CASE REPORT

Transthoracic echocardiographic diagnosis of proximal pulmonary embolism

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Summary
Notwithstanding transthoracic echocardiography (TEE) is an excellent technique for detecting acute right ventricular overload, it can rarely visualise thrombi inside right cardiac cavities and even more exceptionally inside pulmonary arteries. We report the original case of a 48-year-old man referred to our department for a severe recent onset dyspnoea, and in whom bedside transthoracic echocardiography diagnosed acute pulmonary embolism (PE) as it showed inside the pulmonary trunk a highly mobile serpentine 5 cm-long thrombus floating towards the left pulmonary artery. Patient was treated conventionally with favourable clinical and echocardiographic results.

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Introduction
Transthoracic echocardiography (TEE) may reveal findings that strongly support hemodynamically significant pulmonary embolism (PE) like right ventricular dilatation and hypokinesis, paradoxical interventricular septal motion toward the left ventricle, tricuspid regurgitation, and pulmonary hypertension. It could, though, far less frequently visualise thromboembolic material inside the right-sided heart cavities. Direct visualisation of the thrombus, although confirming PE, remains an exceptional finding.

We report the case of a 48-year-old man referred to our department for severe and recent onset dyspnoea and in whom we diagnosed a proximal PE by direct TEE visualisation of the thrombi inside the left pulmonary artery.

Observation
CB, a 48-year-old man, with unremarkable past medical history presented to the emergency department for right leg pain associated with a recent onset NYHA III class dyspnoea.

On physical examination, the patient had regular pulse of 108 beats/min, and blood pressure of 138/68 mmHg. He was orthopneic with a respiratory rate of 24 breaths/min. He had normal heart sounds on auscultation and no rales. His lung fields were clear on chest radiogram.
Examination of the right leg showed clear evidence of deep venous thrombosis, which was subsequently confirmed by vascular Doppler echography. The ECG depicted a sinus rhythm, a rightward axis shift, an S1Q3T3 pattern, an incomplete right bundle block branch and nonspecific ST segment and T-wave abnormalities. Arterial blood gas analysis showed PO2 and PCO2 as 73 and 28 mmHg, respectively.

Transthoracic echocardiography (TEE) was immediately performed and detected acute cor pulmonale with inverted right ventricle to left ventricle ratio (Fig. 1), pulmonary hypertension at 55 mmHg and interestingly parasternal short-axis view revealed, inside the pulmonary trunk, a highly mobile serpentine 5 cm-long thrombus floating towards the left pulmonary artery (Fig. 2).

The diagnosis of proximal pulmonary embolism (PE) was made, we decided, though, not to perform thrombolysis, as our patient was hemodynamically stable and treated him with intravenous heparin and simultaneously started oral anticoagulants.

Echocardiographic control carried out 7 days later was almost normal with total resumption of the thrombus and normalized pulmonary pressures.

Discussion

Being usually unable to directly show the thrombus inside pulmonary arteries, TEE is not considered as a first-line test in the diagnosis of PE. Instead, it generally shows indirect signs of pulmonary embolism, which are due to right ventricular overload and pulmonary hypertension, indeed TEE could reveal an elevated RV/LV ratio or a paradoxical systolic septal motion, the finding of regional RV dysfunction with severe free wall hypokinesis sparing the apex (McConnell sign) is said to be specific for PE. TEE may also play an important role in risk stratification of patients with proven acute PE, in fact, acute RV failure with severe hypokinesis has been showed to be an independent marker of mortality.

Patients presenting with proximal PE have generally a severe dyspnea, hampering a perfect echocardiographic examination, therefore, and also owing to a frequent lack of echogenicity in these cases, TEE cannot always visualize the entire pulmonary trunk, its bifurcation and the two main branches with ease.

As a consequence, observing thrombotic material inside pulmonary is an exceptional finding, in fact, although some large multinational registries recorded several cases of intracardiac thrombus (4% in the large ICOPER registry), reports of intra pulmonary TEE detected thrombus in transit remain very scarce.

Management of similar cases is also a controversial issue, but we believe that in the absence of hemodynamic compromise, thrombolysis should be avoided, and conventional treatment with heparin could generally be effective.

Conclusion

TEE, besides its recognized role as a useful backup in the decision making process in case of suspected PE, may exceptionally prove to be a powerful diagnosis tool, as it allowed in our observation a direct visualisation of a massive thrombus inside pulmonary arteries. A careful echocardiographic examination with a special focus on short axis view may prove very helpful in such a setting.

Conflict of interest statement

The authors have no conflict of interest to declare.

References


