Case report

A case of Bochdalek hernia in adult misdiagnosed as pulmonary tuberculosis

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Abstract

Bochdalek hernias are congenital defects resulting from the failure of posterolateral diaphragmatic foramina to fuse in utero. Usually it manifests in the neonatal period and occasionally in childhood. Symptomatic Bochdalek hernias in adults are infrequent and may lead to gastrointestinal dysfunction or severe pulmonary disease. Patients are initially investigated and treated for other diseases, therefore diagnosis is purely incidental. Herein, we are reporting a case of symptomatic Bochdalek hernia in an 18-year-old female misdiagnosed as pulmonary tuberculosis and treated accordingly, but with no improvement. This case illustrates importance of high index of clinical suspicion and role of computed tomography in avoiding misdiagnosis and occurrence of serious complication if not treated early.

Keywords: Bochdalek hernia, Diaphragmatic hernia, Hydropneumothorax, Laparoscopic repair, Tuberculosis

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Bochdalek hernias are congenital diaphragmatic hernias resulting from failure of posterolateral diaphragmatic foramina to fuse in utero. It was first described in 1848 by Vincent Alexander Bochdalek, a Czechoslovakian anatomist. This entity has been almost a pediatric disease that generally presents with pulmonary symptoms between the neonatal period and preschool age. Diaphragmatic hernia through the posterolateral foramina of Bochdalek represents the most common type of congenital diaphragmatic hernia. Most of the cases present during neonatal life with associated congenital abnormalities and have a very poor prognosis. In adults, they remain mostly asymptomatic and are found incidentally on chest radiographs or computed tomography (CT) done for any other nonspecific complaints. Symptomatic Bochdalek hernia in adults is very rare and may lead to incarcerated bowel, intra-abdominal organ dysfunction or severe pulmonary disease. Sometimes poor quality radiographs may cause diagnostic confusion with pulmonary tuberculosis and lead to delayed diagnosis. Hence CT scan plays an important role in early diagnosis and planning the management.

Case report

An 18-year-old girl referred from department of pulmonary medicine presented with intermittent breathlessness, left sided chest pain for six months which aggravated after taking food. She had frequent episodes of heart burn and hiccup. She had no other complaints like history of fever, hemoptysis or weight loss. There was no history of trauma to chest and abdomen. There was no significant medical or surgical history. She was diagnosed as a case of pulmonary tuberculosis 6 months back as chest x-ray was wrongly interpreted as left hydropneumothorax by a general practitioner. She was started on anti-tubercular therapy (ATT) since then. Neither there was improvement in patient's
Fig 1. Chest X-ray postero-anterior view and lateral view showing indistinct left hemi-diaphragm with multiple air fluid level in left mid and lower zone. Normal fundic gas position is not seen.

Fig 2. Barium meal follow-through series showing abnormal position of stomach and small bowel in the left thoracic cavity.
Fig 3. Contrast enhanced CT of the abdomen showing herniation of stomach (S), spleen (*), small and large bowels (arrow), and mesenteric vessels (dotted arrow) into left hemithorax with compression of left lung parenchyma and mediastinal shift to right side.

condition radiologically nor clinically after completion of six months of ATT.

On physical examination, vitals were within normal range. Respiratory system examination showed reduced chest expansion and breath sounds on left side. On auscultation, bowel sounds were audible on left side. The routine blood examination was found to be normal.

Chest x-ray (postero-anterior and lateral views) showed a large cavity with multiple air fluid levels in left mid and lower zone (Fig 1). Barium meal follow through test showed herniation of stomach and small bowel through left hemithorax (Fig 2).

Computed tomography (Fig 3) confirmed the presence of a left sided Bochdalek hernia with herniation of stomach, small and large bowels, spleen and mesenteric vessels into left hemithorax with compression of left lung parenchyma and mediastinal shift to right side. She was referred to cardiothoracic and vascular surgery department for surgical correction. But patient left against medical advice.

