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PROCEDURAL COMPLICATIONS: PART 1

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

Embolization of the Deep Vein Thrombus During Ultrasound Examination

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ABSTRACT

Thrombus embolization is a rare consequence of ultrasonographic examination of the vessels of the lower limbs. We present a case of a 77-year-old woman with lung cancer who developed pulmonary embolism originating from the right femoral deep vein thrombus during the compression maneuver of the ultrasonographic examination of the lower limbs. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2020;2:2310–1) © 2020 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

A 77-year-old woman with metastatic lung adenocarcinoma was admitted to our hospital due to pneumonia. At admission, the patient's vital signs were as follows: blood pressure (BP) 146/78 mm Hg, heart rate 98 beats/min, respiratory rate 22 breaths/min, SPO_2 98%, temperature 38.9 C°. While in the hospital, she developed respiratory failure that mandated extended hospital stay, during which she was kept on a prophylactic dose of unfractionated heparin. Ultrasound examination of the lower limb was done for suspected deep vein thrombus (DVT) and revealed a thrombus in the right femoral vein (9 mm). The thrombus was hypoechoic, partially attached to the femoral wall (**Figure 1A to 1C**). The femoral vein was dilated (13 mm) and noncompressible. During examination, she developed sudden chest pain and shortness of breath. Echocardiographic examination showed a large mass in the right atrium (RA). The mass was highly mobile and prolapsing into the right ventricle (RV). Also, there was obvious RV dilatation and dysfunction (fractional area changes 22%) (Video 1, **Figure 1D and 1E**). Hemodynamically, the patient was stable (BP 101/67 mm Hg). Subsequent examination of the right femoral vein revealed disappearance of the thrombus. Hence, computed tomography (CT) scan was immediately done and pulmonary embolism was identified (**Figure 1F**). Heparin dose was then increased to the therapeutic level and warfarin was initiated.

Two weeks later, echocardiography and CT scan revealed disappearance of the thrombi. The patient was then discharged on warfarin.

DISCUSSION

Right atrial mass could be a thrombus, tumor, vegetations, or artifact. However, in the present case, based on the temporal sequence of events (clear RA before the event, the presence of DVT, patient's complaints during ultrasound examination, and the disappearance of the mass after anticoagulation therapy), atrial thrombus was the most likely diagnosis.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

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Similar reports showed that the compression maneuver during ultrasound examination could be one of the contributory factors of thrombus dislodgment. Furthermore, free-floating thrombi or thrombi with free-floating tail in the right lower limb veins might have higher tendency for embolization (1).

Thrombus dislodgement during ultrasound examination also could be due to the mechanical effect of the ultrasound waves (2). In the current case, we used a safe mechanical index. Therefore, our findings suggest that the dislodgement was mainly due to the compression maneuver.

ABBREVIATIONS AND ACRONYMS

BP = blood pressure

CT = computed tomography

DVT = deep vein thrombus

RA = right atrium

RV = right ventricle

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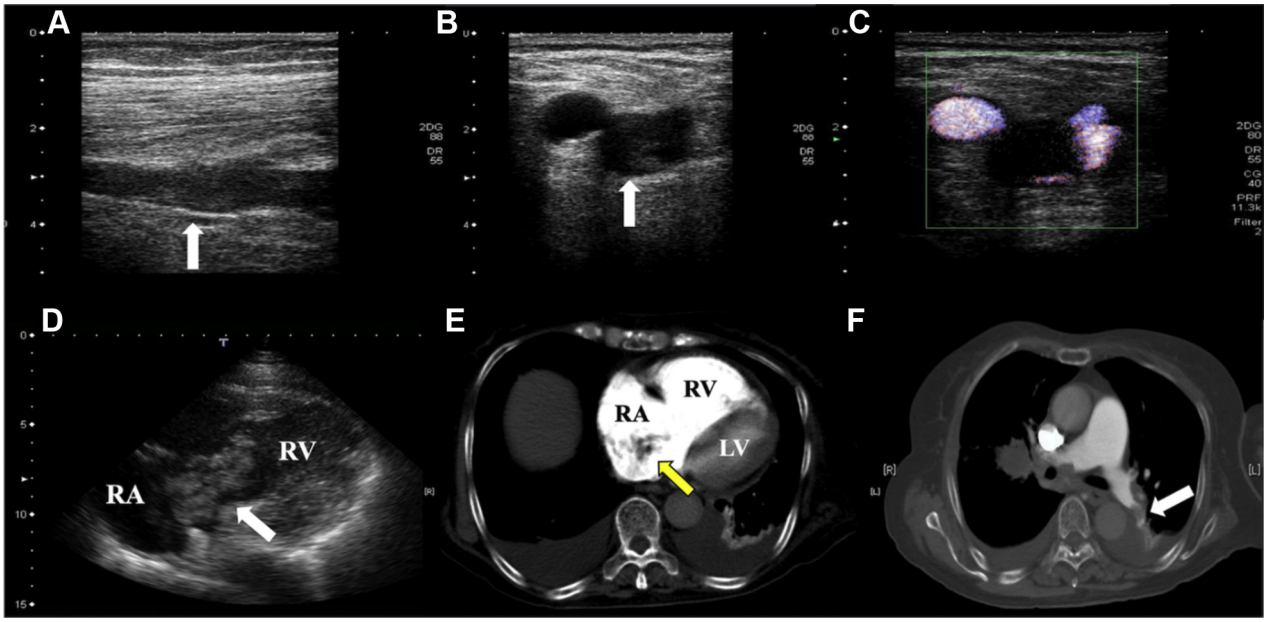
FIGURE 1 Thrombus Migration



(A, B) Ultrasound imaging. Long-axis and short-axis view, respectively, for the right femoral vein showing thrombus. **(C)** Ultrasound imaging. Short-axis view in right femoral vein showing color flow around thrombus. **(D)** Transthoracic echocardiographic imaging. Subcostal view showing right atrial thrombus **(white arrow)** prolapsing through the tricuspid valve. **(E)** Computed tomography (CT) imaging. The view shows thrombus **(yellow arrow)** in the right atrium (RA). The right ventricle (RV) is clearly dilated in comparison with the left ventricle (LV). **(F)** CT imaging. The view shows pulmonary embolism **(white arrow)**.

AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS deep vein thrombosis, echocardiography, lung adenocarcinoma, right atrium thrombus, ultrasound examination

APPENDIX For a supplemental figure and video, please see the online version of this paper.