

# Diaphragmatic Hernia Presenting as Empyema Thorax

Satyendra Dhar, Sanjay K. Bhasin, J.G. Langer

## Abstract

Diaphragmatic injuries are relatively rare and result from either blunt or penetrating trauma. Regardless of mechanism, seemingly innocent penetrating injuries may be long forgotten by the patient and are the most commonly missed diaphragmatic injury. Diagnosis is often missed and high index of suspicion is vital. The clinical signs associated with a diaphragmatic hernia can range from no outward signs to immediately life-threatening respiratory compromise. We report an unusual case of diaphragmatic hernia presenting as empyema thorax after suffering from penetrating injury.

## Key Words

Diaphragmatic Hernia, Empyema.

## Introduction

The diaphragm is integral to normal ventilation, and injuries can result in significant ventilatory compromise. A history of respiratory difficulty and related pulmonary symptoms may indicate diaphragmatic disruption. Penetrating injuries to the chest or abdomen also may injure the diaphragm. This specific injury is seen commonly where penetrating trauma is prevalent. This occurs most often from gunshot wounds but can result from knife wounds. Typically, the wounds are small, although occasionally a shotgun blast or impalement causes a large defect. Delay in detecting and repairing diaphragmatic injury increases both morbidity and mortality. We present one rare case of diaphragmatic hernia presenting as empyema thorax with signs and symptoms as nausea, vomiting, pain chest and abdomen, breathlessness.

## Case Report

A 24-year-old boy was admitted in emergency complaining of nausea, vomiting, pain chest & upper abdomen and breathlessness. On questioning the patient gave history of penetrating injury on left side of chest six months back when he was subjected to tube thoracostomy.

This tube was removed on third day and was discharged after 5 days of observation in the hospital.

On physical examination patient appeared pale, dehydrated and had dyspnea. Chest examination revealed old scar of stab wound on left side, decreased movement with respiration, absent breath sounds and dullness on percussion on left side. Abdominal examination was unremarkable. The chest x-ray showed disruption of left hemidiaphragm outline (eventration) with associated collapse of lung, shift of mediastinum to right side (Fig.1). A gastrografin meal study was performed, which revealed presence of stomach in the thoracic cavity.

At operation approximately two-thirds of stomach had herniated through an 8 cm laceration in left hemi-diaphragm into the chest with ipsilateral pleural empyema. A part of the wall of stomach was necrosed and perforated with formation of gastro-pleural fistula. Stomach was reduced into the abdomen by extending the laceration laterally. Partial gastrectomy of the gangrenous segment of the stomach was done. A percutaneous intercostal chest tube was guided in to the thoracic cavity and attached to water seal drainage bag.

From The Postgraduate Department of Surgery, Government Medical College, Jammu (J&K).

Correspondence to: Dr. Satyendra Dhar, Trikuta Nagar, Jammu (J&K)-180 005.

The thoracic cavity was washed out thoroughly with saline and the diaphragmatic laceration was repaired with an interrupted prolene sutures. We gave stay sutures on either side of laceration thereby, allowing the diaphragm to be tented downwards to aid closure.



**Fig. 1. X-ray chest showing disruption of left hemidiaphragm (eventration)**

### Discussion

Diaphragmatic injuries are relatively rare and result from either blunt or penetrating trauma. These injuries were described first by Sennertus in 1541. Riolfi performed the first successful repair in 1886. Not until 1951, when Carter et al published the first case series, was this injury well understood and delineated (1).

Clinical presentation varies depending on the mechanism of injury (i.e. blunt vs penetrating) and the presence of associated injuries. The symptoms frequently are masked by associated injuries. A history of respiratory difficulty and related pulmonary symptoms may indicate diaphragmatic disruption. Isolated diaphragmatic injury in asymptomatic patients cannot be reliably delineated by either serial physical examination or peritoneal lavage (2).

Penetrating trauma is the most common cause of diaphragmatic injury. The left hemidiaphragm is involved more frequently (>80%) than right (3,4). In our case too left hemi-diaphragm was the site of injury. Visceral herniation occurs in up to 95% of left sided lacerations and stomach is the most frequent abdominal

viscus to herniated (3). In our case also stomach herniated into the left thoracic cavity.

Patients with delayed diaphragmatic herniation frequently present months to years after the initial injury with manifestations of visceral incarceration, obstruction, ischemia from strangulation, or perforation (5). In our case it was the empyema thorax as the presentation of diaphragmatic herniation. Symbas *et al* observed a delay in diagnosis in 8% of cases of diaphragmatic injury from 18 hours to 15 years after injury (6). Vento *et al*, reported a case of left-sided thoracic stab wound, which was primarily treated with percutaneous tube thoracostomy. Ipsilateral empyema appeared 8 weeks later and subsequent investigations revealed herniation of the stomach through the diaphragm (7). In our case the presentation of the patient was six months after the primary injury.

