

# Acute Massive Pulmonary Embolism after Radiofrequency Catheter Ablation

A Rare but Devastating Complication

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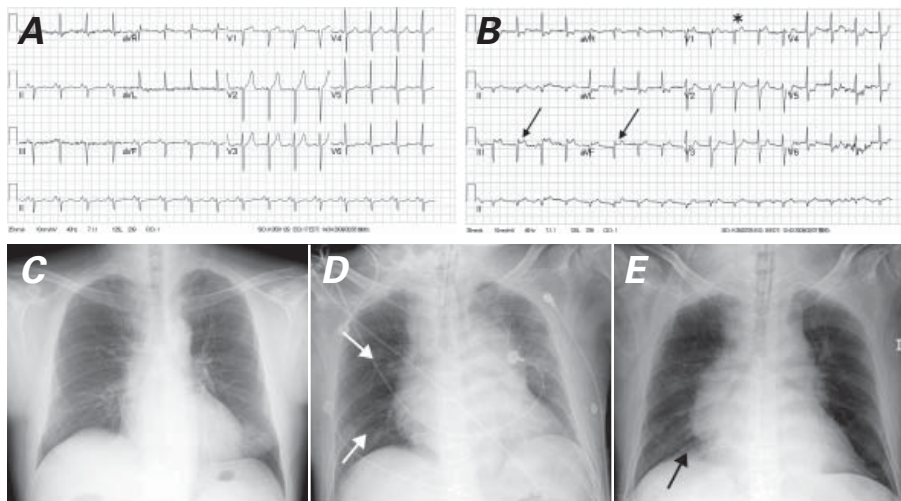
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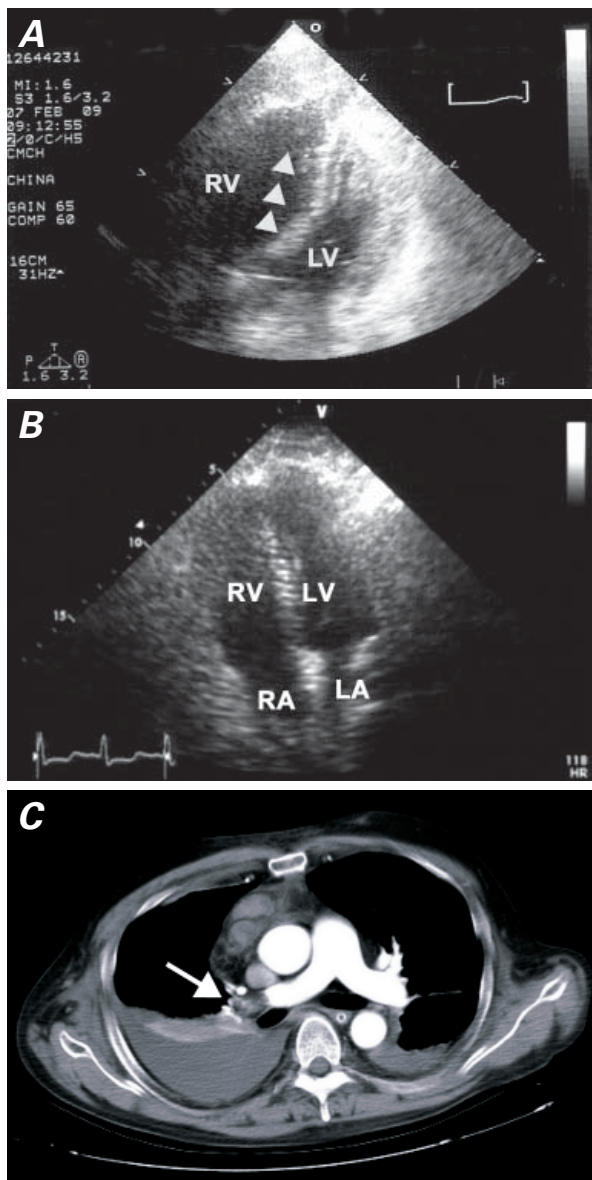
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**A** 47-year-old man underwent radiofrequency catheter ablation because of recurrent paroxysmal supraventricular tachycardia. After the introduction of 2 venous sheaths (1 into each side of the common femoral vein) and 1 arterial sheath into the right femoral artery, typical slow-fast atrioventricular nodal re-entrant tachycardia (AVNRT) was induced, and the slow pathway was ablated uneventfully. The procedure lasted 120 minutes (fluoroscopic time, 14 min). Twenty hours later, the patient developed severe dyspnea, became cyanotic and hypotensive, and lost consciousness. Cardiopulmonary resuscitation was performed. Results of arterial blood gas examination showed a pH of 6.99, PaCO<sub>2</sub> of 53 mmHg, PaO<sub>2</sub> of 38 mmHg, bicarbonate of 12.8 mEq/L, and oxygen percent saturation of 41% with the patient on 50% oxygen through a Venturi mask. A 12-lead electrocardiogram revealed new-onset incomplete right bundle branch block, S<sub>1</sub>Q<sub>3</sub> pattern, and acute-injury currents over the inferior leads (Figs. 1A and 1B). In comparison with chest radiography upon hospital admission (Fig. 1C), repeat radiographs showed a large area of hypovolemia in the right lung (Fig. 1D) and a prominent right descending pulmonary artery (Fig. 1E). Echocardiography showed right ventricular dilation that compressed the left ventricle (Fig. 2A). Acute pulmonary embolism was suspected, and the patient was given 10,000 units of heparin intravenously. Laboratory examination revealed these values: D-dimer, >10 µg/mL (normal, <0.5 µg/mL); platelets, 70,000/mm<sup>3</sup> (normal range, 150,000–400,000/mm<sup>3</sup>); and plasma fibrinogen,



