POCUS to Make the Diagnosis—The Right Way

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Case History

Chief complaint: Cough
History of present illness: 33-year-old male presents to the emergency department with one week of productive cough and yesterday one episode of hemoptysis with speckled blood.

He had what he describes as a mild COVID-19 infection one month ago with cough, weakness, and fever. He felt better, and one week ago returned to his job. Since then, he has had a worsening cough, plus chills, dizziness, nausea, dyspnea on exertion and orthopnea. He denies chest pain. The patient has no PMH or PSH and takes no medications. No significant family history. He denies alcohol, drug use or smoking. He was born in South America and moved to the USA when he was 14 and has not traveled outside of the US since then. He denies any exposure to tuberculosis or other infectious diseases.

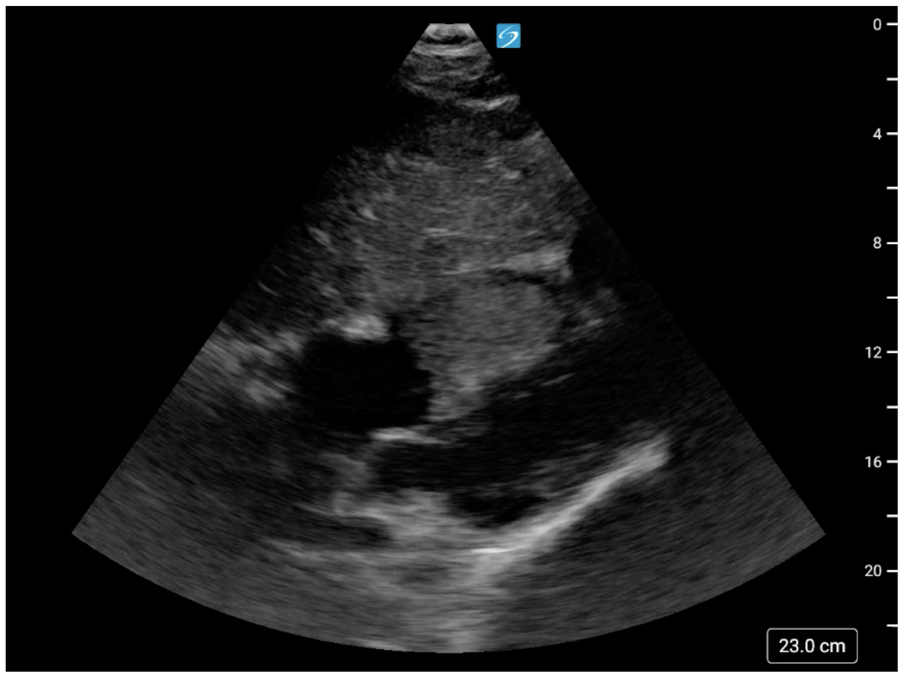
Objective

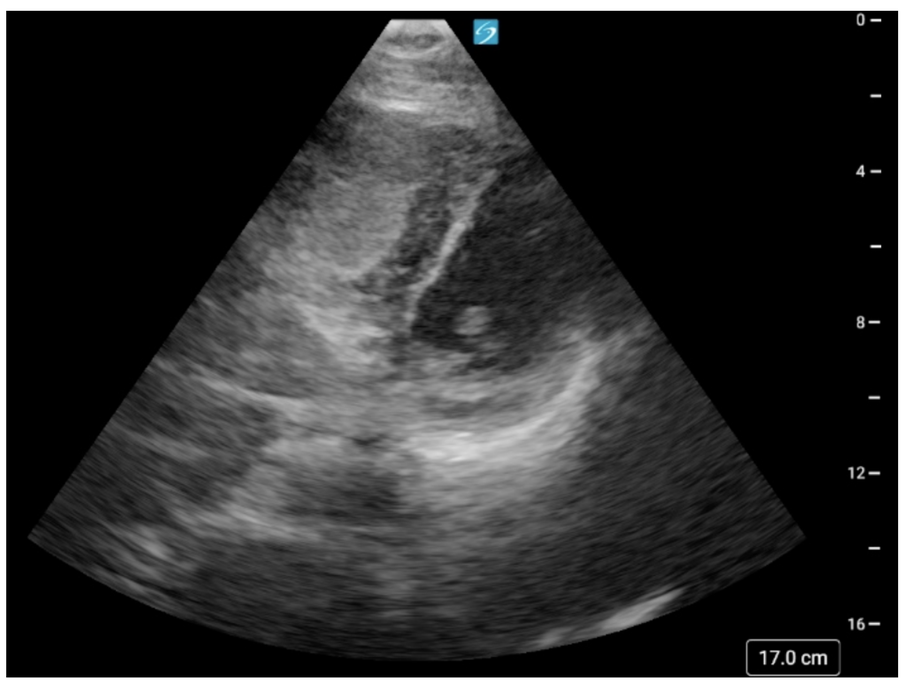
Pertinent Physical Exam:
Vitals: 96.8 F, 133/89, HR 78, RR 16, SpO2 100% on RA, and BMI 21
Unremarkable physical exam
Diagnostic Results:
CBC: HGB 12.8 mg/dL.
CMP: AST 100 Units/L, ALT 186 Units/L
NT-proBNP 841 pg/mL, D-Dimer 1.42 mg/L, HS-Troponin I normal
EKG: Normal sinus rhythm, right axis deviation, RV hypertrophy, T-wave inversions in III, V1-V3, ST depressions in V1–V4, and QTc 516
Chest x-ray: Mild cardiomegaly