Chest x-ray may reveal the injury if the abdominal contents have herniated into the chest. There may be a thickening or fuzziness of the diaphragmatic outline, an elevated hemi diaphragm, shift of mediastinum to opposite side, abnormal course of nasogastric tube or be completely normal. Haemo-pneumothoraces are a common associated finding. Overall plain chest X-ray has 50% accuracy (8).

Standard CT is limited in the diagnosis of diaphragmatic rupture due to the transaxial nature of the images-sensitivity 61-73% (9). In our case we did not subject patient to CT Scan as the x-ray chest revealed the diagnosis. Kileen *et al* observed that there is constriction of viscera at the site of herniation that is referred to as "collar sign" (10).

Surgery is mainstay in the treatment of diaphragmatic rupture. Operative repair is technically more difficult if the surgery is delayed. The difference is based on the degree of adhesion present in the thoracic cavity and the state of the herniated organs. After reduction of the abdominal contents diaphragm can usually be repaired simply with monofilament non-absorbable suture, placed as locked stitches or horizontal

mattress sutures. It is important to adequately wash out the thoracic cavity prior to closure, to remove any clot or contamination. In cases where the diaphragmatic hernia has been present for a long time simple closure may be difficult or impossible, and non-absorbable mesh may be required. In our case we did not come across any adhesions making repair difficult. We could repair the defect with monofilament non-absorbable sutures only but at times closure may be difficult due to wide gap or long standing hernia. In those cases agumentation with mesh repair may be required.

The patient remained under follow up for six months and there was no evidence of recurrence or any other complication.

**References**

1. Welsford M. Diaphragmatic Injuries. *Med J* 2001; 2 (4): 72-76.
2. Madden MR, Paull DE, Finkelstein JL, *et al.* Occult diaphragmatic injury from stab wounds to the lower chest and abdomen. *J Trauma* 1989; 29(3): 292-98.
3. Kuhlman JE, *et al.* Radiographic and CT findings of blunt chest trauma: Aortic injuries and looking beyond them. *Radiographics* 1998; 18: 1085-1106.
4. Feliciano DV, Cruse PA, Mattox KL, *et al.* Delayed diagnosis of injuries to the diaphragm after penetrating wounds. *J Trauma* 1988; 28(8): 1135-44.
5. Kanowitz A, Marx JA. Delayed traumatic diaphragmatic hernia simulating acute tension pneumothorax. *J Emerg Med* 1989; 7(6): 619-22.
6. Symbas PN, Vlasis SE, Hatcher C Jr. Blunt and penetrating diaphragmatic injuries with or without herniation of organs into the chest. *Ann Thorac Surg* 1986; 42(2): 158-62.
7. Vento AE, Heikkila L, Perhoniemi V, Salo JA. Delayed intrathoracic herniation of the stomach with pleural empyema due to diaphragmatic stab wound. *Scand J Thorac Cardiovasc Surg* 1996; 30(1): 45-8.
8. Van Hise ML, *et al.* CT in blunt chest trauma: indications and limitations. *Radiographics* 1998; 18: 1071-84.
9. Aoki AA, *et al.* Traumatic rupture of the right hemidiaphragm in an automobile accident victim. *Am J Radiol* 1998; 171: 386.
10. Killeen KL, *et al.* Helical CT of diaphragmatic rupture caused by blunt trauma. *Am J Radiol* 1999; 173: 1611-16.

GUIDELINES FOR ARTICLES TO BE SUBMITTED UNDER EACH CATEGORY TO "JK SCIENCE" JOURNAL OF MEDICAL EDUCATION & RESEARCH

Article Type	Summary: No. of Words	Key Words: No. of Words	Text : No. of Words	Sub-Headings	Tables: Max. No.	Figures: Max. No.	No. of References
ED	NR	NR	≤ 600-800	NR	NR	NR	≤ 10
RA	NR	NR	≤ 3000	Variable	2	2	30-35
OA	≤ 200	3-5	≤ 2000	Standard	4	2	20-25
SC	≤ 100	3-5	≤ 1200	Standard	2	1	10-15
CR	< 50	3-5	≤ 600-800	Standard	1	3	≤ 10
DR	NR	NR	≤ 1000	NR	1	1	≤ 10

ED = Editorial RA = Review Article; OA = Original Article; SC = Short Research Communication; CR = Case Report; DR = Drug Review