Reminder of important clinical lesson

Tricuspid valve thrombus causing acute pulmonary embolism

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Summary

The development of thrombus on the tricuspid valve is very rare in adulthood and it needs special attention in clinical practice as it can be confused with vegetation or a tumour. Embolisation due to thrombus may have an acute and unexpected course with a detrimental prognosis and a high death rate during the first 24 h after diagnosis. In this report, we presented a case of mobile tricuspid valve thrombus detected by transthoracic echocardiography that led to recurrent pulmonary embolism.

BACKGROUND

Tricuspid valve thrombus is rare in adulthood. However, it needs special attention because it mimics vegetation or a tumour and has a high risk of fatal pulmonary embolism.¹ The previously reported cases indicated that the thrombus on the tricuspid valve developed in patients with cardiac structural abnormalities, coagulative disorders, deep venous thrombosis due to hormonal therapy or in those patients with antiphospholipid syndrome.^{2–6}

In our report, diagnosis of tricuspid valve thrombus causing recurrent pulmonary embolism has been clearly defined and discussed with the evidence of current literature.

CASE PRESENTATION

A 72-year-old woman was admitted to our hospital with the signs of dyspnoea, chest pain, palpitations and dizziness. She gave a history of pulmonary embolism and deep venous thrombosis (DVT) 5 years ago. Her physical examination revealed a blood pressure of 110/80 mm Hg and a heart rate of 82 beat/min. She had a mild systolic murmur heard best at the lower left sternal border. ECG reflected right ventricular strain pattern with normal sinus rhythm.

The patient was haemodynamically stable and initial arterial blood gas analysis was normal (pH=7.42, pCO₂=23.8 mm Hg, pO₂=142 mm Hg, sPO₂ 96%). Her complete blood count, prothrombin time, activated partial thromboplastin time, D-Dimer, troponin, protein C and S,

factor V Leiden, antinuclear antibodies and anticardiolipin levels were all checked and were found as normal. Radiological examination also showed normal results of Doppler ultrasound of lower extremities and CT scanning of the pelvic and leg veins. However, she had an abnormal chest x-ray which showed cardiomegaly with a marked pulmonary trunk.

Transthoracic echocardiogram showed the presence of a mass of 6×8 mm size attached to the posterior leaflet of the tricuspid valve in the right atrium (figures 1A and 1B). The mass was mobile with irregular borders and a non-homogeneous structure consistent with thrombus. Left ventricular ejection fraction was 55% and the atrial septum was intact and pulmonary arteries had no thrombus (figure 1C). There was a moderate tricuspid regurgitation with systolic pulmonary arterial pressure of 50 mm Hg (figure 2). Transoesophageal echocardiography was done that also revealed a possible thrombus attached to the tricuspid valve.

Because of the DVT and pulmonary embolism history, anticoagulation was initiated (1000 U/h heparin infusion after an intravenous bolus of 5000 U) and the dose was determined by the partial thromboplastin time.

On the second day of her hospitalisation, the patient showed progressive clinical deterioration. She became tachypnoeic and tachycardic with low blood pressure. The systolic murmur at the lower left sternal border was found

Figure 1 (A and B) Transthoracic echocardiogram showing the presence of a mass of 6×8 mm size attached to the posterior leaflet of the tricuspid valve in the right atrium and (C) no thrombus in pulmonary arteries.

video 1 Moderate tricuspid regurgitation and a systolic pulmonary arterial pressure of 90 mmHg was determined.

to be intensified with a grade of 3/6. On echocardiography, the initially detected thrombus could not be seen in the cardiac chambers anymore. Moderate tricuspid regurgitation was determined and pulmonary artery pressure was found to be increased to 90 mm Hg (video 1). Spiral-CT of the pulmonary artery was applied immediately. A subsequent CT angiography detected a prominent thrombus in the right pulmonary artery and distal parts of the both pulmonary arteries (figure 3). An arterial blood gas measurement was obtained under breathing room air that showed a partial pressure of oxygen as 52 mm Hg, pH as 7.32, pCO₂ as 45.8 mm Hg and sPO₂ as 84%. Her D-Dimer level increased and was found as 13.86.

On the basis of the diagnosis of pulmonary embolism, thrombolysis with tissue plasminogen activator (tPA) with the infusion of 100 mg was applied. After tPA therapy, she had a prompt clinical improvement.

