

Traumatic Left Hemidiaphragmatic Rupture with Multivisceral Herniation (Stomach, Transverse Colon, Liver, and Spleen) into the Left Hemithorax following a Pedestrian–Vehicle Collision: A Case Report

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ABSTRACT: Introduction: Traumatic diaphragmatic rupture (TDR) is an uncommon consequence of blunt thoracoabdominal trauma, occurring in roughly 0.3–5% of major blunt trauma patients, and is left-sided in the majority of cases because the liver affords the right hemidiaphragm relative protection. Simultaneous herniation of four viscera —

stomach, transverse colon, liver, and spleen — through a single left-sided defect is rarely described, since liver herniation is classically associated with right-sided rather than left-sided tears.

Case Presentation: We report a 37-year-old man who sustained a pedestrian-versus-vehicle collision. On arrival at the trauma center he was tachycardic and tachypneic (respiratory rate 36/min). Contrast-enhanced CT demonstrated a left hemidiaphragmatic laceration with herniation of the stomach, transverse colon, and portions of the liver and spleen into the left hemithorax, producing ipsilateral lung collapse and contralateral mediastinal shift. He underwent emergency laparotomy with reduction of all herniated viscera and primary repair of the diaphragmatic defect, and tolerated the procedure well with an uneventful early postoperative course.

Conclusion: This case highlights an unusual combination of concurrent gastric, colonic, hepatic, and splenic herniation through a single left diaphragmatic rupture, and underscores the need for a high index of suspicion, prompt cross-sectional imaging, and single-stage surgical reduction and repair in patients with high-energy blunt thoraco-abdominal trauma.

Keywords: *diaphragmatic rupture; traumatic diaphragmatic hernia; visceral herniation; blunt trauma; road traffic accident; case report*

Introduction

Traumatic diaphragmatic rupture (TDR) is an infrequent but serious sequela of blunt or penetrating thoraco-abdominal trauma, with a reported incidence of roughly 0.3–5% in blunt trauma series. It results from a sudden pleuroperitoneal pressure gradient generated by high-energy impact, most commonly road traffic accidents. Left-sided ruptures predominate over right-sided ones (in ratios reported from about 2:1 up to 7:1), largely because the liver buffers and protects the right hemidiaphragm, while the relatively weaker left hemidiaphragm and postero-lateral embryological fusion points are more vulnerable to tearing.

The stomach, omentum, transverse colon, and spleen are the organs most frequently reported to herniate through left-sided defects, whereas herniation of liver tissue is far more typical of right-sided ruptures. Diagnosis is frequently delayed or missed on initial

assessment because associated injuries (rib fractures, hemopneumothorax, solid-organ lacerations) dominate the clinical picture, and plain chest radiography has low sensitivity; contrast-enhanced CT is the current diagnostic mainstay. Definitive management is surgical reduction of herniated viscera with repair of the diaphragmatic defect, most often via laparotomy in the acute setting.

