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CASE REPORT

Bochdalek hernia: a rare cause of pleural empyema

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Bochdalek hernia: a rare cause of pleural empyema. L.H. Steenhuis, R.T.O. Tjon A Tham, F.W.J.M. Smeenk. ©ERS Journals Ltd 1994.

ABSTRACT: This case report describes pleural empyema, caused by an intrathoracic ruptured stomach, in an adult patient with Bochdalek hernia. The possible complications and difficulties in diagnosing Bochdalek hernia in the adult are discussed.

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Congenital posterolateral diaphragmatic hernia - so called Bochdalek hernia - is one of the most common congenital diaphragmatic hernias in infants [1–3]: 1 in 2,200–12,500 live births [2, 4, 5].

In infancy, it is a serious illness causing severe respiratory distress, which necessitates immediate operation [1].

Adult Bochdalek hernia, with abdominal viscera in the thoracic cavity, is rare [2, 3]. Smaller herniation (usually containing fat) occur more often [4]. The diagnosis of Bochdalek hernia is not always easy, as is demonstrated in this case.

Case report

A 29 year old woman was admitted to our hospital in April 1988. One day before admission, whilst suffering a cold, she experienced a sudden pain in the left upper part of her chest. Gradually, she developed pain in the upper abdomen. Her medical history included inflammatory bowel disease, and a left-sided pneumothorax, with partial pleurectomy because of a relapse within one month in 1978. The chest film made after this thoracotomy revealed no abnormalities, except for an obliteration of the left costophrenic angle caused by pleurodesis (fig. 1).

Physical examination showed a moderately ill woman with fever (39°C) and shallow breathing. Percussion revealed a dullness at the left lower part of the chest, whilst reduced breath sounds were also heard in this area. There were no crackles. The left upper abdomen was painful, but without peritoneal signs. Laboratory findings were normal (erthyrocyte sedimentation rate (ESR) 2 $mm \cdot h^{-1}$, haemoglobin 8.3 $mmol \cdot l^{-1}$, leucocytes

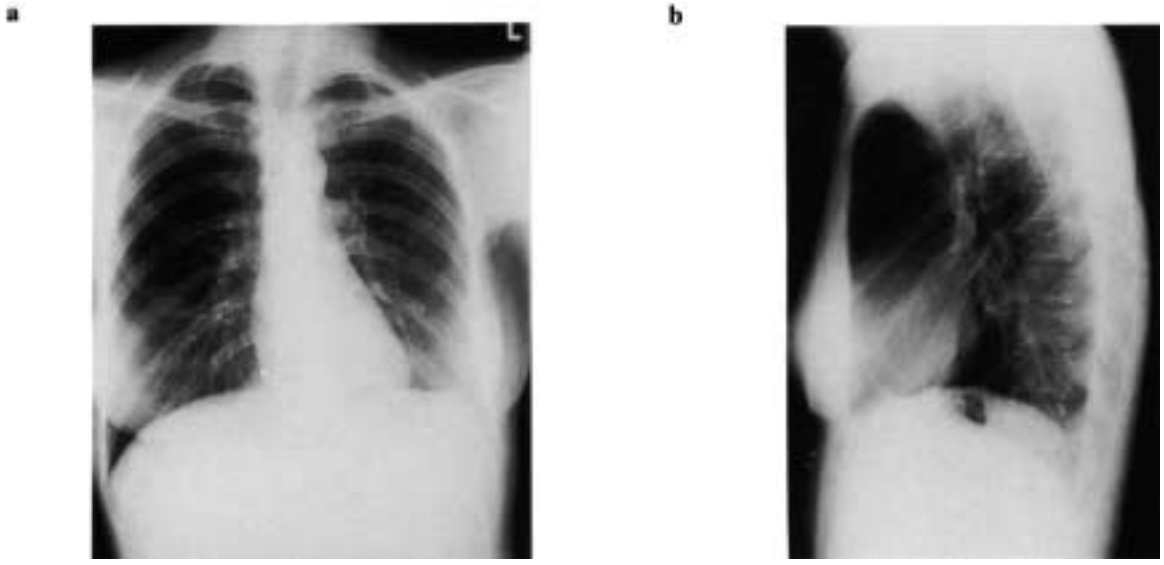

Fig. 1. – a) Posteroanterior and b) lateral chest films made after the first thoracotomy in May 1978, showing an obliteration of the left costophrenic angle related to pleurodesis.

