



Scientific letters

Embolization of Intercostal Arteries in Iatrogenic Haemothorax[☆]



Embolización de arterias intercostales en un hemotórax iatrogénico

Iatrogenic hemothorax is a rare complication after chest tube insertion. It is mainly caused by injury to the intercostal blood vessels. Treatment involves pleural drainage, and thoracotomy is usually required for hemostasis.¹ Occasionally, embolization of the intercostal arteries is an effective therapeutic alternative.

We present the case of a 21-year-old male patient who smoked one packet of cigarettes per day. He came to our Emergency Department due to sharp, sudden chest pain on the right side, accompanied by dyspnea. Upon examination, the patient was conscious, focused and hemodynamically stable. Lung auscultation detected diminished vesicular breath sounds in the base of the right lung, with no evidence of jugular ingurgitation. Anteroposterior chest radiography showed important right hydropneumothorax with moderate lung collapse and an air-fluid level that reached the middle of the right lung field (Figure 1). A 20 Fr chest drain tube was inserted in the right hemithorax in the region of the 5th intercostal space on the anterior axillary line with drainage of air and less than 100 ml of non-hemorrhagic serous liquid. Proper placement of the tube was confirmed radiologically, and the right lung was observed to re-expand adequately.

After 24 h, the patient's general condition worsened, with no vesicular breath sounds in the right hemithorax, blood pressure 90/60, and drainage of more than 800 ml of bloody fluid at more than 400 ml per hour. Chest CT scan with intravenous contrast demonstrated right pneumothorax with the drain tube and a voluminous fluid level (hemopneumothorax), which was causing compression atelectasis of the right lower lobe. The pneumothorax cavity showed a tract compatible with adhesions, although the bleeding point was not identified. The study was completed with intercostal arterial embolization, and, given the suspicion that the origin of the bleeding was the intercostal arteries of the intercostal space through which the drain tube entered into the thoracic

cavity, we decided to perform embolization of their distal ends (Fig. 2). The total discharge was 2100 ml bloody fluid; blood work showed a hemoglobin level of 8.6 g/dl, requiring blood transfusion and volume replacement. During post-op, the patient progressed favorably from a radiological and clinical standpoint and the tube was withdrawn after 10 days.

Hemothorax is defined as the presence of blood in the pleural space. This term is reserved for cases in which pleural liquid hematocrit levels are at least 50% the hematocrit level of the peripheral blood.² From an etiologic standpoint, hemothorax is classified as traumatic, non-traumatic or spontaneous and iatrogenic.

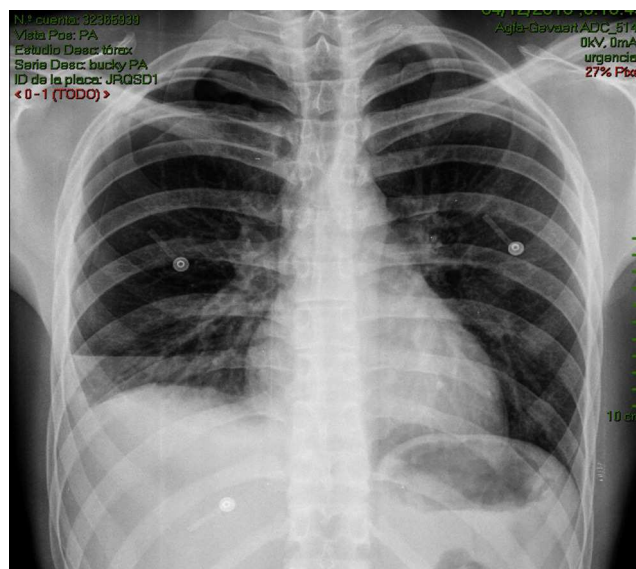


Fig. 1 – Posteroanterior chest radiograph: large right hydropneumothorax with moderate lung collapse and air-fluid level that reaches the right mid-lung.

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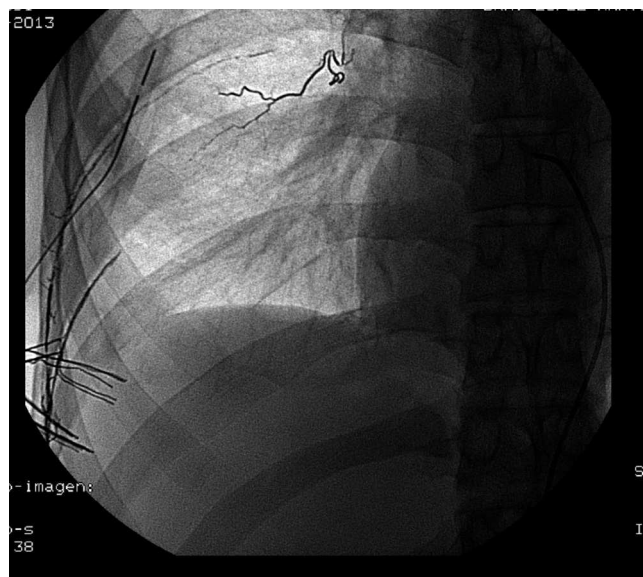


Fig. 2 – Intercostal artery embolization: embolization of the distal part of the intercostal arteries of the intercostal space through which the drain tube enters the thoracic cavity.

Iatrogenic hemothorax after pleural drain placement is a well-known complication, although its frequency has not been well defined in the literature. After thoracocentesis, hemothorax is observed in 0.2%–1% of patients.^{3,4} Some authors⁵ report that the risk of iatrogenic hemothorax increases with patient age. Other authors⁶ have reported that bleeding during thoracocentesis can also be a consequence of a laceration to the collateral intercostal artery (or supracostal branch of the posterior intercostal artery). In our patient, hemothorax was secondary to chest drain insertion, and it was assumed that the cause was a lesion to the intercostal artery.

Massive hemothorax is a rapid accumulation of 1500 ml or more in the pleural space. Thoracotomy is the gold-standard treatment in cases of massive hemothorax and persistent thoracic bleeding where the chest discharge is more than 200 ml/h for 4 h. Thoracotomy is associated with significant morbidity and mortality, and some patients continue bleeding afterwards due to the inability to either identify the bleeding point or completely control the hemorrhage.⁷

Angiographic embolization is an effective alternative to thoracotomy in selected patients as it avoids postoperative complications and high mortality. Conservative treatment involves observation, chest tube placement, volume replacement, analgesic control and, occasionally, ventilatory support. In the last 2 decades, selective angiography embolization after localization of the bleeding vessel has been accepted and recommended as an alternative treatment in the management of patients who continue to bleed, but who respond to fluid

resuscitation. The recent use of CT angiography combined with CT and intravenous contrast is a non-invasive method to determine the site of the hemorrhage, which can be followed by surgical or endovascular treatment.⁸

To conclude, in iatrogenic hemothorax, interventional radiology provides a minimally invasive approach associated with few complications and a high rate of success in hemodynamically stable patients. Our case is interesting because of the successful use of embolization of the intercostal arteries.

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