CASE REPORT

Multiple Proximal Pulmonary Artery Thrombi Detected by Transthoracic Echocardiography

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Received 29 August, 2012; accepted 26 October, 2012
Available online 5 June 2013

KEY WORDS
pulmonary embolism, transthoracic echocardiography

We report the case of a 58-year-old female who presented with shortness of breath and atypical chest pain. Transthoracic echocardiography (TTE) showed not only right ventricular failure signs, but also multiple heterogeneous masses in the pulmonary arteries. The chest-computed tomography scan revealed multiple thrombi-involved bilateral proximal pulmonary arteries. The case emphasizes the imaging of multiple pulmonary thrombi as detected by TTE. © 2013, Elsevier Taiwan LLC and the Chinese Taipei Society of Ultrasound in Medicine.

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Introduction

The clinical presentation, chest x-ray and 12-lead electrocardiogram of acute pulmonary embolism are variable and with non-specific findings. Transthoracic echocardiography (TTE) usually shows right ventricular (RV) failure signs, but seldom presents as a thrombus in the proximal pulmonary artery. Here, we present a case of acute pulmonary embolism which was detected by TTE and confirmed by chest-computed tomography.

Case report

A 58-year-old female had hepatocellular carcinoma, liver cirrhosis, and chronic hepatitis C infection for 2 years. She presented with shortness of breath and atypical chest pain for 2 days. Physical examination revealed tachycardia (heart rate 122/min), tachyapnea (respiratory rate 25/min), and Grade III/VI pansystolic murmur over the left lower sternal...
border. The oxygen saturation detected by pulse oximetry under the ambient room air was only 76%. The laboratory tests were as follows: white blood cell count 19800/µL, hemoglobin 11.5 g/dL, platelet 140,000/µL, C-reactive protein 44.92 mg/L, cardiac troponin I 0.82 µg/L, brain natriuretic peptide 1962 ng/L, D-dimer 75.95 nmol/L, and creatinine 178.4 µmol/L. Transthoracic echocardiography (TTE) showed right ventricular (RV) dilation, moderate tricuspid regurgitation with 33 mmHg difference in pressure between the RV and the right atrium, normal diameter of inferior vena cava, pulmonary hypertension, D-shaped sign of the left ventricle, and multiple heterogeneous masses in the pulmonary arteries (Fig. 1). The chest-computed tomography (CT) scan revealed massive pulmonary embolism involved bilateral proximal pulmonary arteries (Fig. 2).

Discussion

Acute pulmonary embolism often arises from deep venous thrombosis of the lower legs. The clinical presentation of pulmonary embolism is variable, including dyspnea, tachycardia, cough, hemoptyis, cyanosis, syncope, and pleuritic pain. Some risk factors for deep venous thrombosis and pulmonary embolism include advanced age, obesity, reduced mobility, cancer, acute medical illness, oral contraceptive pills, pregnancy, antiphospholipid syndrome, and deficiency of protein C, protein S, or antithrombin III [1,2]. The 12-lead electrocardiogram may reveal signs of RV strain, including right bundle-branch block, T-wave inversions in the anterior precordial lead, T-wave inversions in the anterior precordial lead, and S-wave in lead I and Q-wave and T-wave inversion in lead III [1,2]. The chest x-ray often shows nonspecific findings. The D-dimer assay can be used as a "rule out" test when pulmonary embolism is suspected [1]. Contrast-enhanced chest CT has become the major diagnostic modality of pulmonary embolism. Other alternative image modalities include ventilation–perfusion lung scan, magnetic resonance angiography, TTE, transesophageal echocardiography (TEE), and invasive pulmonary angiography [2]. Although TTE is insensitive for diagnosis, it plays an important role in risk stratification of patients with acute pulmonary embolism. The images of RV dysfunction in patients with pulmonary embolism include RV dilation, regional RV free wall hypokinesia with sparing the apex (McConnell sign), paradoxical septal motion, tricuspid regurgitation, and pulmonary hypertension [2–4]. In hemodynamically unstable patients, TTE can rapidly provide RV failure signs and differential diagnostic imaging of acute chest pain, such as myocardial infarction, aortic dissection, and cardiac tamponade [2]. The hemodynamic response to an acute pulmonary embolism depends not only on the size of the embolus and degree of pulmonary vasculature obstruction, but also on the physiological reaction to the vasoreactive substances released in response to the event and the cardiopulmonary status of the patient at baseline [5]. In the present case, TTE provided not only several RV failure signs, but also direct visualization of thrombi in the proximal pulmonary arteries, which was very useful in the diagnosis, risk stratification, and selection of an optimal treatment. Primary therapy with fibrinolysis or surgical embolectomy is considered for patients with massive or submassive pulmonary embolism. Patients should receive unfractionated heparin or low-molecular-weight heparin after primary therapy. Oral anticoagulation agents such as warfarin are the main medication of outpatient therapy. The target international normalized ratio is between 2.0 and 3.0 for patients with pulmonary embolism [6]. Due to the bleeding tendency and severe comorbidity, our patient did not receive fibrinolysis or surgical embolectomy. She received intravenous unfractionated heparin for 7 days, and then was discharged on warfarin therapy.

Acute massive pulmonary embolism is a lethal disease. TTE provides a rapid and non-invasive examination in the risk stratification of pulmonary embolism. In our case, TTE shows not only RV failure signs, but also visualization of multiple thrombi in the proximal pulmonary arteries, which was useful in choosing adequate management.

References


