De novo right ventricular thrombus in a COVID-19-positive patient

Kodangala Subramanyam,[1] Dilip Johny ,[1] Suresh Bhat,[2] Srivatsa Raghothama [2]

[1]Cardiology, KS Hegde Medical Academy, Mangalore, Karnataka, India
[2]General Medicine, KS Hegde Medical Academy, Mangalore, Karnataka, India

Correspondence to
Dr Dilip Johny;
johnydilip@gmail.com

KS and DJ are joint first authors.

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DESCRIPTION

De novo Right Ventricular (RV) thrombus is unusual in patients with COVID-19. The presence of RV thrombus is usually associated with thromboembolic phenomena happening from Deep Vein Thrombosis (DVT). A 56-year-old woman, known diabetic and hypertensive, was admitted with 1-week history of fever, cough and 3 days of breathlessness. She was severely hypoxemic with an oxygen saturation of 80%. Her reverse transcription-PCR test was positive for SARS-CoV-2. Chest X-ray was suggestive of COVID-19 pneumonia. She was started on parenteral steroids (methylprednisolone 40 mg two times per day), parenteral antibiotics (piperacillin with tazobactam), antivirals (remdesivir 100 mg for 5 days) and anticoagulation (low-molecular weight heparin 60 mg subcutaneously two times per day) along with oxygen therapy. As she became more hypoxemic, she was put on non-invasive ventilation, but subsequently needed mechanical ventilation and inotropic support.

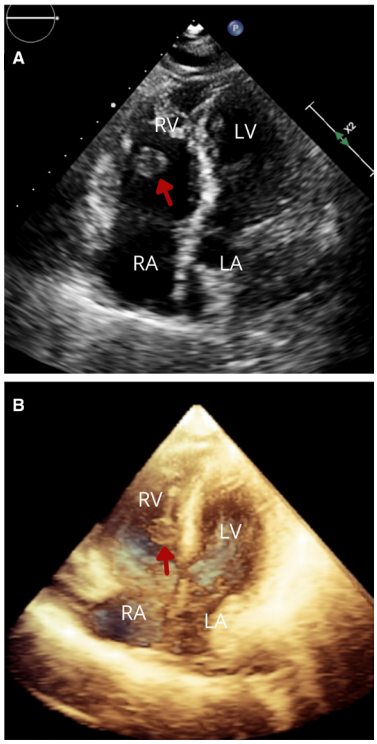


Figure 1 (A) Two-dimensional transthoracic echocardiography shows four-chamber view with right ventricular (RV) type C mobile thrombus (marked in red arrow). (B) Three-dimensional transthoracic echocardiography of the RV thrombus (marked in red arrow). LV, Left Ventricle; LA, Left Atrium; RA, Right Atrium.

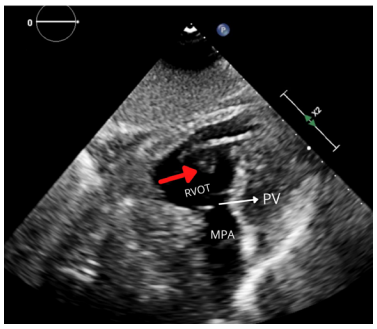
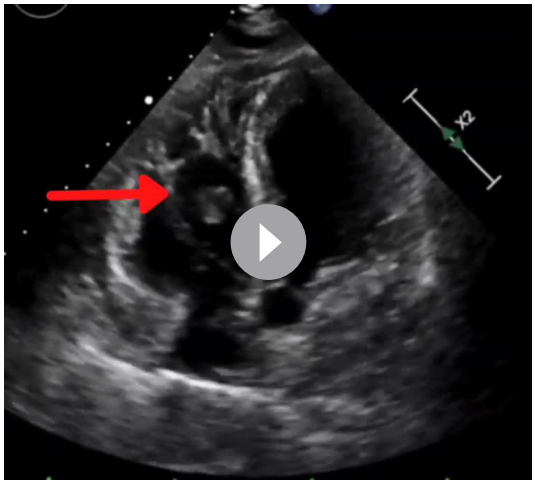


Figure 2 Two-dimensional transthoracic echocardiography (modified view) shows the location of the right ventricular thrombus (marked in red arrow) with respect to the right ventricular outflow tract (RVOT), pulmonary valve (PV) and the main pulmonary artery (MPA).



Video 1 Two-dimensional transthoracic echocardiography shows four-chamber view with right ventricular type C mobile thrombus (marked in red arrow).

