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Lung ultrasound to avoid catastrophic care for false pneumothorax

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Dear Editor,

A 65-year-old man was admitted to the emergency unit for severe dyspnea. The patient's medical history revealed that he suffered from chronic respiratory failure due to emphysema. The patient presented with polypnea, cyanosis, and tachycardia. Hypoxemia was illustrated using pulse oximetry, which was decreased 74 % without oxygen administration. The patient was feverish and without hemodynamic instability. An initial blood sample confirmed the severity of respiratory failure with hypoxemia (PaO_2 47 mmHg) and hypercapnic acidosis ($PaCO_2$ 62 mmHg, pH 7.33). Acute worsening of chronic respiratory failure due to airway infection was suspected. Aerosol and noninvasive ventilation were initiated, and the patient improved slowly. However, thoracic radiography (Fig. 1) revealed gas effusion without pulmonary parenchyma at the top of right pleural cavity. Acute pneumothorax following the rupture of an emphysema bleb was evoked due to the severity of respiratory failure. Placement of a chest tube was discussed for treatment of acute respiratory distress. Lung ultrasonography was realized to confirm the pneumothorax. This examination revealed lung sliding without a B line. M mode confirmed the absence of pneumothorax and the presence of a seashore sign (Fig. 2). A chest tube was not deemed necessary, and a thoracic scan secondarily confirmed the absence of pneumothorax (Fig. 2). The chest radiographic figure was due to a large emphysema bleb (1.5 L).

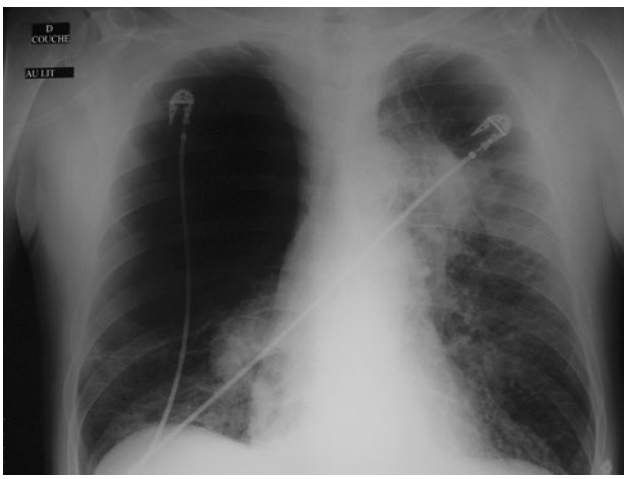

Fig. 1 Thoracic radiography. Note the absence of parenchyma in the right upper segment

Chest radiography is a standard examination for patients in emergency or intensive care units. However, lung ultrasonography provides improved diagnosis in these patients. As long known and recently confirmed, comparison between these two techniques has favored ultrasonography for detection of consolidation, interstitial syndrome, pleural effusion, and pneumothorax [1–3]. The efficiency of diagnosis of pneumothorax by ultrasonography is close to that by chest tomography, the current gold standard [1–3]. Lung ultrasonography can be performed bedside in emergency situations without patient positioning (semirecumbent position is not necessary, in contrast to chest radiography), and this technique provides a diagnosis within several minutes (<1 min with training). Training for pneumothorax diagnosis is rapid, and a practitioner can gain expertise in a few days.

Our report emphasizes the power of lung ultrasonography for pneumothorax diagnosis. This examination avoided insertion of a chest tube, which may worsen the clinical situation and produce dramatic outcomes. Utilization of this technique in patients with large emphysema blebs further supports the accuracy of this technique in pneumothorax diagnosis. This examination should be the first step of lung examination in emergency situations. Physicians must consider lung ultrasonography as a main tool for lung distress diagnosis, and chest radiography should be removed as the gold standard in emergency examination and be considered as second line, if necessary. A global appreciation of patient pathology must be realized.

