

Editorial

Is Thoracic Ultrasonography Necessary in the Respiratory Medicine Outpatient Clinic?☆



¿Es necesario el uso de la ecografía torácica en una consulta general de neumología?

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Thoracic ultrasonography (TU) is a complementary test increasingly used by pulmonologists in recent years, due to its wide range of applications in patients with peripheral pulmonary parenchymal and/or pleural diseases. It also offers several advantages over chest X-ray and computed tomography (CT): it is portable, does not emit ionizing radiation, images are obtained in real time, and it is inexpensive. The major drawbacks of TU are that it is operator-dependent and ultrasound waves do not pass through air.^{1,2}

In respiratory medicine departments, pleural units use TU as the main complementary tool, but unlike specialized medical units, most general departments do not have access to this equipment.

Nevertheless, several types of patients seen in a general respiratory department may require a TU to resolve a suspected diagnosis. However, in the absence of this equipment, a chest X-ray is usually requested as a first option, exposing the patient to ionizing radiation, delayed diagnosis, possible therapeutic errors, and increased health spending.

In this editorial, we do not aim to describe the specific characteristics of the images obtained in a TU in various pleuropulmonary conditions, but instead we will discuss the most common diseases that may require the use of TU in a general clinic.

This procedure would provide more accurate diagnoses, better targeted treatments, and even a more solid justification for requesting more specific imaging tests, such as chest CT.

TU confers benefits in several scenarios:

1. *Pleural effusion (PE)*. Immediate performance of TU can guide the medical, diagnostic, and therapeutic interventions needed in patients with a clinical suspicion of PE. TU can identify PEs of up to 5 ml, evaluate the characteristics of the pleural fluid according to its echogenicity, and reveal signs such as the echogenic swirling seen in PEs of neoplastic origin. PEs should also be examined thoroughly, since they indicate a pathological process in

which other images may be visualized that could help guide diagnosis.^{2,3}

2. *Pneumothorax (PTX)*. An ultrasound scan may be performed to exclude PTX in patients who present in the clinic or in an emergency department, and the diagnosis is routinely based on the absence of comet-tail artifacts and pleuropulmonary movement in B-mode, and the presence of the so-called bar code sign in M-mode. In a meta-analysis in which the utility of TU was compared with chest X-ray in the diagnosis of PTX, sensitivity and specificity of TU were 88% and 99%, and 52% and 100% for chest X-ray, respectively. The authors concluded that the use of TU is very promising, but dependent on the skills of the operator.⁴
3. *Consolidations in peripheral lung parenchyma*. TU is useful not only for diagnosing clinically suspected community-acquired pneumonia, but also for monitoring this disease and diagnosing possible early complications, thus reducing the number of chest X-rays performed. Published studies have shown TU to be more sensitive than chest X-ray in the diagnosis of pneumonia. The major limitation of ultrasound diagnosis are consolidations that do not reach the peripheral lung; furthermore, the operator must be experienced in the use of the technique.^{5–7}
4. *Lung cancer and metastatic pleural involvement*. TU can be used to complement chest X-ray and CT, which are essential in these entities. However, when malignancy is strongly suspected, an initial ultrasound exploration can be made to determine the presence of nodules or masses contiguous with the chest wall, obstructive or secondary compressive atelectasis, PE, metastatic pleural involvement with nodule implantation, or the degree of possible pleural invasion of the mesothelioma.^{8,9}
5. *Interstitial lung disease*. Many patients present with dyspnea, and the simple presence of a certain number of B-lines on the TU image, in addition to other findings, may indicate if the process is cardiogenic or pulmonary. Given the low specificity of B-lines, it is very important to assess the clinical context, clinical history, and physical examination of the patient. For this reason, TU is a useful tool, both in emergency situations and in day-to-day consultations.¹⁰
6. *Pulmonary infarctions due to pulmonary thromboembolism (PTE)*. As TU is operator-dependent, its relatively low sensitivity rules it out as the diagnostic procedure of choice in some diseases,

☆ Please cite this article as: Wangüemert Pérez AL. ¿Es necesario el uso de la ecografía torácica en una consulta general de neumología?. Arch Bronconeumol. 2018;54:355–356.

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including PTE. However, it may be a good alternative in certain circumstances (allergy to contrast medium, pregnancy), and can contribute information to the differential diagnosis.^{11,12} A multicenter study that included patients with suspected PTE found 95% specificity for TU and a positive predictive value of 95%, but a negative predictive value of 75% and 74% sensitivity.¹³

7. *Paralysis and diaphragmatic hernia.* Chest X-ray, being a static image, cannot evaluate diaphragmatic movement in patients previously diagnosed with diaphragmatic elevation using this technique. This means that fluoroscopy must be performed, thus increasing exposure to radiation. TU is useful for studying the diaphragm, as it offers a dynamic examination that can be performed reasonably quickly in a general pulmonology department.^{14,15}

TU is an emerging tool with many advantages for respiratory medicine. We recommend that this technique be implemented in general pulmonology departments, because it would permit on-the-spot decision-making, provide more accurate initial diagnoses, and ensure that the best available treatment is offered from the word go. Pulmonologists, of course, would have to acquire training and a basic knowledge of this technique.

Acknowledgements

My thanks to all my colleagues who taught me to use thoracic ultrasound.

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