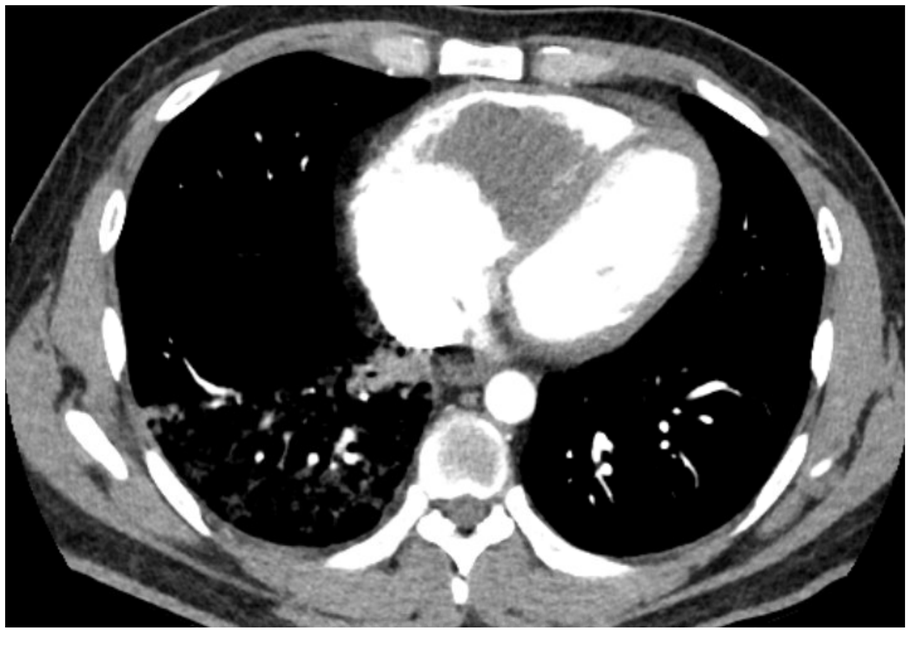
Clinical Questions

What are the the imaging findings?
Large RV mass vs thrombus & RV dilation

What is the differential diagnosis?
Cardiac thrombus, venous thromboembolism, malignant and benign tumors such as metastasis, sarcoma, myxoma, rhabdomyoma, fibroelastoma, and infectious endocarditis







Top: ED POCUS Subcostal view
Middle: ED POCUS Parasternal short axis view
Bottom: CT Pulmonary Angiogram

Case Discussion

This patient appeared well, but the history raised suspicion for cardiac dysfunction or PE. Prompt diagnostic workup was initiated with point-of-care echocardiography which showed a large RV echogenic mass vs thrombus, RV dilation, interventricular septal bowing into the LV, and RV dysfunction with TAPSE of 15 mm. Labs and ECG were congruent with RV dysfunction. CTPA was ordered, the patient was started on IV heparin and admitted by cardiology. CT was negative for PE but showed an RV mass and RLL pneumonia vs unilateral pulmonary edema. Utrasonography of lower extremities was negative for DVT. CT abdomen/pelvis was unremarkable. Complete TTE showed findings consistent with the ED POCUS.

Day 1 of hospitalization a cardiac MRI revealed an irregularly shaped 5 x 5 cm soft tissue mass with likely superimposed thrombus occupying the majority of the RV cavity, abutting the ventricular septum, RV free wall, inferior wall and extending to the RV apex. This mass was causing mild tricuspid regurgitation.

He was taken to the OR on day 6. The right atrium was opened, and a large tumor mass was seen involving the papillary muscles of the tricuspid valve, but no atrial mass. The RV was opened all the way down to the apex, and a large gelatinous mass was carefully removed without damaging surrounding structures. He was taken off cardiopulmonary bypass and admitted to the cardiac ICU. He was discharged home on day 14.

Pathology: Right ventricular myxoma

Take Home Points

1. POCUS is necessary for patients presenting with cough plus cardiopulmonary or concerning systemic symptoms, regardless of vitals
2. RV myxomas are rare, but can lead to PE, RVOT obstruction, and sudden cardiac death. Timely diagnosis is key and POCUS can help make the diagnosis
3. Do not anchor on recent COVID-19 illness