver, large bowel and small bowel.

after the removal of sutures. The first follow-up after 1 week was uneventful.

5 | Discussion

Bicycle injuries constitute a common cause of childhood trauma presenting to the emergency department. Among them, handlebar injuries are an uncommon variety, found to be 1.15 per 100,000 cases [7]. It results when the body of the child strikes the handlebar of the cycle as the child falls off. During this, the force transmitted through the handlebar may cause significant injuries even with low speed [2]. Common abdominal injuries due to it include injuries to the pancreas, small bowel, mesentery, liver, and spleen [8].

Retroperitoneal bleeding secondary to handlebar injury, however, is less common, with one reported case of retroperitoneal hematoma, where conservative management was opted. Retroperitoneal hematoma encountered in trauma are mostly caused by blunt injuries. The majority of them are due to renal injuries and other causes such as vascular injuries, pelvic injuries, and rarely blunt trauma to retroperitoneal structures such as the duodenum and pancreas [6].

In a study by Clarnette and Beasley [9], 32 children with blunt abdominal trauma due to handlebar injuries were identified, and among them, nine had splenic trauma and the rest involved liver, pancreas, kidney, urethral, and bowel injuries. However, none of them were reported to have retroperitoneal hematoma or mesenteric injuries.

CT scan is an important modality in the case of abdominal trauma for further assessment and appropriate management. Though in cases of hemodynamically unstable patients following blunt abdominal trauma with eFAST scan positive, immediate exploratory laparotomy should be done. However, in our case, CT scan was done later once hemodynamic stability of the patient was achieved. As CT scan showed mesenteric injury with retroperitoneal hematoma, it assisted surgeons in the prior discussion of the operative approach in this case. This case not only highlights the importance of CT scan but also the fact that in cases where CT scan is not feasible, retroperitoneal hematoma, though uncommon in bicycle handlebar injury, should be suspected. In the absence of CT scan, high suspicion is to be accounted for when the intraoperative finding is not proportionate to the clinical picture of the patient. In such cases, a retroperitoneal approach may be needed. As the mortality rate ranges from 18% to 60% with traumatic retroperitoneal hematoma, this emphasizes the importance of early recognition and management [5].

Furthermore, the clear history of handlebar injury in our patient helped us to suspect major abdominal injury in this case. Hence, a detailed history to recognize the mechanism of injury, whether it involves handlebar-related injuries or not, might aid the practitioner in the early diagnosis of serious abdominal injuries in child bicyclists.

This case particularly highlights the unusual instance where retroperitoneal hematoma due to mesenteric vascular injury occurred in the absence of any solid or hollow viscus injury. The crucial role of imaging studies in such cases needs to be overemphasized. Prompt decision-making for initial resuscitation and eventual surgical management is key, owing to the infrequent nature of blunt abdominal trauma.

Author Contributions

Riyaz Shrestha: conceptualization, data curation, resources, writing – original draft. **Kipa Shrestha:** formal analysis, investigation, methodology, writing – review and editing. **Kalpana Acharya:** formal analysis, investigation, methodology, writing – review and editing. **Mohammad Adnan Adil:** formal analysis, project administration, writing – review and editing. **Manish Pokhrel:** formal analysis, methodology, resources, supervision. **Anu Maharjan:** formal analysis, methodology, resources, supervision.

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The authors have nothing to report.

Ethics Statement

Since this report involves no experiments, the ethical approval is waived.

Consent

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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