

Ultrasound diagnosis of lung herniation: The *push-out* sign

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Abstract

Lung ultrasound is an expanding field and is becoming a standard of care. Its various bedside applications have modified many diagnostic paths from the newborn to the geriatric patient. In this case report, we describe and show a new sign of the lung ultrasound semeiotics, the *push-out* sign.

Case Report

A 55-year-old woman came up to our general practice office complaining about a cough which had lasted for two weeks. She was in good general condition and she had no fever or other major symptoms.

Physical examination revealed a deformation of the thorax: a well-circumscribed oval shaped bulge was evident during coughing in the eighth intercostal space of the left mid-axillary region. The chest wall bulge was soft and tender at palpation and wasn't apparent during normal respiration but it was easy to detect during cough or Valsalva maneuver (Supplementary file A).

The patient did not report any recent traumatic event, but had undergone a hysterectomy 7 years earlier for a low-grade uterine mixoid leiomyosarcoma.

One year before our visit, a follow up positron emission tomography/computed tomography (CT) showed new focal hypercapitation of suspected neoplastic nature in the posterior segment of the left lower pulmonary lobe. A mini-thoracotomy was performed and the pulmonary parenchyma resulted free from neoplastic infiltration.

A chest ultrasound just over the bulge showed the lung and pleura moving externally with expiration and internally with inspiration (Figure 1). We also registered ultrasound images of the lung herniation during a Valsalva maneuver (Supplementary file B).

We sent the patient for a chest X-Ray by which it wasn't possible to identify the hernia. Because of the relatively young age of the patient and the amount of radiation absorbed during the previous year, we decided not to proceed with a CT scan¹ to confirm the already evident diagnosis.

Discussion

Lung herniation is defined as a protrusion of the lung parenchyma with pleural membranes through a defect of the thoracic wall. The first published description dates back to 1845 when Morel-Lavallée collected 32 cases.² Lung herniation may be classified as congenital, traumatic or post-thoracotomy. Hernia after cardio-thoracic procedures is an uncommon entity.³ A single institution retrospective review of patients submitted to thoracic surgery identified it in only 16 patients over 10 years.⁴

In the case we describe, the cough effort, increasing intrathoracic pressure in a zone of greater laxity, determined the emergence of the hernia well over a year after surgery.⁵

Controversy still exists concerning the role of surgical repair and at the moment our patient is asymptomatic and the management is conservative.

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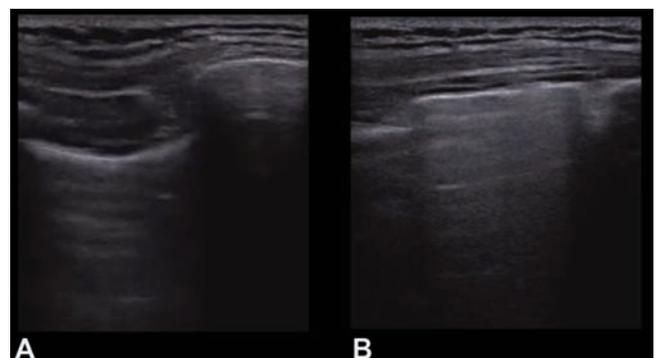


Figure 1. (A) Normal ultrasound image of the lung; pleura can be seen in between and under the ribs; (B) the *push-out* sign: pleura is now visualized out of the ribs.

Conclusions

The diagnosis of lung herniation is usually possible after an accurate history and a clinical examination showing the typical bulge which changes with respiration or with the cough. A confirmation may come from chest sonography. In this case report we described a new lung ultrasound sign which is pathognomonic for lung herniation and which we named the thoracic *push-out* sign.

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