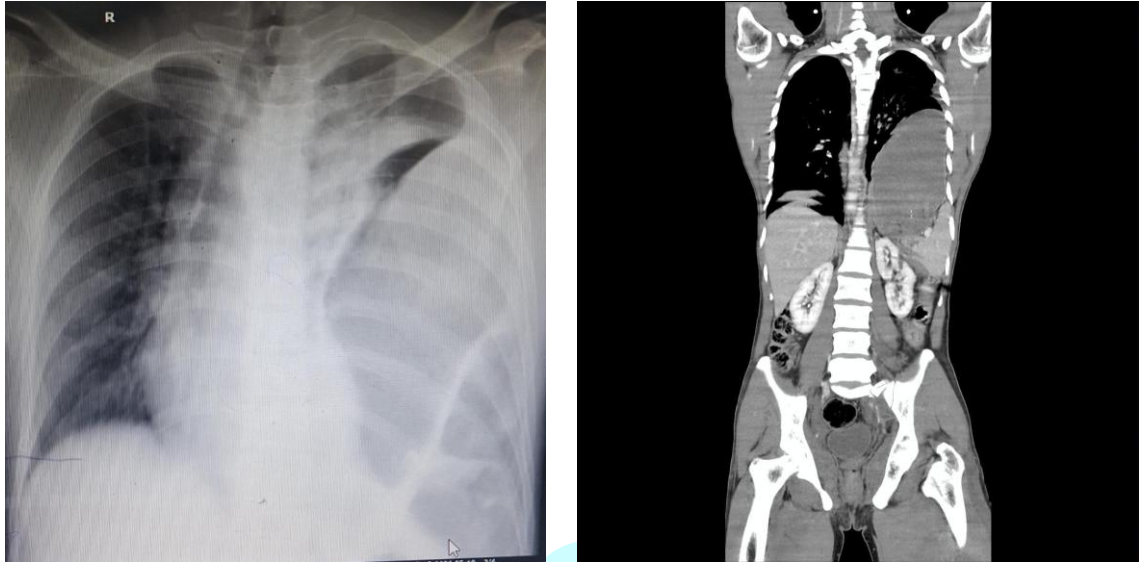
Case Presentation

A 37-year-old male patient with no reported significant past medical history presented to the trauma center after being struck by a vehicle as a pedestrian ("Mazda versus pedestrian"). [Add: time from injury to arrival, prehospital interventions, mechanism details.] On triage assessment he was tachycardic and tachypneic, with a respiratory rate of 36 breaths per minute. [Insert full vital signs — blood pressure, heart rate, oxygen saturation, GCS — and primary survey/FAST findings.] Physical examination [insert findings: breath sounds, abdominal exam, bowel sounds in chest, external signs of trauma] prompted urgent crosssectional imaging.

Contrast-enhanced computed tomography of the chest and abdomen demonstrated a left hemidiaphragmatic laceration with herniation of the stomach, transverse colon, and portions of the liver and spleen into the left hemithorax. The herniated viscera caused collapse of the left lung and a rightward mediastinal shift. [Insert additional CT findings if present: associated rib fractures, pneumothorax/hemothorax, solid-organ injury grades, other injuries identified on trauma survey.]

Given the extent of visceral herniation and mediastinal compromise, the patient was taken for emergency surgical exploration. [Insert operative approach — laparotomy/thoracotomy/laparoscopy, incision, timing from admission.] Intraoperatively, the herniated stomach, transverse colon, liver, and spleen were reduced from the thoracic cavity back into the abdomen. [Insert organ-specific findings/injuries, e.g., any associated lacerations, contamination, viability of reduced organs.] The diaphragmatic laceration was then repaired primarily. [Insert suture technique/material, mesh use if any, chest tube placement.] The patient tolerated the procedure well.

Postoperatively, the patient had an uneventful recovery. [Insert ICU/ward course, ventilator days, chest tube duration, time to oral intake, length of hospital stay, and condition and imaging at discharge and follow-up.]



Discussion

Traumatic diaphragmatic rupture with visceral herniation is an under-recognized but potentially lethal injury pattern in blunt thoraco-abdominal trauma. Its clinical presentation is frequently nonspecific and can mimic or be obscured by tension pneumothorax, hemothorax, or other more conspicuous injuries, which is why a substantial proportion of cases are diagnosed late or only intraoperatively. High clinical suspicion combined with early contrast-enhanced CT — which offers substantially higher sensitivity and specificity than plain chest radiography — is central to timely diagnosis, particularly in high-energy mechanisms such as pedestrian-versus-vehicle collisions.

Several features make this case notable relative to previously published reports of traumatic diaphragmatic hernia:

- Combined four-organ herniation through a single left-sided defect. Most published left-sided TDR cases describe herniation of the stomach, omentum, transverse colon, and/or spleen; concurrent herniation of hepatic tissue as well is comparatively unusual, since the liver's position is classically cited as the reason right-sided ruptures — not left-sided ones — more often involve the liver.

- Mass effect with mediastinal shift and lung collapse at presentation, reflecting a large diaphragmatic defect and a tension-physiology picture that can be mistaken for tension pneumothorax on initial assessment, as has been described in other reports.
- Successful single-stage reduction and repair of all herniated viscera with an uncomplicated early recovery, despite the multi-organ, high-grade nature of the injury — an outcome that reinforces the value of prompt operative management once the diagnosis is made.

The differential mechanical protection afforded by the liver helps explain why right-sided ruptures are less common overall but more often implicate the liver when they do occur; the presence of herniated liver tissue through a left-sided tear in this patient is therefore a comparatively atypical finding worth highlighting for clinicians and radiologists, since it broadens the range of organs that should be actively sought on CT once a left diaphragmatic defect is identified. As in other published cases, careful attention to chest tube placement is warranted whenever herniated viscera are suspected in the thoracic cavity, to avoid inadvertent visceral injury.

This report is subject to the inherent limitations of a single case — findings and outcome cannot be generalized, and longer-term follow-up data are needed to confirm durability of the repair and absence of recurrence or diaphragmatic dysfunction. [Insert length and results of follow-up once available.]

Conclusion

Concurrent herniation of the stomach, transverse colon, liver, and spleen through a single left-sided diaphragmatic rupture is a rare presentation of blunt thoraco-abdominal trauma. Prompt recognition on CT and timely single-stage surgical reduction and repair, as performed in this patient, can achieve a favorable outcome even with extensive multi-visceral involvement. This case adds to a small body of literature documenting atypical organ combinations in traumatic diaphragmatic hernia and reinforces the importance of a high index of suspicion in pedestrian-versus-vehicle and other high-energy blunt trauma.

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