

# Retroperitoneal hematoma secondary to isolated mesenteric injury following bicycle handle bar impact: A case report

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## Introduction

Bicycle handle bar 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 thoraco-abdominal injuries in children with more than a third of them requiring surgical intervention.<sup>1</sup> The most common among them involves intra-abdominal organ injuries, traumatic abdominal wall hernias and bladder rupture.<sup>2-4</sup> However, retroperitoneal hematoma has rarely been reported in bicycle handle bar injury.<sup>5</sup> Bleeding into the space behind the peritoneal cavity, referred to as retroperitoneal hematoma, is an obscure and under diagnosed condition due to the late manifestation of signs and symptoms until significant blood loss has occurred.<sup>6</sup> Here, we present a case of 12 years old boy brought to the emergency department with the alleged history of bicycle handle bar injury who underwent emergency exploratory laparotomy that revealed massive retroperitoneal hematoma secondary to mesenteric/vascular injury with intra-peritoneal extent.

## Case History/Examination

A 12 years old boy presented to the emergency department with right upper quadrant pain, seven hours after sustaining blunt trauma due to bicycle handle-bar 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 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 blood pressure of 90/50 mmHg and heart rate of 135 beats per minute. The rest of the vitals were within normal range. He had a Glassgow Coma Score(GCS) of 15 with bilateral equal pupils, reactive to light and there wasn't any active external bleeding. Extended Focused Assessment with Sonography for Trauma (eFAST) scan yielded positive in hepatorenal pouch of Morrison.

He was resuscitated with intravenous fluid, and transfusion with two units each of packed RBC, FFP(Fresh Frozen Plasma) and platelet concentrate was begun. Bedside abdominal ultrasound showed around 200mL 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 presence of rigidity and tenderness over the right hypochondriac region with sluggish bowel sounds. Apart from this, no abnormal findings were noted.

## Methods

Initial investigations revealed hyperglycaemia, severe leucocytosis and increased PT/INR(Prothrombin Time/International Normalized Ratio). Serial haemoglobin monitoring revealed a fall from initial value of 11.8 gm/dL to 8.6 gm/dL over four hours. Chest X-ray showed a fracture in the right 11<sup>th</sup> rib. Likewise,

a CECT(Contrast Enhanced Computed Tomography) of abdomen and pelvis as shown in figure 2 revealed a large mesenteric hematoma with active extravasation, abutting bowel loops, duodenum and right kidney, and compressing renal vein and inferior vena-cava with mild hemoperitoneum, with no features of solid or hollow viscous injury.

An emergency exploratory laparotomy was performed and intra-operative findings of massive bilateral (right>left) zone II retroperitoneal hematoma as shown in figure in 1, with active arterial bleeding from one of the branches of superior mesenteric artery supplying the ascending colon, was 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 hepatorenal pouch of Morrison.

## Conclusions and Results

On the third post operative period, the patient developed features of hospital acquired pneumonia which gradually settled down. The abdominal drain was removed on 10<sup>th</sup> post operative day. The patient made a gradual recovery, was shifted out from the ICU after five days and was discharged on the 12<sup>th</sup> post operative day, after removal of sutures. The first follow up after one week, was uneventful.

## Discussion

Bicycle injuries constitute to be 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.<sup>7</sup> It results when the body of the child strikes the handlebar of the cycle as the child falls off. During this, force transmitted through the handlebar may cause significant injuries even with low speed.<sup>2</sup> Common abdominal injuries due to it includes injuries to the pancreas, small bowel, mesentery, liver, and spleen.<sup>8</sup>

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. Majority of them are due to renal injuries and other causes such as vascular injuries, pelvic injuries and rarely blunt trauma to retroperitoneal structures as duodenum and pancreas.<sup>6</sup>

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

CT scan is an important modality in 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 hemodynamically stability of the patient was achieved. As CT scan showed mesenteric injury with retroperitoneal hematoma, it assisted surgeons for 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 absence of CT scan, high suspicion is to be accounted when the intraoperative finding is not proportionate to the clinical picture of the patient. In such cases, retroperitoneal approach may be needed. As the mortality rate ranges from 18-60 % with traumatic retroperitoneal hematoma, this emphasizes its importance of early recognition and management.<sup>5</sup>

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 early diagnosis of serious abdominal injuries in child bicyclists.

