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COMMENTARY

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Lung ultrasound in pregnant COVID-19 patients: An added tool to expand patient care

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In this interesting prospective study, the authors correlate ultrasound and CT findings in 39 pregnant patients with COVID-19 using dedicated scores.[1] In their study, lung ultrasound examinations were performed by three examiners experienced in the ultrasonographic technique after undergoing specific training for lung assessment. Six regions of each hemithorax (2 anterior, 2 lateral, and 2 posterior) were examined, with the transducer placed lengthwise and parallel to the ribs. Lung score evaluation was based on the presence of ultrasound artifacts termed A-lines, B-lines, and consolidation. The ultrasound findings were scored as follows: A-lines (0 point), B-lines 84 over 2 (1 point), coalescent B-lines (2 points), and presence of subpleural consolidation (3 points). Each quadrant was analyzed and scored according to its worst finding. The US score was obtained by adding up the scores of the 12 quadrants of each patient. Chest CT scans were performed in a 64-multislice detector CT scanner with volumetric acquisition at maximum inspiration without intravenous contrast media. CT images were reconstructed with 1 mm of thickness with lung and mediastinal filter and assessed by a thoracic radiologist with 8 years of experience. The presence or absence of the following abnormalities were recorded: septal thickening, ground glass opacities, consolidation, and pleural effusion.

Pulmonary impairment was visually categorized similar to the ultrasound assessment: each lung was divided into six regions and classified as normal (equivalent to A-lines on ultrasound), as having septal thickening (equivalent to B-lines on ultrasound), as having ground glass opacities (equivalent to coalescent B-lines on ultrasound), or as having consolidations. The score of each region ranged from 0 to 3 in accordance with the tomographic finding: score of 0, normal tomographic pattern; score of 1, presence of interlobular thickening; score of 2, presence of ground glass opacity (white lung); score of 3, presence of pulmonary consolidation. The lung score was obtained by adding up the scores of the 12 regions. Presence or absence of pleural effusion was also assessed. Cases were classified according to the need for supplemental oxygen during hospitalization. In lung ultrasound the abnormalities predictive of oxygen use were the lung score, coalescent B-lines, and subpleural consolidation. The predictors of oxygen use on the chest CT scans were the lung score and the presence of lung consolidation.

The results in this study showed a significant correlation between the lung ultrasound and chest CT scan scores (rICC = 0.946; $p < 0.001$). Both imaging modalities were significantly accurate in determining the need for oxygen with area under the curves of 0.915 and 0.938, respectively for ultrasound and CT. A lung score over 15 on ultrasound and over 16 on CT were predictors of the need for oxygen, and the sensitivities and specificities were 94.4% and 89.9% and 88.9% and 90.5%, respectively.

Correlation of ultrasound and CT findings and associated scores in pregnant patients with COVID-19 is clinically relevant. Only few studies have compared both imaging modalities. Zieleskiewicz et al.[2] observed a highly accurate ultrasound-based lung score performance (AUC = 0.92) to predict the severity of pneumonia. Deng et al.[3] showed an excellent interclass correlation between CT and ultrasound findings. However, no study has evaluated the performance of ultrasound in predicting the need for oxygen. The authors concluded that lung ultrasound may be utilized in the follow-up of pregnant women with COVID-19 given its proven good level of performance. We fully agree with this hypothesis, however some questions remain regarding the isolated value of ultrasound imaging of the lungs in COVID-19. For pulmonary assessment, ultrasound may be useful and beneficial in

pregnant patients as stated by the authors. However, COVID-19-related complications such as pulmonary embolism or other cardiovascular diseases also influencing the need for oxygen cannot be sufficiently assessed using ultrasound. Obviously, CT angiography examinations should be performed in these circumstances. In addition, early pulmonary manifestation of COVID-19 can be missed even on standard transverse CT reconstructions and multiplanar reformats (MPRs) in certain cases due to overlying bronchovascular structures, which may be critical because even subtle findings commonly tend to worsen rapidly in COVID-19 patients causing the need for prompt hospitalization and oxygen therapy.[4,5,6] Therefore, dedicated minimum intensity projections in CT imaging are generally recommended for highly accurate lung assessment in COVID-19, since it is crucial to detect pulmonary manifestation in the earliest stages in order to enable highly accurate severity assessment thereby improving clinical patient management and outcome.[4] Thus, ultrasound can only serve as an additive imaging modality for close monitoring and follow-up.

In summary, we agree with the authors' hypothesis that ultrasound may be used in the follow-up of pregnant women with COVID-19 given its proven good level of performance. However, ultrasound should be considered as an additive imaging modality and a close correlation with clinical and laboratory data should be applied for disease and therapy monitoring in COVID-19, particularly in case of disease progression.[7]

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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