

Right-Sided Diaphragmatic Rupture and Liver Herniation Following Blunt Thoraco-Abdominal Trauma: A Case Report

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ABSTRACT: Post-traumatic diaphragmatic hernias (PTDH) are rare but potentially life-threatening complications of thoraco-abdominal trauma, often underdiagnosed due to their subtle and delayed presentation. This case report describes a 55-year-old female who presented with acute onset of chronic right upper quadrant pain and exertional dyspnea two weeks after sustaining severe blunt thoraco-abdominal trauma in a road traffic accident. Initial evaluation at the time of the trauma revealed no immediate signs of significant injury, and she was discharged without further investigations. On admission, physical examination revealed dullness to percussion and absent breath sounds over the right lower thorax. A thoraco-abdominal CT scan confirmed the diagnosis of a right diaphragmatic hernia, with herniation of the liver into the thoracic cavity through an 8 cm diaphragmatic defect, causing displacement of thoracic structures and compression of the right lung. The patient underwent surgical repair via a midline laparotomy, with reduction of the herniated liver, diaphragmatic defect closure using interrupted non-absorbable sutures, and thoracic drainage. The postoperative course was uneventful, and the patient was discharged on postoperative day 5 with favorable clinical and radiological outcomes at six-month follow-up.

This case underscores the diagnostic challenges associated with PTDH, particularly in delayed presentations, and highlights the importance of a high index of suspicion in patients with a history of thoraco-abdominal trauma. Advanced imaging, particularly CT scans, plays a crucial role in diagnosis, while timely surgical intervention is essential for optimal outcomes. The rarity of liver herniation in PTDH further emphasizes the need for increased awareness among clinicians to prevent missed or delayed diagnoses. This report aims to reinforce the importance of thorough clinical evaluation, appropriate imaging, and long-term follow-up in patients with a history of trauma to identify and manage such rare but serious complications.

KEYWORDS: Traumatic Diaphragmatic Hernia, Liver Herniation, Trauma surgery.

INTRODUCTION

Traumatic diaphragmatic hernia (TDH) is a rare but potentially life-threatening condition that often results from high-impact thoraco-abdominal trauma. While acute TDH is typically diagnosed shortly after injury, delayed presentations can pose significant diagnostic challenges due to nonspecific symptoms such as chronic pain or dyspnea(1). Right-sided TDH is particularly uncommon, accounting for only 10-15% of cases, and herniation of the liver through the diaphragmatic defect is exceptionally rare(2,3). This rarity, combined with subtle clinical findings, often leads to missed or delayed diagnoses, especially in patients with a history of severe trauma requiring intensive care.

We report the clinical course of a 55-year-old female who developed a right-sided diaphragmatic hernia with liver herniation 15 days following a severe blunt thoraco-abdominal trauma. The case highlights the diagnostic challenges, the critical role of advanced imaging, and the importance of timely surgical intervention in achieving favorable outcomes. By sharing this case, we aim to emphasize the need for a high index of suspicion in patients with a history of trauma, even in the absence of immediate symptoms, and to underscore the value of thorough clinical evaluation and long-term follow-up in preventing delayed complications.

PRESENTATION OF THE CASE

This is a 55-year-old female patient with no significant past medical history, admitted for acute onset of chronic right upper quadrant pain and exertional dyspnea that had persisted for two weeks. The patient reported a history of a severe blunt thoraco-abdominal trauma following a road traffic accident 15 days prior to her current presentation. At the time of the accident, she was evaluated at a local hospital but was discharged home without further investigations, as she had no immediate symptoms or signs of significant injury. On physical examination, there was dullness to percussion over the right lower thorax, and auscultation revealed absent

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breath sounds in this area. A thoraco-abdominal CT scan showed elevation of the right diaphragmatic dome, with herniation of the liver into the right thoracic cavity through a right diaphragmatic breach measuring 8 cm in diameter with Displacement of Thoracic Structures and compression of the right lung (Figure 1).



Figure 1 : Coronal CT-Scan of a liver hernia through the right hemidiaphragm.

The patient underwent surgery, and a midline incision was performed, revealing a right diaphragmatic rupture through which the liver was incarcerated (Figure 2). The liver was liberated from the adhesions with the diaphragm then reduced, the diaphragmatic defect was repaired using interrupted non-absorbable No. 2 sutures in a crisscross fashion, and a 18-Fr Joly chest tube was placed for thoracic drainage.

