Ultrasound in Pregnant Women With Suspected COVID-19 Infection

To the Editor: We read with great interest the article by Dr Soldati and colleagues, "Proposal for International Standardization of the Use of Lung Ultrasound for Patients With COVID-19: A Simple, Quantitative, Reproducible Method."[1] As the authors point out, lung ultrasound (LUS) is an unquestionably useful tool for detecting lung damage in the entire population. We would like to share our experience to highlight an example of an application of this technique that holds a special interest in pregnant women.

Although pneumonia seldom manifests in pregnant women, the coronavirus disease 2019 (COVID-19) pandemic makes this population more vulnerable to such infections. In addition to avoiding the risks from radiation, clinical ultrasound (US) can help control disease transmission from infectious patients.[2]

The lung infection that Soldati and colleagues described in their article was compatible with that observed in emergency services, where these patients are attended.[1] Pleural effusion is already infrequent and mostly due to concomitant diseases, so in pregnant women, its incidence is even lower.[3]

In 75% of cases, the respiratory involvement extends to posterior basal regions, and in 50% to the posterosuperior region.[3] We therefore propose beginning the examination in these areas to minimize health professionals' exposure. Ideally, clinicians should scan 14 chest regions[3,4] in the shortest possible time, recording the findings in each area according to the proposed score. It is important to optimize the image quality using gain adjustment and deactivation of filters.[4]

We performed LUS examinations in 4 women at 6, 9, 19, and 25 gestational weeks with respiratory symptoms compatible with COVID-19 infection. All 4 were clinically examined for signs and symptoms and underwent LUS examinations in the emergency

Figure 1. Lung US images obtained with a convex transducer. **A**, Areas of acquisition landmarks. **B**, **C**, and **E**, The pleural line is continuous and regular. Below, horizontal artifacts (white arrows) called A-lines are shown. This image corresponds to areas that are not affected. **D**, **F**, and **G**, In the posterior fields in both lungs, the pleural line is unsmooth and discontinuous. Fused vertical artifacts (yellow lines) called B-lines are visible under the pleura. These are due to local alterations in the early stage of mild infection.

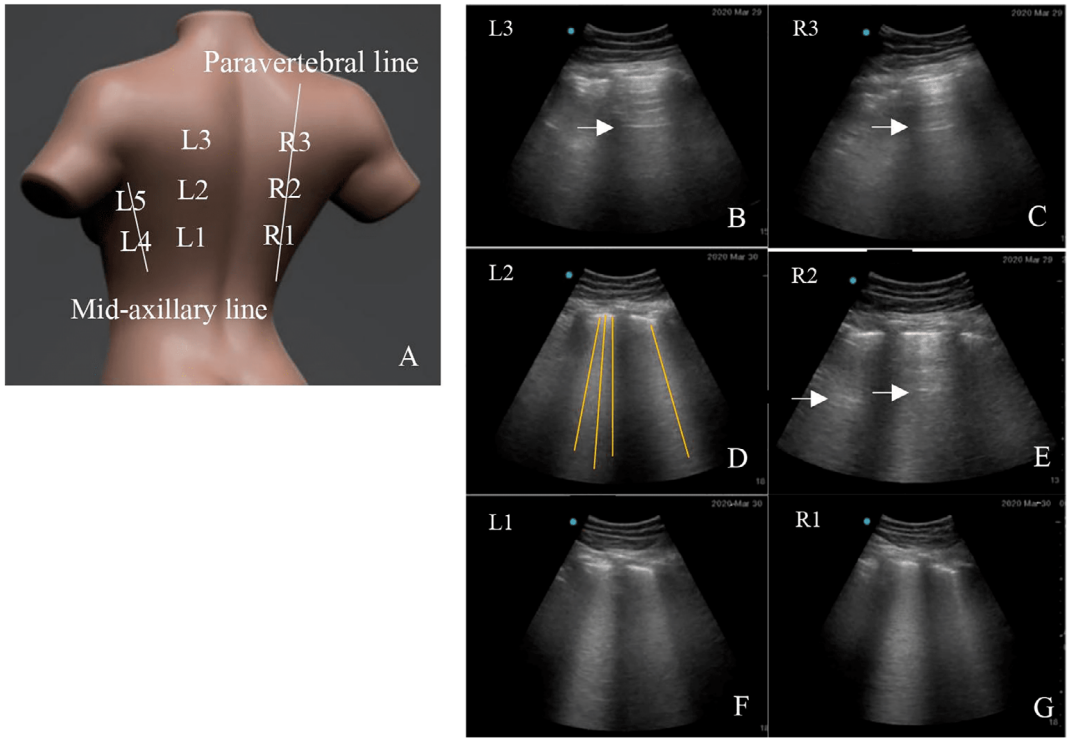
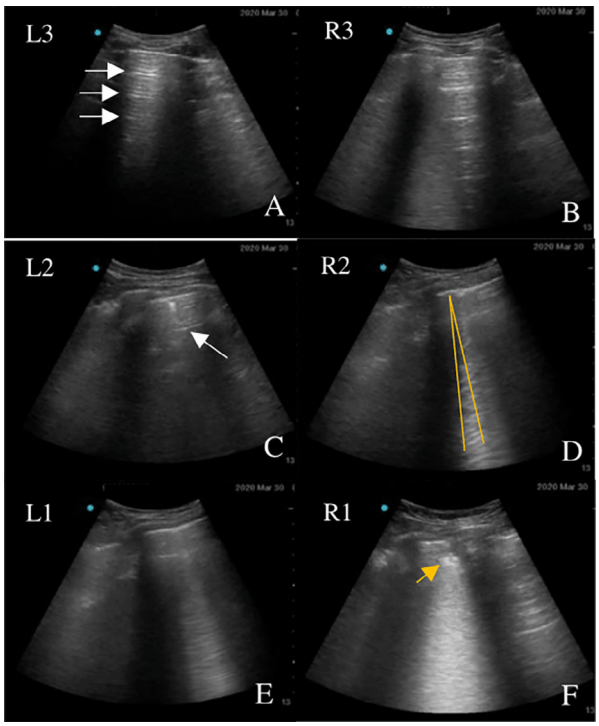