Her two-dimensional and three-dimensional transthoracic echocardiography (figures 1A,B and 2) (videos 1–3) showed a de novo RV mobile thrombus (type C),[1] 12×12 mm size was seen attached to the RV lateral wall. She had moderate pulmonary arterial hypertension (pulmonary artery systolic pressure—55 mm Hg). Pulmonary arteries appeared normal in calibre and free of thrombus up to the extent visualised. Left ventricular ejection fraction was 45% with regional wall motion abnormality noted in the apex and anterior septum.

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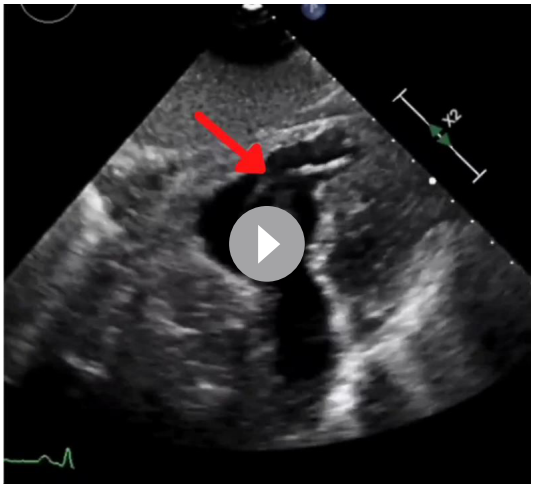
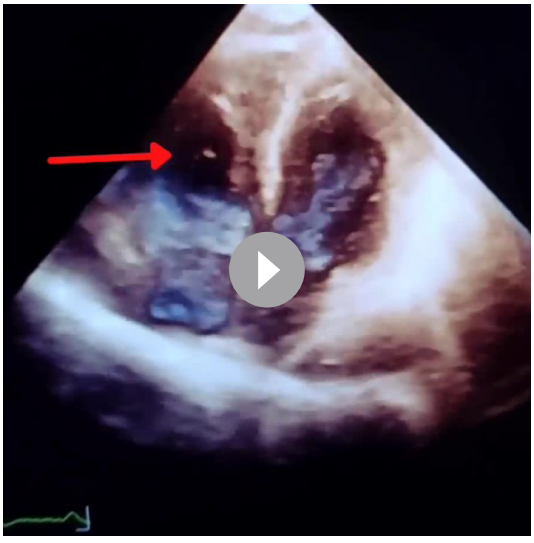


Video 2 Two-dimensional transthoracic echocardiography (modified view) shows the location of the right ventricular thrombus (marked in red arrow).



Video 3 Three-dimensional transthoracic echocardiography of the right ventricular thrombus (marked in red arrow).

No pericardial effusion was seen. Both the lower limb venous doppler showed no evidence of DVT. Also, no thrombus was visualised in the inferior vena cava. CT pulmonary angiogram could not be done as she was unstable. Intravenous heparin infusion was given for anticoagulation. The size of the RV clot did not decrease even after 1 week of parenteral anticoagulation. Thrombolysis or percutaneous mechanical thrombectomy[2] or any other invasive procedures were not done as the patient's attendants were not willing except for mechanical ventilation. She was continued on mechanical ventilation and other supportive medical measures but her condition did not improve.

COVID-19 is a thromboinflammatory disease that promotes thrombosis and coagulopathy. The mechanisms involved in the thrombus formation appear to be multifactorial. It is postulated that dysregulated immune responses mediated by inflammatory cytokines, lymphocyte cell death, hypoxia and endothelial damage are involved.[3] This case highlights the de novo occurrence of RV thrombus (type C), unlike other cases of RV thrombus in patients with COVID-19 due to the presence of DVT or vascular catheter.[4 5]

According to the classification of the European Working Group on Echocardiography, three types of RV thrombus have been described. Type A thrombus is worm-shaped and extremely mobile. Type B are more or less immobile, non-specific clots resembling left heart thrombi. Type C thrombi resemble a myxoma and are highly mobile.[1] The present case shows type C thrombus seen in COVID-19-positive patients.

Learning points

- The left ventricular thrombus seen in patients with COVID-19 is usually due to ventricular dysfunction. Right heart thrombus is due to thromboembolism from deep vein thrombosis. Isolated de novo right ventricular thrombus in patients with COVID-19 is rare.
- Echocardiography is an effective, easy-to-use and valuable bedside imaging test for diagnosis and assessment of prognosis in such patients.
- Additional therapy with extracorporeal membrane oxygenation may be beneficial in such critically ill patients.

Contributors SK—concept, literature search, manuscript editing, management of the patient and supervision of the case. DJ—literature search, data acquisition, manuscript editing, management of the patient, figure and video designing, and editing. SB—overall management and supervision of the case. SR—data acquisition, overall management and supervision of the case.

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ORCID iDs
Dilip Johny http://orcid.org/0000-0002-4922-2806
Srivatsa Raghothama http://orcid.org/0000-0002-6751-5725

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