

Lung ultrasound: the need of an adequate training for the next generation of internists

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Dear Editor,

We read with interest the review by Touw *et al.*¹ and the related editorial,² which warmly warrant the use of ultrasound for internists. We would respectfully remark that an adequate comprehensive training is needed to teach and learn the uses and limitations of ultrasound.³ An optimal ultrasound examination of a dyspnoeic patient should be done in sitting position, since it is unlikely that a dyspnoeic patient can lie in a supine position. Moreover, differently from what was suggested,¹ the pleural surface is most accessible from the back with longitudinal and transversal intercostal and paravertebral scans.³ The lung ultrasound (LUS) artifacts arise from the difference in acoustic impedance in the pleural spaces and have been classified as simple reverberation (horizontal A-line), 'comet-tail' and 'ring-down' (vertical B-line) artifacts, but some confusion of these terms is apparent,¹ (that 'comet tail' is considered to be a synonym of B-line).⁴ Although Touw *et al.*¹ suggested suppressing all software artefact reduction and image optimisation and prefer the high frequency and high resolution linear probe, which reduces the number of artifacts, most of the images shown in the paper¹ are taken by a sector probe, useful to scan between the ribs, but with poor near-field resolution to evaluate pleural line and useless for LUS. It is unrealistic to suppose that LUS allows us to distinguish easily between pulmonary oedema, COPD, asthma, pulmonary embolism, pneumothorax and pneumonia with sensitivities and specificities ranging from 81 to 100%, since even large lung consolidations, easily detectable by X-ray, can only be evaluated by ultrasound if no air is obstructing the beam's passage and their nature is not identifiable by the sole ultrasound imaging, since cancer, atelectasis and pneumonia have similar aspect.³ Moreover alveolar consolidations, in contrast to pleural effusion, do not appear first on a postero-basal scan; only aspiration pneumonia of mechanically ventilated patients arises in

this way.⁶ Regarding diffuse lung disease, the statement 'LUS does not require any cardiac ultrasound imaging, as a cardiac cause of dyspnoea can be diagnosed from lung imaging only',¹ is quite hazardous. The certainty that more than two anterior B-lines are pathological and indicate interstitial syndrome and thus pulmonary oedema, and that the number of B-lines per screen or the distance between B-lines allows assessment of severity, is quite odd due to the variability related to different probes and setting, particularly in a moving dyspnoeic patient. The protocol proposed is not a good way to spread the use of ultrasound in the daily clinical practice, since formal training incorporating ultrasound in adequate curricula is crucial for physicians,⁵ avoiding simplistic numeric rules, since medicine is not arithmetic.

REFERENCES

1. Touw HR, Tuinman PR, Gelissen HP, et al. Lung ultrasound: routine practice for the next generation of internists. *Neth J Med.* 2015;73:100-7.
2. Alsmas J, Bosch FH. Ultrasound for internists: changing bedside examination. *Neth J Med.* 2015;73:98-9.
3. Sperandeo M, Rotondo A, Guglielmi G, Catalano D, Feragalli B, Trovato GM. Transthoracic ultrasound in the assessment of pleural and pulmonary diseases: use and limitations. *Radiol Med.* 2014;119:729-40.
4. Trovato GM, Sperandeo M. Sounds, ultrasounds, and artifacts: which clinical role for lung imaging? *Am J Respir Crit Care Med.* 2013;187:780-1.
5. Sperandeo M, Dimitri L, Pirri C, Trovato FM, Catalano D, Trovato GM. Advantages of thoracic ultrasound-guided fine-needle aspiration biopsy in lung cancer and mesothelioma. *Chest.* 2014;146:e178-9.
6. Sharma S, Maycher B, Eschun G. Radiological imaging in pneumonia: recent innovations. *Curr Opin Pulm Med.* 2007;13:159-69.