

Importance of point-of-care ultrasound in early diagnosis of COVID-19 complications

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DESCRIPTION

A previously healthy 25-year-old woman in her 29th week of pregnancy arrived to the emergency department due to fever up to 39°C for the previous 5 days. Additional symptoms included central chest pain with coughing and deep inspiration, odynophagia, dry cough and dyspnoea at rest.

On initial physical exam, the patient had an oxygen saturation of 97% with nasal cannula at 3 L per min. Chest X-ray showed an infiltrate of the upper left lobe (figure 1A, white arrow). Laboratory tests showed a white cell count of $5.01 \times 10^3/\mu\text{L}$ (normal value (NV): 4.0–11.5), lymphocytes $0.6 \times 10^3/\mu\text{L}$ (NV: 1.2–4.0), C reactive protein 54.90 mg/L (NV: 0.1–10.0), D-dimer 1119.0 ng/mL (NV: 0–500). Kidney and liver function markers were within normal parameters. SARS-CoV-2 rapid antigen test was performed with positive result, confirmed with a reverse transcription PCR, being admitted to the internal medicine ward. Dexamethasone 6 mg once daily (od), azithromycin 500 od and thromboprophylaxis (enoxaparin 40 mg od) was started.

The next day, the patient continued to present the previously described chest pain leading us to perform a point-of-care Ultrasound (POCUS) enhanced physical exam, using a hand-held ultrasound device (Vscan Air – General Electric Healthcare, Illinois, USA). Heart auscultation was normal. On lung auscultation, there was bilateral base crackles and hypoventilation in the right basal lobe. There was a mild bilateral pitting oedema of the lower limbs. Then the POCUS enhanced physical exam was performed. The focused cardiac ultrasound was relevant for a subxiphoid pericardial effusion of up to 1.4 cm with no haemodynamic repercussion (figure 1B, white arrow). Lung ultrasound was performed following a 12-zone scanning scheme of the anterior, lateral and posterior chest, showing a hepatisation of the left haemithorax (figure 1C, white arrow), an anterior, posterior bilateral thickened pleural line, bilateral confluent B-lines (in the posterior basal lobes) (figure 2A and video 1) and small consolidations in the right lateral lobe (figure 2B, white arrow, and video 1). The hypoventilation in the right basal lobe correlated with the liver (uplifted due to advanced pregnancy). The compression ultrasound of the lower limbs ruled out deep vein thrombosis.

Based on these results, additional testing was ordered showing a troponin-I 6 ng/L (NV: 0–48) and the ECG presented sinus rhythm at 108 bpm, with no other relevant abnormalities.

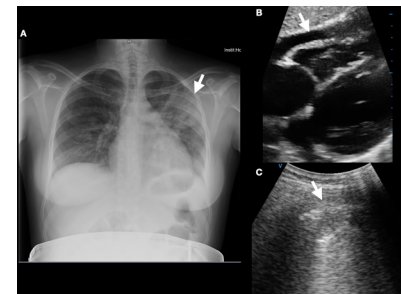


Figure 1 Chest X-ray showing an infiltrate of the upper left lobe (A, white arrow). Focused cardiac ultrasound showing a subxiphoid pericardial effusion (B, white arrow). Lung ultrasound showing a thickened bilateral confluent B-lines and hepatisation of the left haemithorax (C, white arrow).

With these findings, our patient was diagnosed with uncomplicated acute pericarditis, meeting two of four criteria according to 2015 ESC guidelines¹: typical pain and pericardial effusion. However, due to treatment with corticosteroids already in place (at an equivalent dose of prednisone 0,5 mg/kg per day) and positive evolution over the course of hospitalisation, she declined to start therapy with colchicine,² and no additional treatment was required. With described treatment, our patient presented satisfactory evolution, lowering temperature to normal degrees and presenting marked improvement in respiratory symptoms. The dose of dexamethasone was tapered 1 mg per week after the third month of therapy. One month after hospital discharge she remains asymptomatic.

POCUS has a growing importance, particularly during the current pandemic, due to the fact that it allows for the fast and early detection of a relatively

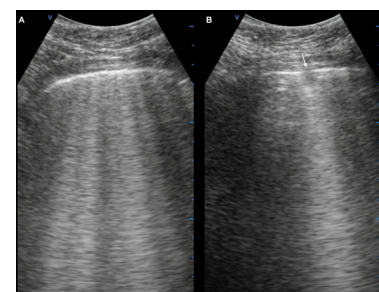


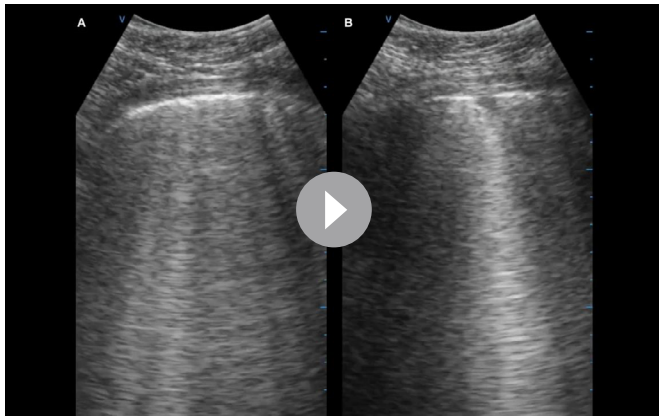
Figure 2 Lung ultrasound showing a thickened pleural line, bilateral confluent B-lines (A) and small consolidation of the right lateral lobe (B, white arrow, and video 1).



