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Traumatic Left Diaphragmatic Rupture with Herniation of the Stomach and Left Hepatic Lobe Following Blunt Thoracoabdominal Trauma: A Case Report

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ABSTRACT

Introduction and Importance: Traumatic diaphragmatic rupture (TDR) is an uncommon but potentially life-threatening consequence of blunt thoracoabdominal trauma. Delayed diagnosis is frequent because clinical manifestations and radiological findings may be subtle. Herniation of abdominal viscera into the thoracic cavity can result in respiratory compromise, strangulation, and increased morbidity. Concurrent herniation of the stomach and left hepatic lobe through a left-sided diaphragmatic defect is particularly rare.

Case Presentation: A 45-year-old female sustained blunt thoracoabdominal trauma after a road traffic accident. She initially received treatment at a peripheral healthcare facility and was subsequently referred to our tertiary care center with persistent chest discomfort and dyspnea. Imaging demonstrated a left diaphragmatic rupture with herniation of the stomach and left hepatic lobe into the thoracic cavity. Associated injuries included D12 vertebral body fracture, left humeral head fracture, and pubic rami fracture without evidence of major solid organ injury. Emergency exploratory laparotomy revealed an approximately 12 cm defect in the left hemidiaphragm. The herniated stomach and left hepatic lobe were reduced, and the defect was repaired primarily using interrupted non-absorbable sutures. The postoperative course was uneventful, and the patient was discharged on postoperative day eight.

Clinical Discussion: Traumatic diaphragmatic rupture results from a sudden increase in the pressure gradient between the abdominal and thoracic cavities. Left-sided injuries predominate because the liver provides relative protection to the right hemidiaphragm. Computed tomography remains the imaging modality of choice in hemodynamically stable patients. Early surgical repair is essential to prevent complications associated with visceral herniation and strangulation.

Conclusion: A high index of suspicion is crucial for the diagnosis of diaphragmatic injuries following blunt trauma. Early CT imaging and prompt surgical intervention can lead to favorable outcomes even in patients with multiple associated injuries.

Keywords: Traumatic diaphragmatic rupture; Diaphragmatic hernia; Blunt thoracoabdominal trauma; Stomach herniation; Hepatic herniation; Case report

1. INTRODUCTION

Traumatic diaphragmatic rupture (TDR) is a rare injury occurring in approximately 0.8–5% of patients sustaining significant blunt thoracoabdominal trauma. The condition is frequently associated with high-energy mechanisms such as motor vehicle collisions and falls from height. Owing to its nonspecific clinical presentation and the presence of concomitant injuries, diagnosis may be delayed or missed during the initial assessment.

Left-sided ruptures account for the majority of cases because of the relative weakness of the left hemidiaphragm and the protective effect of the liver on the right side. Delayed recognition may result in progressive herniation of abdominal viscera into the thoracic cavity, causing respiratory compromise, bowel obstruction, strangulation, and increased mortality.

We report a rare case of traumatic left diaphragmatic rupture with simultaneous herniation of the stomach and left hepatic lobe following blunt thoracoabdominal trauma.

2. PRESENTATION OF CASE

A 45-year-old female pedestrian was struck by a four-wheeler while crossing the road on 28 July 2025. She received initial management at a local healthcare facility and was referred to our institution on 3 August 2025 because of persistent chest discomfort and progressive dyspnea.

On admission, the patient was conscious and hemodynamically stable. Physical examination revealed reduced air entry over the left hemithorax and mild respiratory distress. No signs of peritonitis were present.

Associated injuries included:

- D12 vertebral body fracture
- Left humeral head fracture
- Pubic rami fracture

Routine laboratory investigations were within acceptable limits.

Chest radiography demonstrated elevation of the left hemidiaphragm with a gastric shadow occupying the lower thoracic cavity. Contrast-enhanced computed tomography of the chest and abdomen revealed a left diaphragmatic rupture with herniation of the stomach and a portion of the left hepatic lobe into the thorax. No major intra-abdominal solid organ injury was identified.

