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CASE IMAGE IN CARDIOVASCULAR ULTRASOUND

Lung consolidation as an acoustic window to superior vena cava by transthoracic ultrasonography in the intensive care unit

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The superior vena cava (SVC), due to its anatomical location, is challenging to evaluate by transthoracic ultrasonography. There are descriptions in the literature of its evaluation through a right supraclavicular and a modified left parasternal approach, but in both cases its visualization is partial [1, 2]. We describe an unusual case in which it was possible to visualize the entire length of the SVC due to the presence of right lung consolidation.

A 56-year-old male with a medical history of arterial hypertension and obesity was admitted to the intensive care unit (ICU) due to severe Covid-19 pneumonia, requiring orotracheal intubation and mechanical ventilation support in the prone position. After several days, he presented improvement in oxygenation, for which he began the weaning process. The patient evolves with an episode of desaturation with a higher oxygen requirement. As ultrasonography has emerged as an important diagnostic tool in the Covid-19 pandemic, we performed a lung evaluation with point-of-care ultrasound (POCUS), using the phase-array transducer at 2–4 MHz, with its mark pointing towards the head, resting on the second right intercostal space at the level of the midclavicular line, with the ultrasound machine with the cardiac preset. It showed in B mode with the tissue harmonic imaging function activated, the presence of lung consolidation defined as a tissue-like pattern visible at the chest wall, arising from the pleural line [3], which served as an acoustic window that allowed visualization of the superior vena cava in its long axis flowing into the right atrium. In addition, by rotating the transducer 90º with its mark pointing to the left of the patient, an axial view of the SVC could be obtained (Fig. 1). Due to the sudden event of hypoxemia associated with the absence of fever and respiratory secretions, the condition was interpreted as lung atelectasis at the right middle lobe. A chest X-ray was requested, which confirmed the finding. Chest physiotherapy was indicated with improvement of his clinical condition. A new ultrasonographic evaluation showed the disappearance of the consolidation and no visualization of the SVC. He was later extubated and discharged from the ICU.

Under normal conditions, the presence of air in the lung does not allow visualization of the structures below the pleura. However, lung consolidation can act as an acoustic window by losing normal aeration, allowing the identification of mediastinal structures [4].

In our patient, the lung consolidation at the right middle lobe with tissue-like pattern functioned as acoustic windows that allowed clear visualization of the SVC in its entirety. This case shows that the presence of a consolidated right middle lobe may allow the evaluation of the SVC by transthoracic ultrasonography.

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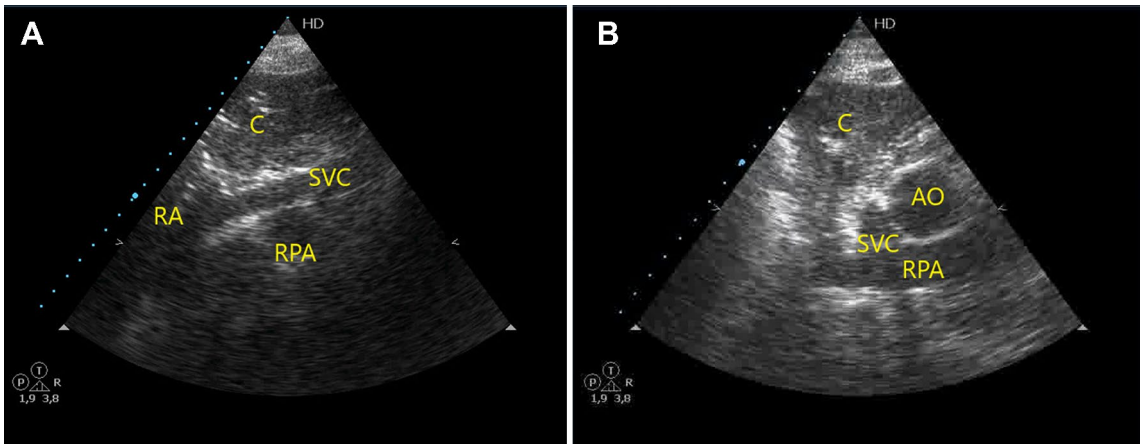

Fig. 1 Lung ultrasound at the right middle lobe. (**A**) A long axis view showing consolidation (C), superior vena cava in its long axis (SVC), right pulmonary artery (RPA), and right atrium (RA). (**B**) A Short axis view showing consolidation (C), superior vena cava in its short axis, right pulmonary artery (RPA), and aorta (AO)

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Data availability The data that support the findings of this study are available from the corresponding author, IC, upon reasonable request.

Declarations

Conflicts of interest The author declares that he has no conflict of interest.

Written consent Written consent was obtained from the patient before the publication of this case.

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