Follow-up TTE showed a thrombus in the right pulmonary artery which was much smaller and more organised.

On the ninth day of her hospitalisation, she was discharged with oral warfarin treatment with an international normalised ratio (INR) level as 2.6.

INVESTIGATIONS

Abnormal chest x-ray which showed cardiomegaly with a marked pulmonary trunk.

Transthoracic echocardiogram showed the presence of a mass of 6×8 mm size attached to the posterior leaflet

Figure 2 On echocardiography, thrombus could not be seen in the cardiac chambers, moderate tricuspid regurgitation was detected.

of the tricuspid valve in the right atrium and pulmonary arteries had no thrombus (figure 1). The mass was mobile with irregular borders and a non-homogeneous structure consistent with thrombus. Left ventricular ejection fraction was 55% and the atrial septum was intact. There was a moderate tricuspid regurgitation with systolic pulmonary arterial pressure of 50 mm Hg (figure 2).

Transesophageal echocardiography was done that also revealed a possible thrombus attached to the tricuspid valve.

On the second day of her hospitalisation, on echocardiography, the initially detected thrombus could not be seen in the cardiac chambers anymore (figure 4) and moderate tricuspid regurgitation was determined and pulmonary artery pressure was found to be increased to 90 mm Hg (video 1).

Spiral-CT of the pulmonary artery was applied immediately. A subsequent CT angiography detected a prominent thrombus in the right pulmonary artery and distal parts of both pulmonary arteries (figure 3).

DIFFERENTIAL

Tricuspid valve thrombus is rare in adulthood. However, it needs special attention because it mimics vegetation or a tumour.

TREATMENT

On the basis of the diagnosis of pulmonary embolism, thrombolysis with tPA with the infusion of 100 mg was applied. After tPA therapy, she had a prompt clinical improvement.

OUTCOME AND FOLLOW-UP

On the ninth day of her hospitalisation, she was discharged with oral warfarin treatment with an INR level as 2.6.

DISCUSSION

Although tricuspid valve thrombus is rarely seen in clinical practice, there are several reported cases in the current literature. In some of the cases patients were found to have cardiac structural anomalies such as ventricular septal defect (VSD) or a small shunt after the surgical VSD closure. In the other two reported cases, tricuspid thrombus was found to be associated with DVT due to hormonal therapy. In another case, antiphospholipid syndrome which should be suspected in a patient with a valvular or intracardiac thrombus and without any organic heart disease was reported.²⁻⁶ However still, in almost one-half of the cases, the underlying causal factor cannot be determined.⁷

In our case, we also suspected that the tricuspid valve thrombus was from DVT though having no evidence to support this idea. We claim two possible explanations for the development of thrombus in our patient. The first possibility is the entrapment of pulmonary emboli in the tricuspid valve from deep vein system or pelvic veins. Although Doppler ultrasound of lower extremities and CT scanning of the pelvic and leg veins were normal on admission, she had a history of pulmonary embolus and DVT. The second possibility is the secondary development of thrombus on the valve with minor endothelial injury and stasis of blood on the right side of the heart due to

Figure 3 CT angiography detected a prominent thrombus in the right pulmonary artery and distal parts of both pulmonary arteries.

Figure 4 Transthoracic echocardiogram showing no thrombus in tricuspid valves (A, systol and B, diastol).

pulmonary hypertension which was probably caused by recurrent pulmonary emboli.⁸

Management strategy (fibrinolytics, anticoagulants or surgical thromboembolism and percutaneous catheter based therapy) of the life-threatening right heart thrombus remains controversial. Therapeutic recommendations based on small numbers of consecutive patients or retrospective case series have failed to reach a consensus.⁹ Many investigators suggest surgery as the most efficient treatment. Thrombolytic therapy is also recommended as the treatment of choice, with some advantages and potential risks.^{10–11} The percutaneous catheter directed retrieval of clots is a promising possibility, but only four cases have been reported to date.¹² Chartier *et al* reported that there was no significant difference between these therapeutic approaches in terms of in-hospital mortality.¹³

Learning point

Although the thrombus on the tricuspid valve is rarely diagnosed, its possibility should be considered when a mass is found attached to the tricuspid valve. It can be hazardous as it has a propensity to embolise at any time causing dismal prognosis and a high death rate during the first 24 h of diagnosis. Thus, early diagnosis and treatment are crucial for preventing fatal pulmonary embolism.

Competing interests None.

Patient consent Obtained.

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