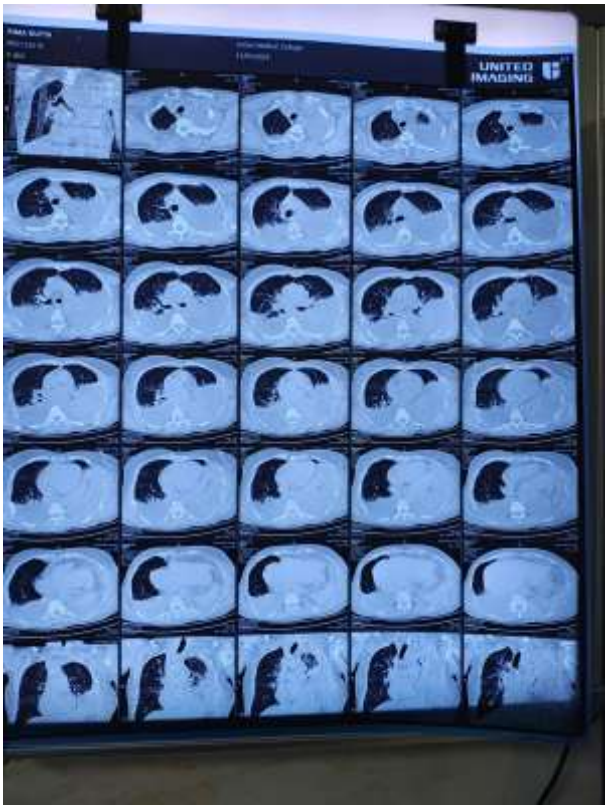


Figure 1. Contrast-enhanced CT of the chest and abdomen (axial sections) demonstrating herniation of the stomach and bowel loops into the left thoracic cavity, consistent with left diaphragmatic rupture.

Following multidisciplinary evaluation, the patient underwent emergency exploratory laparotomy. Intraoperatively, an approximately 12 cm defect was identified in the left hemidiaphragm. The stomach and part of the left hepatic lobe had herniated into the thoracic cavity. The herniated viscera were carefully reduced into the abdomen, and the diaphragmatic defect was repaired primarily using interrupted non-absorbable polypropylene sutures.

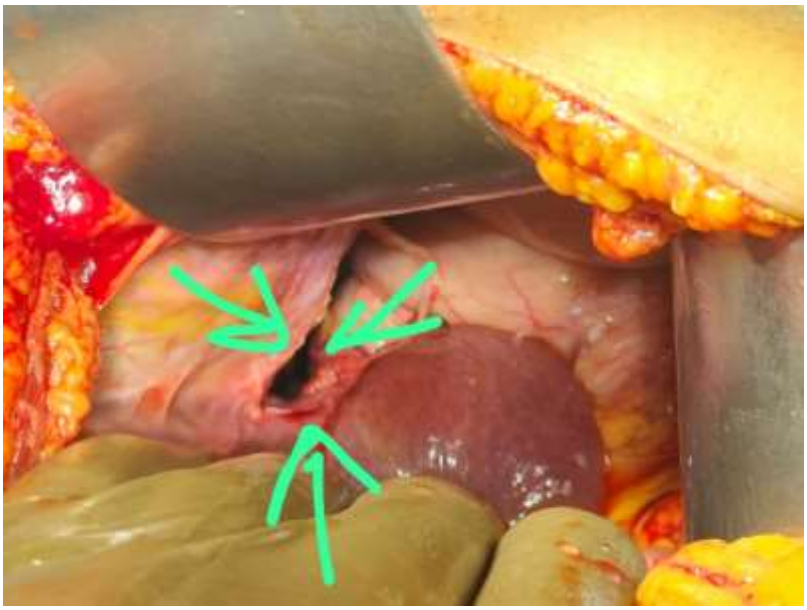


Figure 2. Intraoperative photograph demonstrating the diaphragmatic defect (arrows) with the herniated viscera visible through the opening in the left hemidiaphragm.

