On Lung Ultrasound Patterns Specificity in the Management of COVID-19 Patients

Reply

To the Editor: We appreciate the letter from Vetrugno et al.,1 which we thank for the comments made. We agree that the indications for an ultrasound examination are mainly those of home and hospital triage, aimed at identifying lung involvement in patients with clinical signs suggestive of COVID-19 and in whom both the chest radiographic findings and the polymerase chain reaction swab results for SARS-CoV-2 are negative (variable percentages between 65% and 35% of cases).2–4

Additionally, LUS can be an excellent tool for monitoring patients with a diagnosis of COVID-19, following them during the different evolution phases of the disease. Moreover, LUS represents a valuable monitoring tool that is also applicable during intensive and pharmacologic treatment, obviating the use of computed tomography.

We also agree that the LUS signs of COVID-19 are not currently specific, also because most of them identify a physical state of the lung surface (in general terms, a denser state) rather than COVID-19-specific anatomic or morphologic characteristics.5,6 Only consolidations clearly represent anatomic alterations. However, lung consolidations appear in many conditions. Moreover, what has clearly emerged from recent studies6,7 is that simply counting B-lines does not represent a reliable indicator, as their visualization strongly depends on parameters such as the imaging frequency. This implies that the very same patient would be evaluated differently depending on the scanner and transducer used. This further shows the urgency for a standardized approach on the use of LUS, which can only be established by close collaboration between medical and technical experts.

With this being said, relative specificity can be attributed to the following findings when observed in the not-very-early stages: (1) a bilateral and patchy distribution of artifactual (polymorphic) findings (with relatively spared areas); and (2) multifocal white lung signs, which are not easily found in other diseases, especially in patients who are relatively young and without a history of lung disease.

It is true that viral pneumonia can result in similar LUS images,8 but the viral pneumonia caused by COVID-19 has a particular preference for producing superficial ground glass findings,9 whose ultrasound expressions are white lung and confluent vertical artifacts. Surely overlapping between diseases creates confusion, but this represents a weakness of many diagnostic methods.

In conclusion, LUS, like other investigation techniques, has strengths and weaknesses. Obviously, we need to understand how to enhance their strengths and limit their defects. The rapid onset of the coronavirus pandemic has not yet allowed us to refine alternative diagnostic options to computed tomography for this disease. Ultrasound semiotics of COVID-19 pneumonia are at the initial stage of their understanding, and further studies are needed to fully unlock the potential of LUS. In this regard, we cannot exclude the possibility of defining patterns that are specific to COVID-19. It is likely that other diagnostic aspects may emerge (for example, studying the dynamics of pleural line movements). In the meantime, we believe that a rational integration of LUS (used on the basis of the evidence acquired so far) with the clinical data resulting from the traditional examination of the patient represents a useful strategy.

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