Discussion

Diaphragm is a thin fibromuscular structure separating thoracic cavity from abdominal cavity. Diaphragm develops by fusion of septum transversum, the primitive central tendon of diaphragm and the pleuroperitoneal membrane beginning in the third week of embryogenesis and is completed by 8-10 weeks\(^\text{14}\). Congenital diaphragmatic hernia is characterised by displacement of abdominal organs into the thorax through a defect in diaphragm due to lack of development of the pleuroperitoneal folds or due to inappropriate migration or absence of the diaphragmatic musculature or weakness in the embryological point of fusion\(^\text{1}\). Depending on the anatomical location, congenital diaphragmatic hernia can be divided into following three types:-
1) Postero-lateral diaphragmatic hernia / Bochdalek hernia
2) Anterior-retrosternal hernia / Morgagnian hernia
3) Septum transversum defect / Hiatal hernia

Postero-lateral is the most common type accounting for around 95% cases and the other types occur with an incidence of 2% each. The congenital hernia generally presents in the first few hours of life or in neonatal period where as traumatic hernias can present in any age groups. Diaphragmatic hernia in adults is commonly due to trauma. The congenital diaphragmatic hernia tends to occur more commonly on the left side because the right pleuropertitoneal fold fuses earlier than left and liver is supposed to act as a barrier. Bochdalek hernia affects about 1 in 2,200 to 12,500 live births and usually presents as a neonatal emergency.

Diagnosing this condition is very difficult in adults and in most of the cases it is an incidental diagnosis. Patients complaints are generally vague and range from gastrointestinal symptoms to pulmonary and respiratory symptoms like vomiting, abdominal pain with distension, exertional dyspnoea and chest pain, the latter being the most common complaint. It is a cumbersome task on part of a physician to differentiate between traumatic diaphragmatic hernia and Bochdalek hernia in adult as both cases present with same clinical and radiological features. It is only the history of trauma, blunt or penetrating preceding the complaints that favours the diagnosis of traumatic diaphragmatic hernia. The most common cause is motor vehicle collisions and the most common group of patients is unsurprisingly young men. In traumatic hernia, it is expected to find supportive signs of chest and/or abdominal trauma like rib fractures, solid organ injuries (liver, spleen), hemothorax, hemoperitoneum, etc.

Blunt or penetrating trauma leads to sudden onset of increased intra-abdominal pressure, which is distributed in all directions. The diaphragm offering the least resistance, fails by disruption. Since the dome of the left diaphragm is free and unprotected it becomes the most common site for traumatic diaphragmatic hernia.

Radiological investigation plays a significant role in the diagnosis of this condition. In chest x-ray air-fluid levels are seen in thoracic cavity indicating the presence of stomach high in thorax which can be misinterpreted as a hydro pneumothorax in certain clinical settings. Our patient was misdiagnosed and treated as pulmonary tuberculosis. Dilated bowel loops were also seen in the thorax. Sometimes a naso-gastric tube is placed and radiographs are obtained which have a dual purpose. Firstly, it decompresses the stomach and secondly it confirms the abnormal presence of stomach in thoracic cavity.

On plain film chest radiography, Bochdalek hernias may be confused for other thoracic pathology including left middle lobe collapse, air space consolidation, pericardial fat pad, sequestration of the lung, mediastinal lipoma, or anterior mediastinal mass. CT scan gives a confirmation of the diagnosis so that further management can be planned accordingly.

The most frequently herniated organ is the stomach followed by the colon, spleen, small intestine and ureter. The incidence of Bochdalek hernia in routine CT scan in adults has been reported to vary from as low as 0.17% to as high as 6%, thus emphasising on the fact that its presence is more common than assumed though the majority stay asymptomatic and only very few present with complications. Thus, only about 130 cases have been reported in the literature. The reason being asymptomatic hernias may be missed and it is only those hernias, which become complicated or symptomatic that present themselves to the clinician.

Treatment is essentially surgical which includes exploratory laparotomy, reducing the contents and examining the contents for any injury, perforation and viability. The defect is identified and primary closure is done by non-absorbable suture material. A synthetic mesh or Teflon patch may be used to reinforce the repair. It can be performed via two approaches, transabdominal and transthoracic. In cases of intestinal obstruction or strangulation, the transthoracic approach is preferred otherwise, a transthoracic repair should be considered as it is a technically simpler procedure. Laparoscopic repair can also be done.

**Conclusion**

Bochdalek hernia in adults is a rare clinical entity presenting mostly as post prandial dyspnoea and epigastriac pain. A high index of clinical suspicion is required for correct diagnosis because it mimics other diseases like pulmonary tuberculosis as in our case. Chest x-ray after naso-gastric tube placement may help in diagnosis when herniating sac contains stomach. CT scan confirms the diagnosis. Exploratory laparotomy is done in most of the cases to find out the primary defect. A mesh may be used to strengthen the primary repair. Abdominal compartment syndrome is a rare post-
operative complication and when suspected a mesh may be used to help in abdominal closure.

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