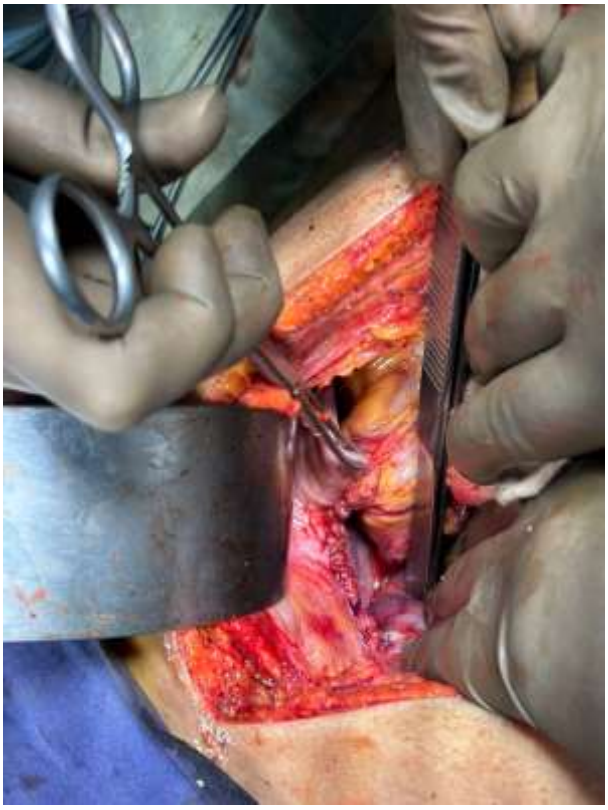


Figure 3. Intraoperative photograph following primary repair of the diaphragmatic defect using interrupted non-absorbable polypropylene sutures.

The postoperative period was uneventful. The patient showed progressive respiratory improvement and was discharged on postoperative day eight in stable condition. Follow-up evaluation demonstrated satisfactory recovery without recurrence.

3. DISCUSSION

Traumatic diaphragmatic rupture occurs when a sudden rise in intra-abdominal pressure exceeds the tensile strength of the diaphragm, resulting in disruption of the musculotendinous structure. Blunt trauma accounts for the majority of cases and is commonly associated with road traffic accidents.

The diagnosis remains challenging because symptoms are often nonspecific and overshadowed by associated injuries. Initial chest radiographs may suggest the diagnosis but have limited sensitivity. CT imaging has become the diagnostic modality of choice, demonstrating characteristic findings such as diaphragmatic discontinuity, the collar sign, and intrathoracic herniation of abdominal contents.

The stomach represents the most commonly herniated organ in left-sided ruptures. Herniation of the liver is more commonly observed in right-sided injuries because of its anatomical location. Therefore, simultaneous herniation of both the stomach and left hepatic lobe through a left diaphragmatic defect is an uncommon finding and contributes to the uniqueness of this case.

Surgical repair remains the definitive treatment. In the acute setting, laparotomy is generally preferred because it facilitates evaluation and management of associated intra-abdominal injuries. Primary repair with non-absorbable sutures is adequate for most acute defects, while larger defects may require mesh reinforcement.

This case highlights the importance of maintaining clinical suspicion in patients with persistent respiratory symptoms after blunt thoracoabdominal trauma, even when hemodynamic parameters remain stable. Early diagnosis and timely surgical intervention contributed to the favorable outcome in our patient.

4. CONCLUSION

Traumatic diaphragmatic rupture should be considered in all patients sustaining significant blunt thoracoabdominal trauma. Persistent respiratory symptoms, abnormal chest radiographs, and suggestive CT findings should prompt urgent surgical evaluation. Early recognition and operative repair can prevent life-threatening complications and significantly improve patient outcomes.

LEARNING POINTS

1. Traumatic diaphragmatic rupture is an uncommon but potentially fatal injury after blunt thoracoabdominal trauma.
2. Left-sided ruptures are more common than right-sided injuries.
3. CT imaging is the diagnostic modality of choice in hemodynamically stable patients.
4. Simultaneous herniation of the stomach and left hepatic lobe through a left diaphragmatic defect is rare.
5. Early surgical repair provides excellent outcomes and prevents delayed complications.

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