Images in Cardiology

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Pulmonary Embolus in Transit

EFTHYMIOS N. DELIARGYRIS, M.D., JOSEPH M. FALSONE, M.D., AND PARK W. WILLIS IV, M.D.

Cardiac Graphics Laboratory, University of North Carolina Hospitals, Chapel Hill, North Carolina, USA

FIG. 1 Twelve-lead electrocardiogram showing sinus tachycardia, right-axis deviation, and incomplete right bundle-branch block. Note the deep S wave in lead I, Q wave in lead III, and the T-wave inversion in lead III ($S_1Q_3T_3$ pattern) with ST-segment and T-wave deviations in V_1 – V_3 .

A 60-year-old woman was transferred to our institution because of altered mental status, tachycardia, and hypotension. She had a history of hypertension and was in her usual state of health until two days earlier when she had a syncopal episode. Upon arrival, the patient was lethargic but arousable on a continuous

intravenous infusion of dopamine at $10 \mu\text{g/kg/min}$. Blood pressure was 95/60 mmHg, and heart rate was 140 and regular. Respirations were 30/min and labored. Oxygen saturation was 95% on 4 liters of supplemental oxygen with arterial blood gas of pH:7.37, PaCO_2 of 29 mmHg, and PaO_2 of 69 mmHg. Intravenous heparin therapy was initiated.

The initial electrocardiogram (Fig. 1) showed abnormalities characteristic of acute cor pulmonale. A spiral computed tomogram (Fig. 2) demonstrated the presence of low attenuation areas, consistent with thrombus, in the right atrium, both pulmonary arteries, and throughout the pulmonary vasculature. Transthoracic echocardiography (Fig. 3) showed a mobile echogenic mass in the right atrium. There was marked dilatation and decreased contraction of the right ventricle with severe tricuspid regurgitation. Due to hemodynamic instability and echocardiographic evidence of acute right ventricular failure, the patient underwent emergent percutaneous pulmonary embolectomy and intrapulmonary urokinase infusion. In spite of initial angiographic improvement

Address for reprints:

Efthymios N. Deliargyris, M.D.
Department of Medicine
Division of Cardiology
Burnett-Womack Bldg #7075
Chapel Hill, NC 27599-7075, USA

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FIG. 2 Spiral computed tomogram with intravenous contrast. Thrombus is present in both main pulmonary arteries and throughout the pulmonary vasculature.

FIG. 3 Two-dimensional transthoracic echocardiogram shows a highly echogenic mass confined to the right atrium (RA). RV = right ventricle, LV = left ventricle.

FIG. 4 Autopsy specimen demonstrating the presence of thrombus in the right atrium, right ventricle and pulmonary outflow tract. Thrombus was also present in the inferior vena cava and throughout the pulmonary vascular bed.

the patient developed refractory bradycardia and hypotension. Resuscitative efforts were unsuccessful. Autopsy confirmed the presence of thrombus in the right atrium, right ventricle, and both pulmonary arteries (Fig. 4). There was no evidence of malignancy.

Management of acute massive pulmonary embolism remains challenging. The presence of emboli entrapped within the right heart chambers is evidence of a large thrombus burden and has been associated with mortality rates of up to 50% when managed medically. In addition to supportive care, therapeutic options include intravenous heparin, thrombolytics, catheter-extraction techniques, and surgical embolectomy. However, as the present case demonstrates, even aggressive combination therapy may be unsuccessful.

Reference

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