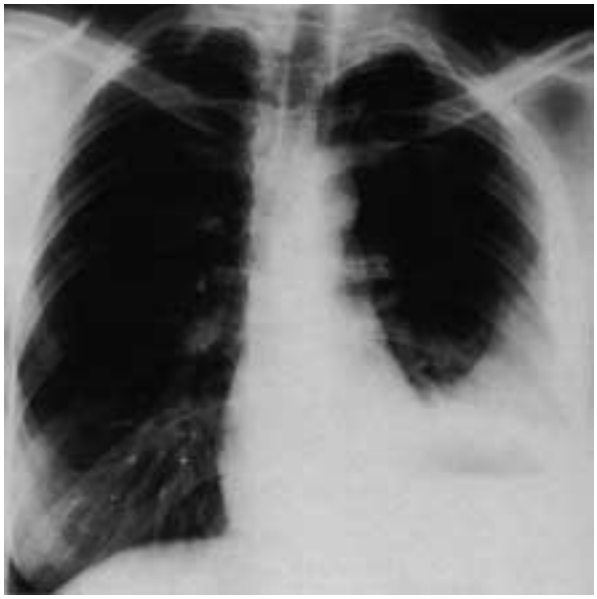

Fig. 2. – Chest film made at admission to our hospital in 1988, showing elevation of the left diaphragm, with pleural fluid in the last lower part of the chest, and an air fluid level, probably the stomach.

$10.8\times10^{9}\cdot l^{-1}$, normal differentiation). The chest film made at admission suggested elevation of the left diaphragm, with pleural fluid in the left lower part of the chest, and an air fluid level, probably the stomach (fig. 2). At thoracocentesis no pleural fluid could be obtained.

The patient's condition deteriorated within a few days, with progression of abnormalities on the chest film (fig. 3). Laboratory data now showed leucocytosis. A pleural empyema with pockets was clinically suspected. Differential diagnosis included a lung abscess (masked by pleural shadowing), oesophageal rupture, with perforation to the pleural cavity, and subdiaphragmatic pathology. Endoscopy of the upper gastrointestinal tract, performed one day before surgery, revealed no abnormalities. Computerized tomography (CT) showed pleural fluid, with consolidation in the left lower part of the chest, causing suspicion of pleural empyema. Because of these findings, a thoracotomy followed: air and pus was seen in the pleural cavity, along with necrotized gastric tissue, bulging through the posterolateral aspect of the left diaphragm. A partial resection of the stomach was performed, and the diaphragmatic defect was closed. Gram-staining showed Gram-positive cocci and Gram-negative rods - together with many leucocytes - in the pleural fluid. Only *Streptococcus faecalis* was isolated. Recovery was without complications.

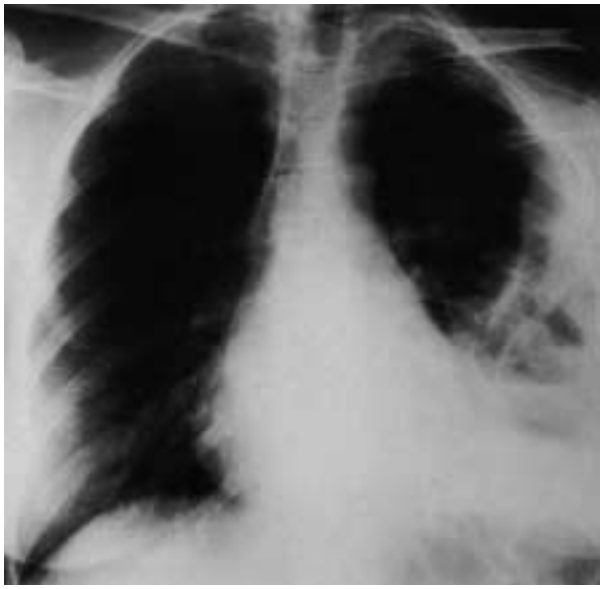

Fig. 3. – Chest film made 4 days after admission, showing progressive abnormalities with multiple air fluid levels.