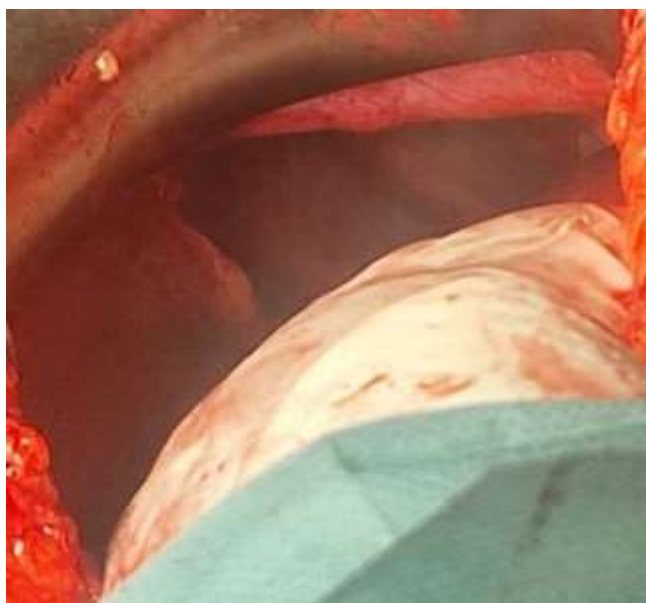


Figure 2 : Operative view of a right hemidiaphragm defect.

The postoperative course was uneventful, with normal respiratory function and discharge on postoperative day 5. At the six-month follow-up, the patient showed favorable clinical and radiological outcomes, particularly with normal respiratory dynamics.

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DISCUSSION

Post-traumatic diaphragmatic hernias (PTDH) involve a muscular defect in the diaphragmatic dome, which can lead to the intrathoracic migration of abdominal viscera. These hernias are unique in trauma surgery, often indicating the severity of the initial injury. However, they remain among the most underrecognized and frequently missed injuries(4). The etiologies of PTDH are predominantly high-energy polytrauma and thoraco-abdominal penetrating injuries, while rare causes include difficult childbirth(5), crush injuries, or postoperative herniation(6).

From an anatomopathological perspective, the left hemidiaphragm is affected in 70-90% of cases, largely due to the protective effect of the liver on the right side. The herniated contents vary, with the most frequently involved organs, in descending order of frequency, being the stomach (31.8%), colon (27.2%), omentum (15.9%), small intestine (13.6%), spleen (6.8%), and liver (4.5%)(3).

the presence of the liver along with its attachments underneath the right hemidiaphragm accounts for the lower incidence of transdiaphragmatic herniation following small defects from either penetrating or blunt trauma(7).

Diagnostically, the absence of symptoms can lead practitioners to delay the identification of PTDH. In approximately half of the cases, the hernia is overlooked(3), as seen in our patient, who had sustained severe thoraco-abdominal trauma 15 days prior following a road traffic accident. Consequently, PTDH may only be revealed later, often incidentally or during the evaluation of complications(4). In our case, the subtlety and nonspecific nature of the symptoms contributed to the delayed diagnosis.

The diagnosis was initially suspected on clinical examination and confirmed by spiral computed tomography (CT), which provided transverse and coronal sections, as well as three-dimensional reconstructions. CT is the imaging modality of choice in this context, as it not only reveals the hernia but also demonstrates complications affecting the herniated organs(8).

A midline laparotomy is the most used surgical approach. It allows for adhesiolysis, hernia reduction, and diaphragmatic repair, which is typically performed using interrupted non-absorbable sutures. This technique was chosen for its durability and ability to withstand tension. The consensus was to use interrupted sutures with non-absorbable suture material, even though there is no scientific evidence of its superiority over running sutures or the use of absorbable sutures(9). However, in cases of large diaphragmatic defects, the use of prosthetic mesh may be necessary to reinforce the repair.

This case highlights several key points:

1. **High Index of Suspicion:** Clinicians should maintain a high index of suspicion for PTDH in patients with a history of thoraco-abdominal trauma, even in the absence of immediate symptoms.
2. **Importance of imaging:** Advanced imaging, particularly CT scans, plays a crucial role in the diagnosis of PTDH, especially in cases with delayed presentation.
3. **Long-Term Follow-Up:** The necessity of regular and long-term follow-up for patients who have sustained severe thoraco-abdominal trauma, as delayed complications such as PTDH may arise.

CONCLUSION

This case underscores the diagnostic challenges and rarity of liver herniation in traumatic diaphragmatic hernias. It emphasizes the importance of a high index of suspicion, advanced imaging, and timely surgical intervention in achieving favorable outcomes. By sharing this case, we aim to raise awareness of the potential for delayed presentation of PTDH and to highlight the critical role of thorough clinical evaluation in patients with a history of trauma.

Provenance and peer review

Not commissioned, externally peer reviewed.

Consent

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

Ethical approval

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Conflicts interests

Authors have declared that no competing interests exist.

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