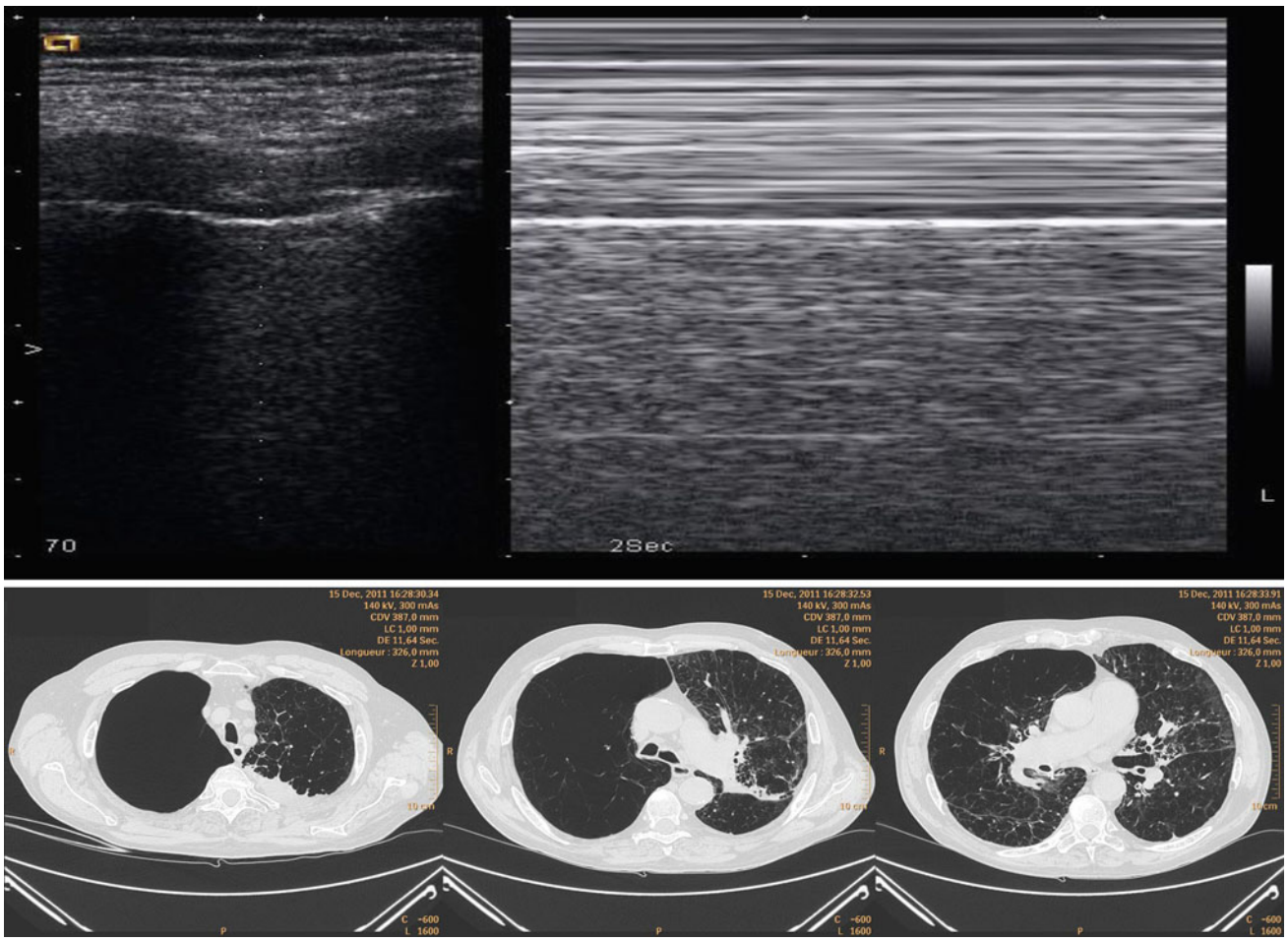

Fig. 2 *Top* right lung ultrasonography. Probe was positioned on the anterior wall just below clavicle. On the *left side*, two-dimensional picture. Lung sliding was observed, but no B line was visualized. On *right side*, time-motion picture confirmed the presence of lung motion with seashore sign. *Bottom* chest tomography confirmed the absence of pneumothorax and the large emphysema bleb

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