Discussion

The diaphragm derives from different sources. The central portion is formed from the septum transversum. The meso-oesophagus forms the mediodorsal portion. The musculature of the lateral body wall plus the pleuroperitoneal membranes form the lateral portions. The posterolateral portions are last to develop, and are closed by the pleuroperitoneal membranes, which grow ventrally and fuse with the septum transversum by the eighth week of embryonic life [3, 6]. Cessation of closing can result in herniation of abdominal viscera into the thorax, through this opening [2, 3, 6]. Most large defects are in the left posterolateral position [2, 3, 6, 7]. Often there is no hernial sac [2, 3].

About 100 cases of large Bochdalek hernias have been described since 1853 [2]. Gale, however, found a prevalence of about 6% with CT-investigation. Most of these hernias are small. He found a ratio of left-sided to right-sided hernias of 2:1, instead of the 9:1 ratio found previously [4].

Small Bochdalek hernias are asymptomatic, and even the larger ones do not necessarily produce symptoms [4, 5, 8, 9]. The most common presentation is left-sided abdominal and chest pain, associated with difficult breathing and intestitial obstruction [2]. Sometimes, only gastrointestinal symptoms [10], caused mainly by obstruction of abdominal viscera [3, 9], occur.

The patient's history and physical examination are not helpful in making the diagnosis, because of their nonspecific character. Bowel sounds at chest auscultation [8], and intestinal obstruction, with left lung signs, and a relatively nondistended abdomen [2], however, could be clues leading to the correct diagnosis.

Plain chest films are adequate to diagnose large herniations [2], but most small ones are not visible [5]. A previous normal chest film does not rule out the presence of a hernia [2]. A single smooth focal bulge, centred approximately 4–5 cm anterior to the posterior diaphragmatic insertion on a lateral chest film, is characteristic [4]. Sometimes the hernia simulates pleural effusion [9]. Barium enema studies are sometimes required, and are often diagnostic, provided the patient has been placed in the Trendelenburg position. Otherwise, too many falsely negative results will be found [2, 8, 9]. CT is considered to be a more accurate method for diagnosing suspected small herniations, because these

congenital hernias are less likely to contain gastrointestinal loops [9]. Coronal magnetic resonance sections are particularly valuable in showing the relationships of the thoracic mass to the diaphragm. A definitive diagnosis can be made, because of characteristic features, such as: 1) discontinuity of the soft tissue line of the diaphragmatic musculature adjacent to the mass; 2) localization of the lesion in the posterior aspect of either hemidiaphragm; and 3) congruency and continuity of the sub- and supradiaphragmatic densities through the diaphragmatic defect [4, 5].

As soon as the diagnosis is made, operative repair should be carried out - even if there are no symptoms - because of the severe complications that large hernias can give, such as strangulation of hernial contents [2, 3, 8]. Small, asymptomatic hernias do not require surgical intervention [5]. In general, direct closure of the defect is possible, whereas prosthetic material is seldom needed [2, 8]. The mortality of an early operation is low (<4%) [2, 8], whilst an emergency operation has a much higher mortality [8].

The finding of a Bochdalek hernia in our patient was the more surprising because of her earlier left-sided thoracotomy with pleurodesis. Bochdalek hernia, however, is usually not seen at this kind of operation (because of its posterior localization), unless one actively looks for it. Furthermore, it is likely that a herniation had not yet occurred (fig. 1). An infection can dissolve adherences, even after an operatively performed pleurodesis. As is apparent from the loculated aspect, this must be the case. Also the preoperatively performed endoscopy of the upper gastrointestinal tract had shown no abnormalities. The fundus region however, is a well-known blind spot during endoscopy. Pathology in this location can easily be missed.

Our patient's deterioration could be explained by necrosis of the stomach wall, caused by ischaemia due to strangulation. Also, the thoracentesis procedure itself could have injured the stomach wall and, thus, caused empyema.

This case report stresses the rareness of an adult Bochdalek hernia. The lack of awareness, together with its nonspecific symptomatology, often leads to an incorrect diagnosis [2]. Therefore, in any patient with left lung signs associated with intestinal obstruction, and a relatively nondistended abdomen, Bochdalek hernia should be considered. In these cases we think it advisable to make enema studies with water soluble contrast, or CT-studies with contrast whilst the patient is in the Trendelenburg position. When Bochdalek hernia is confirmed, proper treatment will be operative, because simple chest tube drainage is inadequate.

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