A Delayed Diaphragmatic Hernia
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Citation

Abstract
In surgical practice, diaphragmatic injuries are present in 1-7 % of people with significant blunt trauma¹ and an average of 3% abdominal injuries². Diaphragmatic rupture resulting from blunt trauma is still not suspected by many surgeons. We encountered an interesting case, where a traumatic diaphragmatic hernia could only be diagnosed after 20 days of the initial chest trauma and that too because of intercostal thoracostomy tube drain showed food particles. CT scan revealed abdominal contents in the chest and thoracostomy tube was placed inside the stomach. He was successfully managed by exploratory laparotomy, closure of perforation and diaphragm repair with a prolene sutures.

INTRODUCTION
Diaphragmatic rupture usually occurs as a result of blunt or penetrating injury. The left hemidiaphragm is more commonly affected than right after blunt trauma³. Depending on the type and site of the defect, herniated organs may include liver, kidneys, omentum, or bowel. Injuries to the diaphragm are usually accompanied by other injuries, and they indicate that more severe injury may have occurred⁴.

CASE REPORT
A 45 year-old male was referred to the emergency department of our hospital with complaints of food particles coming through the intercostal tube thoracostomy drain and respiratory difficulty on 26/7/2010 from a local hospital.

The patient gives history of a bike accident on 29/6/2010; He had a fall on road due to sudden application of the brake by the rider. He was then treated in a emergency of his local hospital. The patient was in stable condition with complaints of pain left leg and he was given skin traction left limb for pelvic fracture and subsequently discharged with analgesics.

Initial X ray finding on 29/6/2010 showed normal picture as in the fig (1).

The patient was apparently alright for 20 days then he developed respiratory difficulty, again he was taken to same hospital. X ray on 23/7/2010 showed haziness in the left chest as in fig (2, 3) Patient was managed by tube thoracostomy.
The patient was allowed orally next day, tube thoracostomy drain content showed food particles and was then referred to our institute. He was attended in stable condition with complaints of respiratory difficulty. Intercoastal tube thoracostomy drain content was milky with food particles. Examination showed crepts in left lower and middle chest and bony crepits in left chest indicating multiple rib fractures. No other added sounds were present. Abdomen was soft and with no tenderness at any site.

Emergency CT scan of chest and upper abdomen was done, which revealed presence of stomach and gut loops in the left chest and thoracostomy tube found inside the stomach with hydropneumothorax as in fig (4, 5, and 6).

**Figure 4**
Fig (4) CT scan of thorax (transverse section) the stomach is seen in the left thoracic cavity with thoracostomy tube passing into gastric lumen with collapse of lung.
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Figure 5
Fig (5) CT thorax (sagittal section) showing the defect in the diaphragm with herniation of stomach and its vascular components.

Figure 6
fig (6) CT scan of thorax and upper abdomen (coronal section) showing herniation of stomach into left hemidiaphragm with chest tube inside the gastric lumen, collapse of the left lung and shifting of the mediastinum to opposite side.

So a provisional diagnosis of delayed diaphragmatic hernia was made. He was explored with a transverse upper abdominal incision given with preparation for thoractotomy if required. The operative findings were: (1) Big defect of 6 x 5 cm present in the diaphragm in its postero-central part see fig (7), (2) Upper part of the stomach herniating into the chest, (3) Perforation of dimension 4 x 3 cm present in the anterior wall of the stomach near greater curvature with thoracostomy tube passing through the perforation see fig (8), (4) Biliary collection of about half liter in the left pleural cavity.

Figure 7
Fig (7)

The contents in the pleural cavity were having dense adhesions, which were gently separated by blunt dissection and by slightly enlarging the diaphragmatic defect. All abdominal contents were repo sited back in the abdominal cavity. Stomach perforation was closed with a Graham’s patch.

Figure 8
Fig (8)

The defect of the diaphragm was defined and it was repaired with the help of an interrupted prolene sutures. Both pleural and peritoneal cavities were thoroughly cleaned, the pleural cavity was drained with an intercostal drain and the
abdomen closed in layers. Recovery from general anaesthesia was smooth and was maintaining good oxygen saturation. Post op X-ray chest showed expanded lung fields as in fig (9) and (10).

**Figure 9**
Fig (9)

**Figure 10**
Fig (10) The chest tube was removed and patient was kept for a day and it was uneventful. Patient was then discharged and was asked for follow up after 5 days. Follow up of patient was uneventful with near normal lifestyle activities.

**DISCUSSION**

Ambroise Pare made the first description of diaphragmatic rupture in a French artillery captain who had been shot eight months before his death from complications of the diaphragmatic rupture. Not until 1951, when Carter, et al published the first case series, was this injury well understood and delineated. Since the incidence of associated injuries is high, attention required for the diagnosis of diaphragmatic rupture is less. Diaphragmatic injuries present in three clinical phases as first described by Grimes (i) the first or acute phase begins with injury (2) if not diagnosed earlier, the second or latent phase occurs. This phase is asymptomatic but may evolve into gradual herniation of abdominal contents. The diagnosis may be made later because of complications of herniation of abdominal contents in to pleural cavity. (3) The third or obstructive phase is characterised by bowel or visceral herniation, obstruction, incarceration, strangulation and possible rupture of stomach and colon. Even cardiac tamponade has been reported.

Even plain chest radiographs are the one of the most accessible imaging modalities and a highly useful screening tool in cases of suspected diaphragmatic injury. The overall diagnostic accuracy of chest X-rays is difficult to accurately assess but has been reported as ranging from 27 to 62% for left sided injuries and 17% for right sided injuries, although one report quotes diagnostic rates of as low as 3%. The suspicion of the diaphragmatic rupture really alters viewing of the chest radiography. In a review of 13 cases of spontaneous diaphragmatic injury, all but one suffered left sided ruptures, further highlighting the natural weakness of the left hemi-diaphragm.

The misdiagnosis is usual in India and other developing countries and this calls for caution in interpretation of chest x rays. There are case reports of misinterpreting it to be pulmonary Koch’s disease. In delayed cases, time interval between trauma and presentation ranges from two weeks to forty years. If diagnosis is delayed to months or years after the injury, symptoms are generally less severe, and are due to size reduction in the chest cavity like dyspnoea, orthopnea, respiratory distress etc, and partial or complete obstruction of herniated abdominal contents like nausea, vomiting, abdominal and chest pain etc.

The case is being reported to highlight the following points:

- Delayed presentation of traumatic diaphragmatic rupture and its association with perforation of herniated stomach due to tube thoracostomy, it is an indication of low suspicion index in the surgeon community and chest x ray being unreliable in diagnosis of diaphragmatic rupture. This type of case can be dealt with exploratory laprotomy.

**References**

2. Asensio JA, Petrone P. Diaphragmatic injury. In:
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