**Fig. 1** Twelve-lead electrocardiograms show **A**) left-axis deviation at hospital admission, and **B**) subsequent acute-injury currents in the inferior leads (arrows), incomplete right bundle branch block (asterisk), and new-onset S<sub>1</sub>Q<sub>3</sub> pattern when the patient experienced acute respiratory distress. **C**) Chest radiograph at hospital admission. Subsequent radiographs show **D**) a large area of hypovolemia in the right lung (arrows) and **E**) a prominent right descending pulmonary artery (arrow), consistent with acute pulmonary embolism.



**Fig. 2** Transthoracic echocardiograms show **A**) right ventricular (RV) dilation compressing the left ventricle (LV) during cardiopulmonary resuscitation (arrowheads) and **B**) attenuation of the RV dilation after 24 hours of heparin therapy. **C**) Chest computed tomogram shows a large embolus in the right main pulmonary artery (arrow), with a filling defect.

LA = left atrium; RA = right atrium

136.7 mg/dL (normal range, 200–400 mg/dL). The right ventricular dilation resolved after 24 hours of heparin therapy (Fig. 2B). Computed tomography (CT) of the chest with contrast medium revealed a filling defect in the right main pulmonary artery (Fig. 2C) and the right descending pulmonary artery. On the same day as the cardiopulmonary resuscitation, duplex ultrasonographic imaging of the right leg revealed intravenous thrombosis with loss of color-Doppler signals at the puncture site of the right common femoral vein. The thrombotic obstruction was further detect-

ed by markedly diminished pulsed-wave Doppler signals, as compared with the normal flow pattern distal to the thrombosis. After the patient underwent 3 weeks of systemic anticoagulation therapy, chest CT revealed resolution of the pulmonary embolism.

## Comment

The most severe complications associated with radiofrequency catheter ablation include death (0.3%), stroke (0.2%), complete atrioventricular block (1%), cardiac tamponade (0.6%), acute myocardial infarction (0.1%), and thromboembolism (0.4%).<sup>1</sup> To prevent thromboembolism during a left-heart procedure, heparin should be given to achieve an activated clotting time of 250 to 300 sec.<sup>2</sup> During a right-heart procedure, anticoagulation may be used on an individual basis and is considered useful for complex mapping or ablation procedures.<sup>2</sup>

Systemic heparinization is not routinely recommended for patients undergoing catheter ablation for AVNRT; however, without systemic anticoagulation, the risk of pulmonary thromboembolic complications increases. Pulmonary embolism should be suspected and treated accordingly in patients who develop acute respiratory distress after a right-heart ablation procedure.

## References

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