



RUPTURED BOUNDARIES: A CASE SERIES ON THE SURGICAL CHALLENGE OF ADULT DIAPHRAGMATIC HERNIAS

General Surgery

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ABSTRACT

Objective: To present the clinical evaluation, diagnostic challenges, and surgical management of complicated diaphragmatic hernias (DH) in adult patients. **Methods:** This observational, descriptive study was conducted at the Department of Surgery, SMS Medical College, Jaipur, from February 2024 to August 2025. We analysed all adult patients who presented with a diaphragmatic hernia and underwent surgical intervention during this six-month period. Data on patient demographics, clinical presentation, surgical approach, intraoperative findings, morbidity, and mortality were compiled and reviewed. **Results:** Six patients (four males) with an average age of 46.6 years were included. The diagnoses comprised three left Bochdalek hernias (BH), one right BH, one Morgagni-Larry hernia, and one traumatic diaphragmatic hernia (TDH). The most frequent presenting symptoms were vomiting and abdominal pain (50% of cases). Four patients were managed via laparotomy and two via laparoscopy. The colon and stomach were the most common herniated viscera. The mean postoperative hospital stay was 8.25 days. Two postoperative mortalities occurred. No recurrences were noted during long-term follow-up. **Conclusion:** Adult diaphragmatic hernia remains a significant diagnostic and therapeutic challenge. While minimally invasive surgery is linked to faster recovery, laparotomy is often required for emergent presentations. A high index of suspicion is crucial for diagnosis, which should be followed by prompt surgical repair without a "watchful waiting" period.

KEYWORDS

Diaphragmatic Hernia, Adult, Emergency Surgery, Bochdalek Hernia, Traumatic Diaphragmatic Hernia, Strangulation

INTRODUCTION

A diaphragmatic hernia (DH) is defined by the protrusion of abdominal viscera into the thoracic cavity through a defect in the diaphragm. These can be broadly classified as congenital (CDH) or acquired. The incidence of CDH is approximately 1 in 3,000-5,000 live births⁽¹⁾. While most CDH cases are identified in infancy, smaller defects may go unnoticed and remain asymptomatic until adulthood.

Acquired hernias, particularly traumatic diaphragmatic hernias (TDH) resulting from blunt⁽²⁾ or penetrating trauma, are more prevalent in the adult population^(2,3,4). The reported incidence of TDH is between 0.4% and 8%^(5,6).

Congenital hernias are predominantly left-sided (80-90%). This is attributed to the later closure of the left pleuro-peritoneal canal and the protective buffering effect of the liver on the right hemidiaphragm^(7,8).

In adults, many diaphragmatic hernias are asymptomatic and discovered incidentally⁽⁹⁾. However, presentation can be delayed and severe, with symptoms arising from the incarceration or strangulation of herniated organs⁽¹⁰⁾. Once a complicated DH is diagnosed, immediate surgical intervention is mandated to mitigate the high rates of morbidity and mortality associated with this condition. This case series details our experience with the surgical management of six varied and complex cases of adult diaphragmatic hernias.

Methodology

This observational, descriptive case series was conducted at the Department of Surgery, SMS Medical College and Hospital, Jaipur, India. The study period was from February 2024 to August 2025. We included all adult patients who were diagnosed with any form of diaphragmatic hernia and underwent surgical treatment at our tertiary care centre during this six-month interval.

Data were collected on patient demographics, clinical history, presenting symptoms, diagnostic imaging, surgical characteristics (approach, findings, repair technique), and postoperative outcomes (morbidity, mortality, length of stay). The case series was reported in accordance with STROBE guidelines⁽¹¹⁾. Written informed consent was obtained from all patients or their attendants prior to surgical intervention.

Case Presentations

Case 1: A 52-year-old male presented with abdominal pain. A CT scan confirmed a left Bochdalek hernia. A laparoscopic approach was initiated but converted to a laparotomy due to dense splenic adhesions. The stomach, spleen, colon, and omentum were reduced, and the defect was repaired with a composite mesh. The patient recovered well

and was discharged on day 6.

Case 2: A 37-year-old female presented with chest pain and vomiting. She had a known diagnosis of a left diaphragmatic hernia for five months. An obstructed L-BH was diagnosed, and a successful laparoscopic repair with mesh was performed. She was discharged on day 6 with an intercostal drain (ICD) that was removed at follow-up.

Case 3: A 54-year-old male presented with right upper abdominal pain. Imaging revealed a large right Bochdalek hernia containing the liver, kidney, omentum, and colon. He underwent a successful laparoscopic trans-abdominal repair with mesh. He was discharged with an ICD on day 6, which was subsequently removed.