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Video 1 Lung ultrasound showing a thickened pleural line, bilateral confluent B-lines (A) and small consolidation of the right lateral lobe (B).

common complication of SARS-CoV-2 infection: thrombosis and effusion. Additionally, it is a cheap and effective diagnostic technique that can be performed both in the emergency department or during hospitalisation, allowing follow-up on evolution and changes in patients' pathology.

SARS-CoV-2 infection has been associated with cardiac manifestations and pericardial effusion. We should be aware of the possibility of complications such as cardiac tamponade or myopericarditis that will require specific treatments.^{3 4} In this regard, Focus Cardiac Ultrasound is a standardised but restricted cardiac ultrasound examination that may be undertaken by a range of medical professionals with diverse backgrounds but appropriately trained, aimed to detect a limited number of critical cardiac conditions, such as the presence of pericardial effusion/cardiac tamponade, left and right ventricular size and function, intravascular volume status and may aid decision making during cardiopulmonary resuscitation.

Although there are expanding applications of pulmonary MRI in the clinical evaluation of lung disorders and could have been of use, particularly in a pregnant patient, it is still associated with cost, complexity and difficulty in reading; moreover, it is an imaging technique that is not available in many centres.⁵

The importance of this case is threefold; first, it is an example of acute pericarditis in a SARS-CoV-2 positive patient, an underdiagnosed complication worthy of additional study.⁶ Second, the use of POCUS allowed us to avoid the use of diagnostic techniques dependent on ionising radiation, particularly important due to our patient being pregnant during hospitalisation. Third and finally, it shows how the use of POCUS allows for a faster diagnosis and quick detection of complications in both hospitalised and ambulatory patients, which leads to earlier and more directed treatment of these conditions that during the current pandemic is more important than ever before.^{7 8}

Learning points

- ▶ Multiorgan point-of-care ultrasound (POCUS), including lung, heart and venous system, allows a whole integrated approach to the patient, enabling a faster diagnosis and quick detection of complications in both hospitalised and ambulatory patients with COVID-19.
- ▶ POCUS may be useful in the everyday evaluation of our patients, in multiple settings and by multiple specialty physicians, especially in a vulnerable population such as pregnant women.
- ▶ POCUS allowed us to avoid the use of diagnostic techniques dependent on ionising radiation.

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REFERENCES

- 1 Adler Y, Charron P, Imazio M, *et al*. 2015 ESC Guidelines for the diagnosis and management of pericardial diseases: The Task Force for the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC) Endorsed by: The European Association for Cardio-Thoracic Surgery (EACTS). *Eur Heart J* 2015;36:2921.
- 2 Deftereos SG, Siasos G, Giannopoulos G, *et al*. The Greek study in the effects of colchicine in COVID-19 complications prevention (GRECCO-19 study): rationale and study design. *Hellenic J Cardiol* 2020;61:42–5.
- 3 Diaz-Arocutipa C, Saucedo-Chinchay J, Imazio M. Pericarditis in patients with coronavirus disease 2019: a systematic review. *J Cardiovasc Med* 2021. doi:10.2459/JCM.0000000000001202. [Epub ahead of print: 28 Apr 2021].
- 4 Hatabu H, Ohno Y, Gefter WB, *et al*. Expanding applications of pulmonary MRI in the clinical evaluation of lung disorders: Fleischner Society position paper. *Radiology* 2020;297:286–301.
- 5 Tung-Chen Y. Acute pericarditis due to COVID-19 infection: an underdiagnosed disease? *Med Clin* 2020;155:44–5.
- 6 Yadav S, Singh A, Manisha K, *et al*. Point of care ultrasound in coronavirus disease 2019 pandemic: one modality helping multiple specialties. *J Med Ultrasound* 2021;29:9–14.
- 7 Hernández-Piriz A, Tung-Chen Y, Jiménez-Virumbrales D, *et al*. Importance of lung ultrasound follow-up in patients who had recovered from coronavirus disease 2019: results from a prospective study. *J Clin Med* 2021;10:3196.
- 8 Furqan MM, Verma BR, Cremer PC, *et al*. Pericardial diseases in COVID19: a contemporary review. *Curr Cardiol Rep* 2021;23:90.

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