

# Delayed diaphragmatic hernia: an unusual complication of tube thoracostomy

Geç diyafram hernisi: Tüp torakostomisinin alışılmadık bir komplikasyonu

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The nature of a tube thoracostomy -a blind maneuver- renders it subject to complications. Nevertheless, it is very uncommon to create a diaphragmatic hernia with this procedure. Herein, we present the occurrence of this complication after six months under emergency conditions that was treated by thoracotomy.

**Key Words:** Diaphragmatic hernia; tube thoracostomy/complication.

Tüp torakostomisi belli bir morbidite insidansı bulunan invazif bir girişimdir. Bu işlemle bir diyafram herniasyonu oluşması alışılmadık bir durumdur. Bu yazıda, takılmasından aylar sonra geç bir komplikasyon olarak ortaya çıkan torakotomi ile onarılan gecikmiş bir diyafram herniasyonu olgusu sunuldu.

**Anahtar Sözcükler:** Diyafram hernisi; tüp torakostomisi/komplikasyon.

Tube thoracostomy is an invasive procedure associated with a certain incidence of morbidity related to the technique of insertion.

In the literature, uncommon complications of chest tube placement have been described, including intracardiac placement, acute diaphragmatic paralysis, empyema, lung perforation, placement of the tube in to the chest wall, perforation of intraabdominal organs (such as liver, spleen, stomach), hemothorax, subclavian vein injury, Horner syndrome, and cardiogenic shock.<sup>[1-5]</sup>

Herein, we present an unusual complication of tube thoracostomy, a delayed diaphragmatic herniation, which developed several months after its placement.

## CASE REPORT

A 52-year-old man was admitted to our hospital with an upper abdomen and left-sided chest pain. According to his history, he was admitted six months ago to the emergency department with sudden onset of chest pain and shortness of breath, and a chest tube was inserted based on the chest X-ray reveal-

ing a left-sided pneumothorax; he was discharged three days later. His physical examination revealed a tube thoracostomy scar at the seventh left intercostal space anterior to the anterior axillary line. Chest X-ray revealed a soft tissue mass above the left hemidiaphragm (Fig. 1a). Magnetic resonance imaging (MRI) of the thorax revealed diaphragmatic herniation of the intra-abdominal structures in to the thoracic cavity (Fig. 1b). The omentum was herniated from the anterior portion of the diaphragm to the chest cavity.

A left standard thoracotomy passing through the previous thoracostomy scar was performed. The omentum was herniated through a diaphragmatic defect, which was exactly under the previous thoracostomy site (Fig. 1c). The omentum was replaced in the abdominal cavity and the defect closed with simple nonabsorbable sutures. The apical blebs causing this previous pneumothorax were also ligated.

The postoperative course of the patient was uneventful, and he was discharged on the fifth postoperative day.

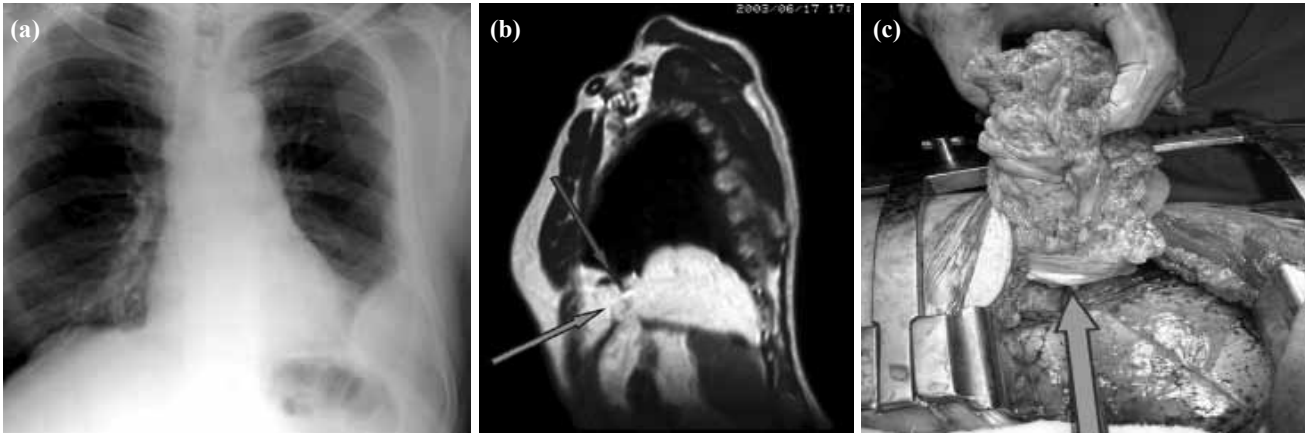
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**Fig. 1.** (a) Chest X-ray revealed a soft tissue mass above the left hemidiaphragm. (b) Coronal image of magnetic resonance showing the herniation of omentum to thoracic cavity. (c) Operative appearance of omentum herniated through the diaphragmatic defect.

## DISCUSSION

Percutaneous chest tube thoracostomy is a common procedure in which the chest tube is inserted into the pleural space using a clamp after creating a tract or using a trocar. Both methods can cause complications. Diaphragmatic laceration and paralysis have been reported, but to our knowledge, there is no report in the English literature of late diaphragmatic herniation secondary to chest drain insertion.<sup>[1-3]</sup>

In the first hospitalization of the patient due to the pneumothorax, during the insertion of the chest tube, the thoracostomy incision was made from the 7th intercostal space and anterior to the anterior axillary line, and the clamp was deeply inserted and opened in the thoracic cavity, causing a diaphragmatic perforation that went unrecognized at the time; however, as there was a small distance from the thoracic wall to the diaphragm, the tube was placed correctly in the chest cavity. The patient was discharged without any problem. During his routine follow-up at the sixth month, diaphragmatic herniation was suspected and MRI revealed the exact diagnosis.

Tube thoracostomy is a blind maneuver necessitating care to ensure maximum hand control during the passage of the parietal pleura. Sudden uncontrollable penetration into the chest cavity and unnecessary opening and closing of the clamp inside the thorax should be avoided. In the case of a pneumothorax, unless a tension pneumothorax, reduction in the lung volume can cause a diaphragmatic elevation, which can also increase the risk of penetration to the diaphragm during the insertion of the clamp.

In a pneumothorax case, the safest position for the chest tube is the 4th or 5th intercostal space at the midaxillary line or the 2nd intercostal space at the midclavicular line.

Complications such as intracardiac or intrapulmonary placements, perforation of intraabdominal organs and vascular injuries<sup>[2-4]</sup> can be diagnosed immediately after the insertion of the chest tube and can be classified as acute complications. However, after the perforation of the diaphragm, the herniation of the omentum into the thoracic cavity may take months to occur, and it is thus categorized as a late complication. After the placement of any kind of chest tube, we advise following the patient for at least six months in order to not miss such late complications.

This case highlights the need for proper training and experience and extreme caution in chest tube placement in an effort to minimize both acute and late complications.

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