Figure 2. Lung US images obtained with a convex transducer in the posterior fields. **A** and **B**, Regular pleural line with horizontal artifacts referred to as A-lines (white arrows) due to a normally aerated lung surface. **C**, Areas with A-lines and a broken pleural line in the same intercostal area. **D**, The pleura is irregular, and vertical artifacts referred to as B-lines (yellow lines) are visible. These are signs of local alterations. **E**, Local artifacts referred to as B-lines. **F**, The pleura is broken; below the breaking point, a consolidated area called a subpleural consolidation appears with confluent B-lines (white lung). This area appears as a result of loss the aeration in moderate disease (yellow arrow).



department. No other imaging tests were undertaken. Two women showed images compatible with moderate interstitial pneumonia due to COVID-19[4]: pleural irregularity, a focal and patchy interstitial pattern, and B-lines in posterior basal and middle areas (Figure 1). In 1 patient, there was evidence of subpleural consolidation in a posterior hemithorax (Figure 2). In those with pathologic US findings, the nasopharyngeal aspirates were positive for severe acute respiratory syndrome coronavirus 2. The 2 patients with normal US findings did not show positive polymerase chain reaction findings for severe acute respiratory syndrome coronavirus 2.

One patient consented to using hydroxychloroquine and started treatment in the emergency department, continuing it throughout her admission, with a favorable evolution. Another patient refused drug treatment; she received symptom management and close follow-up, also showing a favorable clinical evolution. No radiologic studies were deemed necessary, and monitoring of fetal well-being showed normal findings.

We would like to highlight the use of LUS as a first-line diagnostic tool for suspicion of pneumonia.[5] In the context of the potential disease transmission during a pandemic situation, this technique is of special interest in pregnant women, as it enables safe diagnosis and early treatment. Although one of the principal limitations is the absence of standardized training, the learning curve is relatively narrow. This method can generally be performed by physicians with no radiologic specialty, so it can be an examination tool for physicians tasked with treating these patients.

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References

1. Soldati G, Smargiassi A, Inchingolo R, et al. Proposal for international standardization of the use of lung ultrasound for patients with COVID-19: a simple, quantitative, reproducible method. *J Ultrasound Med* 2020; 39:1413–1419.
2. Moro F, Buonsenso D, Moruzzi MC, et al. How to perform lung ultrasound in pregnant women with suspected COVID-19. *Ultrasound Obstet Gynecol* 2020; 55:593–598.
3. Huang Y, Wang S, Liu Y, et al. A Preliminary Study on the Ultrasonic Manifestations of Peripulmonary Lesions of Non-Critical

Novel Coronavirus Pneumonia (COVID-19) (February 26, 2020). *Infect Dis*. Available at SSRN: https://ssrn.com/abstract=3544750 or https://doi.org/10.2139/ssrn.3544750.

4. Peng QY, Wang XT, Zhang LN. Chinese Critical Care Ultrasound Study Group (CCUSG). Findings of lung ultrasonography of novel corona virus pneumonia during the 2019–2020 epidemic. *Intensive Care Med* 2020; 46:849–850.
5. Alzahrani AS, Al-Salamah MA, Al-Madani WH, Elbarbary MA. Systematic review and meta-analysis for the use of ultrasound versus radiology in diagnosing of pneumonia. *Crit Ultrasound J* 2017; 9:6.