This case particularly highlights upon 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 need to be over-emphasized. Prompt decision making for initial resuscitation and eventual surgical management is key, owing to this infrequent nature of blunt abdominal trauma.

### **Author Contribution**

**Riyaz Shrestha** : Conceptualization; data curation; resources; writing- original draft

**Kipa Shrestha** : Formal analysis; investigations; methodology; writing- review and editing

**Kalpana Acharya** : Formal analysis; investigations; 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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### **Conflict of Interest statement:**

The authors declare that they have no conflict of interest to disclose.

### **Ethical Statement:**

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

### **Consent:**

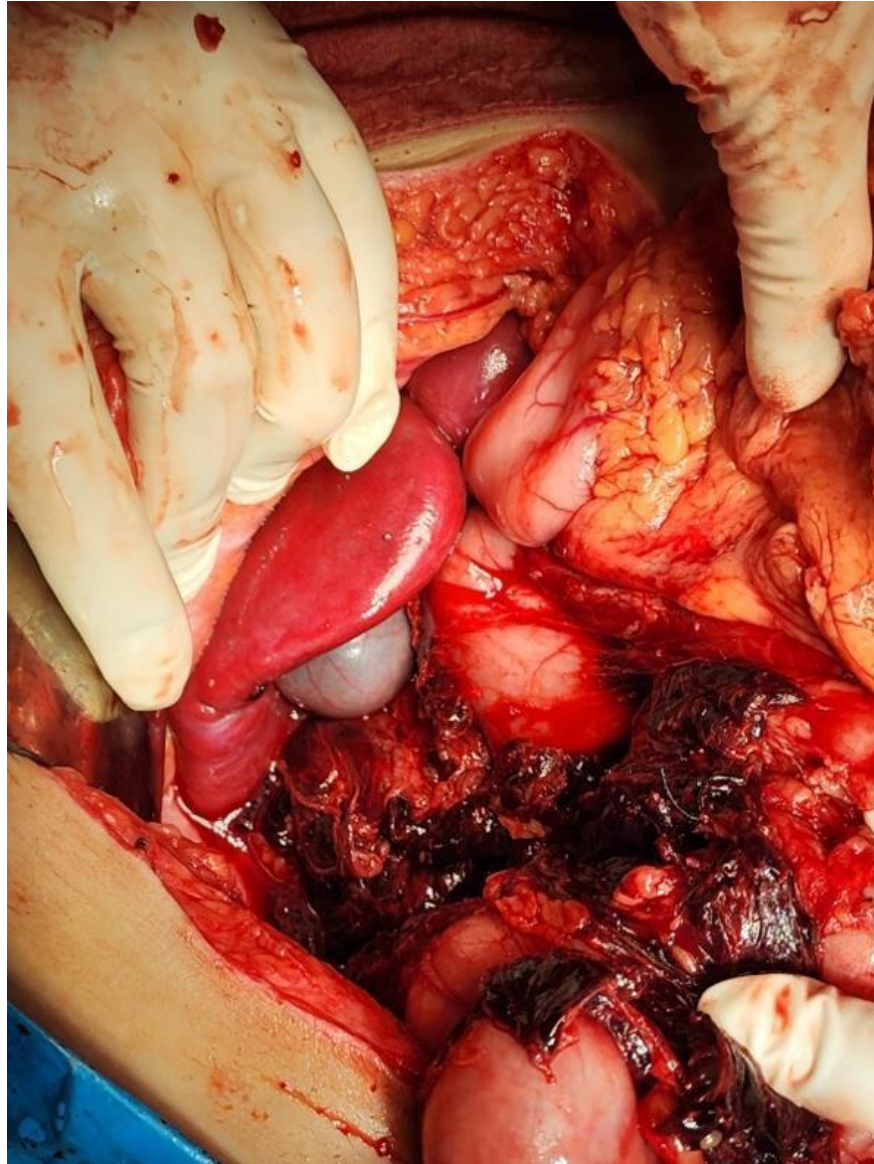
Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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### Legend of figures



**Figure 1: Intraoperative findings of Zone II retroperitoneal hematoma (approximately 200mL of blood clots) with intact liver, large bowel and small bowel.**



**Figure 2:** CT (Computed Tomography) scan imaging showing a large hyperdense lesion noted in the right hypochondrium and prerenal region, with tiny contrast blush in the anterior aspect of the lesion.