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Editorial

The Role of Lung Ultrasound in the Management of Respiratory Emergencies

El papel de la ecografía pulmonar en las urgencias respiratorias

Why don't I use lung ultrasound with my patients? This is the question I hope you'll be asking yourself when you finish reading this humble article, if you're not already using it. Lung ultrasound is clearly in fashion, or rather the SARS CoV-2 has made it fashionable. But for many it is already an old acquaintance that has proven its usefulness in diagnosing respiratory diseases such as pneumothorax, pleural effusion, interstitial lung diseases (ARDS, heart failure, pulmonary fibrosis) or pneumonia.[1,2] It is, therefore, a tried and tested tool in the differential diagnosis of patients with dyspnoea at the point of care.[3–5] But this hasn't always been the case, suffice to say, for example, that it wasn't reflected a useful diagnostic tool in Harrison's until the 19th edition and now it is considered by some to be the new stethoscope. Neither one extreme nor the other, let's remember we're referring to point-of-care ultrasound (POCUS), i.e. we're going to use ultrasound in clinical contexts supported by the best medical records and physical examination possible in order to significantly reduce our uncertainty and make medical decisions that improve the evolution and prognosis of our patients. Consequently, it should not be considered an outpatient diagnostic test,[6] unlike complete ultrasounds, but rather as part of the doctor's responsibilities when attending patients. It can be said that lung ultrasound is a paradigm within the POCUS: it features easy image acquisition, lacks an equivalent comprehensive test, and we can interpret findings that per se have no clear significance given that we assess ultrasound artefacts – non-existent structures. Building on this concept, which might even appear to be magical, we'll use a linear probe to assess pleural movement and a convex probe to assess artefact patterns below the pleura (A-lines, B-lines and/or consolidation).

If we go back to the title of the article, the following points will be very useful for a number of pathologies:

- Assess the behaviour of the pleural line identifying the presence or absence of pleural sliding – very useful in diagnosing pneumothorax[7] – provided that we have clinical grounds for concern, seeking to identify the lung point sign (presence and absence of sliding in the same intercostal space) if this is not complete.
- With regard to parenchymal diseases, we must interpret artefact patterns (A-lines, B-lines, consolidation) in a way that would correctly identify the degree of lung aeration, from low to high. The occurrence of B-lines doesn't necessarily mean a presence of extravascular lung water, but rather they should be correlated with the clinical–pathological context. We could be talking about unilateral interstitial syndrome if they occur in only one hemithorax (pneumonia, for example) or bilateral interstitial syndrome if they occur in both hemithorax (heart failure, pulmonary fibrosis or acute respiratory distress syndrome (ARDS).
- Identify pleural effusion[8] as an anechoic area above the diaphragm in which we can locate the lung parenchyma within it, depending on its size and location. Furthermore, it provides additional information on the effusion depending on its echogenicity, indicating whether it is exudative or transudative, or if septations are present that make drainage difficult. In addition, ultrasound is indicated to rule out a pneumothorax after thoracentesis, thus significantly reducing requests for control X-rays, which are much less sensitive and involve ionising radiation.

But as we mentioned above, clinical relevance is more important than imaging or artefact interpretation. The trend in any disease or diagnostic process is to create algorithms or diagnostic protocols to assist decision-making. In assessing patients with acute dyspnoea using ultrasound, the best-known approach is the BLUE[4] protocol, published in 2008. Nonetheless, when assessing a patient with dyspnoea or acute respiratory failure, instead of adhering to a strict protocol that frequently fails to adapt to the everyday diagnostic reality of emergency patients, integrating a scanning system tailored to clinical suspicion is recommended. Similarly, lung ultrasound should not be used merely as a diagnostic tool, as we would be wasting its great usefulness in monitoring the evolution of parenchymal and pleural diseases,[9,10] and the progress of patients on ventilators, as its accessibility and replicability make it an extremely valuable instrument in critical contexts.

Finally, we shouldn't understand that dyspnoea is a clinical symptom that exclusively effects the lungs. In fact, dyspnoea is very difficult to specifically diagnose using our customary clinical tools, which have an accuracy well below what is desirable[11], so point-of-care ultrasound has a key role to play in considerably narrowing this differential diagnosis. Hence, we'll have to make do with the combined accuracy of using multi-organ ultrasound and carrying out cardiac, pulmonary and vascular assessment in patients with dyspnoea with no apparent cause, including ruling out deep vein thrombosis and inferior vena cava assessment.[12]

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As a veteran colleague once said at our XXXII National Congress of the Spanish Society of Emergency Medicine, SEMES VIGO 2022: "Few things have done as much to combat burnout in doctors as point-of-care ultrasound". I hope you're already getting applying gel to your patients. . .

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