

# Acute pulmonary embolism and right atrial thrombus as a complication of the central venous access port device for the delivery of chemotherapy

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A 30-year-old obese man with seminoma testicular cancer receiving chemotherapy presented with a 3-day history of increasing dyspnea and reduced exercise tolerance. Two months earlier, he underwent right-sided orchidectomy followed by 3 cycles of bleomycin chemotherapy via the implanted port device. On admission, the patient was in a good general condition, without shortness of breath and chest pain. On physical examination, heart rate was 116 bpm, blood pressure was 110/70 mm Hg and arterial oxygen saturation (SaO<sub>2</sub>) was 90%. Computed tomographic angiography detected thromboemboli in the segmental arteries of both lungs and intermediate-low risk acute pulmonary embolism (PE) was confirmed. Additionally, a transthoracic echocardiogram revealed an echo-dense mass (34 × 31 mm) in the right atrium (RA) partially obstructing the inflow to the right ventricle (transtricuspid mean gradient, 4 mm Hg) (FIGURE 1A). A transesophageal echocardiography confirmed a large immobile mass in the RA, attached to the atrial wall and located opposite the tip of chemotherapy port line (FIGURE 1B). The interatrial septum was curved toward the left atrium (FIGURE 1C) and left-to-right interatrial shunt via patent foramen ovale in the color Doppler was found. Despite 2 weeks on anticoagulation with low-molecular-weight heparin (enoxaparin 120 mg twice a day), this right atrial mass persisted unchanged. Due to the risk of further pulmonary embolization, obstruction of the tricuspid valve or inferior vena cava, possible

paradoxical embolism, and potential neoplastic character of the mass, its surgical excision was performed. During surgery, the patent foramen ovale was closed and the venous port was explanted. The histopathology revealed an organizing thrombus and no evidence of malignancy. The follow-up transesophageal echocardiography performed 9 months after the surgery did not reveal any pathological mass in the RA (FIGURE 1D). The interatrial septum curvature was normal and there was no interatrial shunt (FIGURE 1E and 1F).

Catheter-related central thrombosis is a rare but potentially catastrophic complication. Right atrial thrombi are found in about 10% of cases of pulmonary thromboembolism.<sup>1</sup> In a study by Ogren et al<sup>2</sup> among patients with RA thrombi, 36% of all patients had PE and 6.5% of all patients with PE confirmed at autopsy had RA thrombi. Thrombus in the right atrium or ventricle carries a mortality rate of 40%.<sup>3</sup> The unusual features of this case include atypical site of thrombus on the inferior vena caval opening, directly opposite the outlet of the port line, rather than around the port line, and the possible facilitation of thrombus formation by chemotherapeutic agent. Importantly, when the catheter tip is located within the RA, it may repeatedly brush against the atrial wall and induce intimal damage and thrombus formation. Based on a search of the available literature, it seems that the thrombus located in the RA opposite to the chemotherapy catheter tip should be removed surgically because neither thrombolytic

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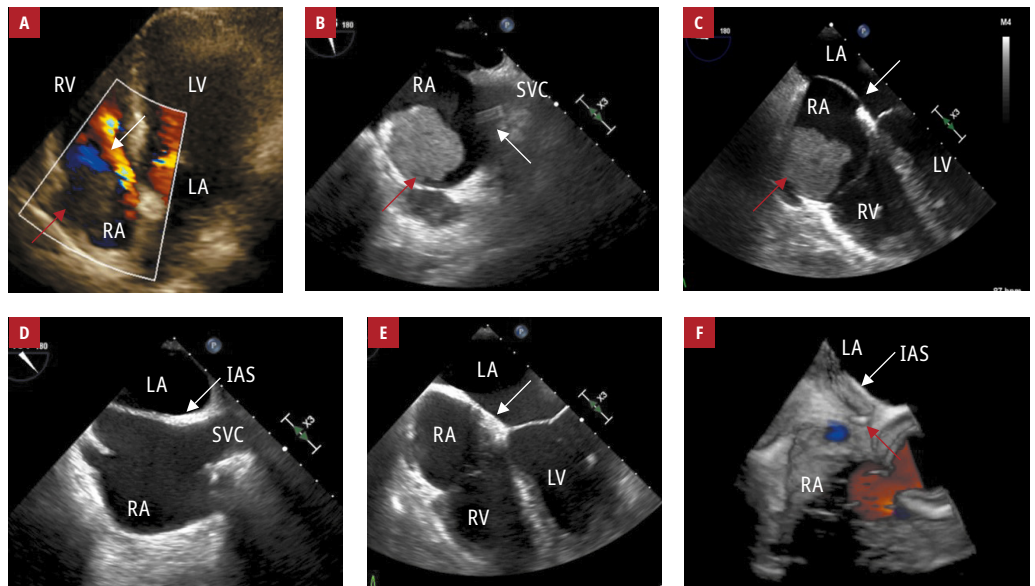
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**FIGURE 1** **A** – transthoracic echocardiography showing an abnormal mass (red arrow) in the right atrium and turbulent inflow (white arrow) into the right ventricle in color Doppler; **B** – transesophageal echocardiography, bicaval view, showing a large right atrial thrombus (red arrow) located opposite the tip of chemotherapy port line (white arrow) visible in the superior vena cava outlet; **C** – transesophageal echocardiography, 4-chamber view, showing thrombus (red arrow) and the interatrial septum (IAS) (white arrow) curved toward the left atrium in systole; **D** – follow-up transesophageal echocardiography, bicaval view, showing a correct echocardiographic image of the right atrium after the surgery; **E** – follow-up transesophageal echocardiography, 4-chamber view, showing a correct IAS shape (arrow) after the surgery; **F** – 3-dimensional transesophageal echocardiography, 4-chamber view, showing surgical suture (red arrow) closing the patent foramen ovale  
Abbreviations: LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle; SVC, superior vena cava

nor heparin therapy was effective in this group of patients.<sup>4</sup> Additionally, special attention and effort should be given to place the catheter tip in the superior vena cava or in its junction with the RA and to avoid catheter implantation in the right atrium. In recent years, in order to assure rapid and expert-based individualized care for patients with PE, particularly in the intermediate-risk group, a strategy of multidisciplinary pulmonary embolism response teams has been developed and implemented.<sup>5</sup>

## ARTICLE INFORMATION

**CONFLICT OF INTEREST** None declared.

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