Case 4: A 58-year-old female with a 5-month-old diagnosis of DH (which she refused to have surgically treated) presented in a critical state with recurrent vomiting and malnutrition. She had a history of blunt trauma (RTA) two years prior. Emergency laparotomy revealed a strangulated Morgagni-Larry hernia with gangrene of the transverse colon and spleen. A splenectomy, colon resection, and colostomy were performed. Her postoperative course was complicated by ARDS, and she succumbed to respiratory failure on day 9.

Case 5: A 43-year-old male, a known case of coronary artery disease (CAD), presented with an obstructed L-BH. Emergency laparotomy revealed gangrene of the strangulated omentum, necessitating an omentectomy. His postoperative course was complicated by acute renal failure and suspected generalized thrombo-embolism secondary to his CAD. He died on postoperative day 3.

Case 6: A 36-year-old male was referred one day after a road traffic accident with multiple fractures and shortness of breath. CT confirmed a traumatic diaphragmatic hernia (TDH) with bowel herniation. An ICD insertion yielded feco-bilious output. Emergency laparotomy revealed a gastric perforation (repaired with a Graham patch) and a gangrenous segment of ileum (which was resected). A loop ileostomy was created. After a prolonged ICU stay for sepsis, he recovered and was discharged on day 15.

RESULTS

We analysed six patients, comprising four males and two females, with a mean age of 46.6 years. The most common presenting symptoms were abdominal pain (3/6, 50%) and vomiting (3/6, 50%).

A chest X-ray was suggestive of the diagnosis in four of the six patients. A contrast-enhanced CT scan was used to confirm the diagnosis in four cases; the other two required immediate emergency surgery without advanced imaging.

All patients underwent a trans-abdominal approach¹. Three surgeries were initiated laparoscopically (one converted to open) and three were primary laparotomies². Mesh repair was utilized in all laparoscopic cases, whereas no mesh was placed in the three emergency laparotomy cases.

The hernia types included four Bochdalek, one Morgagni-Larry, and one TDH. The most frequently herniated organs were the stomach, omentum, and colon (4/6 cases), followed by the spleen (3/6) and kidney (2/6) All cases involved herniation of at least two organs.

Significant intraoperative complications were noted in 50% (3/6) of cases, including gut gangrene. One patient had a strangulated and perforated stomach, and one required a splenectomy.

The mean postoperative length of stay was 8.25 days. This was 6 days for the laparoscopically managed patients but 15 days for the TDH patient. The overall mortality rate for this series was 33.3% (2/6 patients).

DISCUSSION

Diaphragmatic hernia in adults is an uncommon but clinically significant condition. Our series reflects the known literature, with left-sided Bochdalek hernias being the most common congenital type observed^{11, 13}. We also managed two rare presentations: a right Bochdalek hernia and a left Morgagni-Larry hernia.

While TDH typically presents in a delayed fashion across three phases (acute, latent, and obstructive)¹³, our series included a rare case (Case 6) of an acute TDH presentation with strangulation.

Diagnostically, we found that a chest X-ray is a valuable initial tool, often suggesting the diagnosis. A CT scan remains the gold standard for confirmation. However, due to the nonspecific nature of symptoms, a high degree of clinical suspicion is paramount.

The central finding of our series supports the imperative for immediate surgical intervention. A "wait-and-watch" policy is inadvisable, even with mild symptoms, as these can precede catastrophic strangulation¹⁴. This is highlighted by two of our patients (Cases 2 and 4) who were diagnosed five months prior to presentation. While one (Case 2) was successfully repaired laparoscopically, the other (Case 4) refused surgery, presented with gangrene, and ultimately died.

The surgical approach should be tailored to the clinical scenario. A minimally invasive (laparoscopic or thoracoscopic) repair is associated with good outcomes and quicker recovery in elective cases^{17,18,19}. Our experience supports this: the stable patients who underwent a complete laparoscopic repair had good recovery, with quicker initiation of diet. However, in emergency settings with suspected strangulation or perforation, an urgent laparotomy provides superior access and control.

Postoperative management is critical and often requires multidisciplinary care. Re-expansion of a chronically collapsed lung can lead to pulmonary atelectasis²⁰. Furthermore, patients with significant comorbidities, such as CAD (Case 5), are at an exceptionally high risk for fatal complications like thrombo-embolism.

CONCLUSION

Diaphragmatic hernias in adults present a formidable diagnostic and surgical challenge. Once diagnosed, there is no justification for conservative or delayed management; prompt surgical intervention is mandatory. Given the rarity of the condition, clinical training must emphasize the identification of subtle symptoms and the need for early referral. Patients diagnosed with DH must be thoroughly counseled on the life-threatening risks of a "waiting period" to prevent avoidable morbidity and mortality.

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