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TRAUMATIC RUPTURE OF DIAPHRAGM: A CASE REPORT

Vidyadhar A. Kinhal¹, Mahesh Desai S², Syeda Siddiqua Banu³

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ABSTRACT: Diaphragmatic injury (DI) is a rare clinical entity. It can be obvious on Chest X-ray or have an occult and delayed presentation with non-diagnostic imaging studies, thus being easily missed. A high index of suspicion should be maintained in such cases because delayed diagnosis is associated with an increased risk for herniation and strangulation of abdominal organs, leading to life threatening consequences. For patients with uncertain diagnosis-diagnostic laparoscopy, thoracoscopy or open surgical exploration may be needed. In established cases DI is repaired with open surgical or minimally invasive techniques. Neglected DI is associated with high mortality. Its diagnosis becomes difficult especially in poly trauma patients and occult cases. Therefore, the detection, an accurate diagnosis and prompt management is a real challenge. We report a case of DI due to blunt thoraco abdominal trauma in a 28-year-old gentleman managed successfully at our hospital.

KEYWORDS: diaphragmatic injury, poly trauma, thoracoscopy.

INTRODUCTION: Diaphragmatic injury (DI) is a result of severe blunt or penetrating thoracoabdominal trauma. Its exact incidence is not known.^[1] DI has varied presentations, such as acute and delayed. The delayed cases often present with either respiratory distress or intestinal obstruction due to strangulation of the herniated bowel segment in the thorax.^[2] Since the diaphragm is in a constant state of motion its wounds are unlikely to heal spontaneously. A thorough knowledge of DI and an early treatment helps in significant reduction of morbidity and mortality.

CASE REPORT: A 28 year old man presented to us in profound shock and breathlessness following blunt thoraco abdominal trauma due to fall of a gunny bag containing rice while working. Physical examination revealed bruising on the anterior abdominal wall and left hypochondrium. Diffuse tenderness over his left hemithorax and left hypochondrium was noted. Examination of the chest revealed decreased respiratory movements and breath sounds on the left side. Primary resuscitation was done to achieve hemodynamic stability. Once the patient was haemodynamically stable, plain CT chest was done which revealed herniation of stomach in left hemithorax with collapse of the left lung and shift of the mediastinum to the right side (figure 1). Blood investigations were unremarkable.

An emergency exploratory laparotomy was performed via left thoracoabdominal incision. Rupture of left dome of diaphragm was noted with herniation of entire stomach into the left hemithorax. (figure 2). The stomach was reduced and repositioned back into the abdominal cavity. The base of the left lung was visible but didn't reveal any tear. The rent in the diaphragm was clearly delineated and sutured with no 1 prolene in continuous fashion (figure 3). An

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intercostal drain was placed in the left hemi thorax. Peritoneal lavage with normal saline was given and abdominal cavity was closed in layers. Patient was on ventilator support for 48 hours. Adequate physiotherapy was instituted. Full lung expansion on left side was achieved in a week and Intercostal drain was removed. Post-operative period was uneventful (figure 4). Thereafter patient is under constant follow up and is doing well.

DISCUSSION: Traumatic rupture of the diaphragm may occur due to blunt, penetrating or iatrogenic injuries. Males are more commonly affected than females. The left hemi diaphragm is most common site involved, as the liver possibly has cushioning effect on the right side.^[3,4] Approximately 75% of the diaphragmatic injuries are caused by blunt trauma and 25% by penetrating trauma and are often associated with injury to other intra-abdominal organs.^[5] Isolated injury to diaphragm is rare.

Although the exact mechanism is unknown, it is proposed that a direct blow to the abdomen leads to a sudden transmission of force through the abdominal viscera that acts as a hydrodynamic fluid wave leading to significant increase in the intra-abdominal pressure leading to diaphragmatic rupture.^[6] Our patient also had a thoracoabdominal injury due to fall of a gunny bag that might have led to the increased intra-abdominal pressure ultimately leading to DI.

According to the duration of injury, diaphragmatic rupture can be categorized into one of three groups (early or acute, i.e. immediately or within 14 days post-injury; latent, diagnosed after acute injury but before intestinal obstruction or strangulation; late, where correct diagnosis is established with intestinal obstruction or strangulation). The present case is of acute variety as it was diagnosed within 12hrs.^[1] The missed injuries of the diaphragm may occur either due to delayed rupture or delayed detection. In delayed rupture, the diaphragmatic muscle is devitalized at the time of the initial injury and starts acting as a barrier against herniation. Delayed detection becomes evident only when the intrathoracic pressure becomes negative and herniation occurs some time later. Therefore, during exploratory laparotomy, a meticulous inspection and palpation of the entire diaphragm becomes mandatory in every case of trauma.^[5]

A high index of clinical suspicion and imaging studies help in an accurate early diagnosis of DI. The usual symptoms of DI may include shoulder or epigastric pain, respiratory distress and intrathoracic bowel sounds.^[6] In cases of delayed presentation with chronic herniation, symptoms of partial or complete intestinal obstruction may be present. Sometimes herniated and distended stomach or colon may easily be mistaken as pneumothorax or hydr-pneumothorax.^[1] The clinical signs in the diagnosis of diaphragmatic hernia include diminished expansion of the chest wall, impaired resonance, adventitious sounds, cardiac displacement, circulatory collapse, cyanosis and dyspnea and asymmetry of the hypochondria.^[7]

There is no "gold standard" for early diagnosis of traumatic diaphragmatic rupture, an early CXR and CT help in the diagnosis. Established cases should be managed by laparotomy and suturing of the defect. Open exploration can be carried out through the abdominal or the thoracic route.^[1,8] The operative repair of a rupture is simple if performed immediately as in our case. Delayed repair becomes difficult mainly because of adhesions and atrophy of the diaphragm and is subjected to higher chances of dehiscence, Use of mesh is controversial. The non-absorbable prosthetic meshes are required to repair such chronic injury. In doubtful cases or all cases of

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blunt or penetrating trauma chest a diagnostic laparoscopy or video-assisted thoracoscopy should be performed.^[1] Irreversible shock and head injury are most likely causes of intra-operative or early post-operative deaths whereas sepsis and multisystem organ failure predominate as late causes of death.^[5,7]

CONCLUSION: Traumatic diaphragmatic rupture is uncommon but lethal sequelae to blunt thoracoabdominal injury. Pre-operative diagnosis is pivotal in preventing morbidity and mortality associated with missed rupture. Thus a thorough knowledge about DI is required.

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FIG. 1: CT film showing elevated left hemi diaphragm with abdominal contents and collapsed left lung



FIG. 2: Rent in the diaphragm showing stomach herniation

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FIG. 3: Diaphragmatic rent being repaired



FIG. 4: Post op wound after suture removal

AUTHORS:

1. Vidyadhar A. Kinhal
2. Mahesh Desai S.
3. Syeda Siddiqua Banu

PARTICULARS OF CONTRIBUTORS:

1. Professor & HOD, Department of General Surgery, VIMS, Bellary.
2. Assistant Professor, Department of General Surgery, VIMS, Bellary.
3. Final Year Post Graduate, Department of General Surgery, VIMS, Bellary.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Syeda Siddiqua Banu,
Post Graduate,
Department of General Surgery,
VIMS, Bellary.
E-mail: syeda_dr@yahoo.com

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