PRELUDE OF TRAGEDY: ENTRAPPED HUGE THROMBI INTO A PATENT FORAMEN OVALE IMPENDING PARADOXICAL EMBOLISM

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Infrequently, patent foramen ovale or atrial septal defect act as a passage for the venous thrombi to reach the arterial circulation. These arterial thrombi can evoke tragic paradoxical embolisms. We report a case of impending paradoxical embolism due to a huge thrombus trapped through a patent foramen ovale in a 66-year-old man who presented with sudden dyspnea and chest discomfort in ten days after colon cancer surgery. The transthoracic echocardiogram demonstrated signs of acute right ventricular pressure overload and a huge linear mass wedged in a patent foramen ovale. On the intraoperative transesophageal echocardiography, the huge linear mass was freely floating in both right and left cardiac chambers passing through atrial septum. To prevent paradoxical embolism from this thrombus, he underwent emergent embolectomy and about 25 cm sized linear thrombus entrapped PFO was successfully removed.

KEY WORDS : Paradoxical embolism · Patent foramen ovale · Pulmonary thromboembolism.

INTRODUCTION

Patent foramen ovale (PFO) has been identified as potential risk factor for embolic stroke and peripheral embolism presumably because it may act as a conduit through which venous thrombi can reach the arterial system.¹⁻³⁾ We describe a case of acute pulmonary embolism and trapped long thrombus into a PFO impending paradoxical embolism. The patient was successfully treated with an emergency embolectomy and closure of the PFO.

CASE

A 63-year-old man underwent surgery for the treatment of his colon cancer. He suddenly presented a severe dyspnea and chest discomfort on the tenth postoperative day. On physical examination, he was diaphoretic and bilateral jugular veins were engorged. He was hypotensive with a blood pressure of 70/48 mmHg. The pulse rate was 120 beats/min and the respiratory rate was 34/min. The electrocardiogram revealed sinus tachycardia, poor R progression, and T-wave inversions at the whole precordial leads. He was hypoxic with a partial pressure of arterial oxygen of 54 mmHg on room air. The bedside transthoracic echocardiogram revealed enlargement of right cardiac chambers and a D-shaped left ventricular configuration. The systolic pulmonary artery pressure, estimated by continuous wave Doppler tracing of the tricuspid regurgitation, was greater than 60 mmHg. There was a long, worm-like, freely floating mass from the inferior vena cava, the right atrium, and the right ventricular outflow tract which trapped in the atrial septum (Fig. 1A). About 8 cm segment of the opposite tip passing through the atrial septum was freely moving in the left atrium and the left ventricle through the mitral valve. Computed tomography of the chest showed both pulmonary arterial occlusions by the multiple thrombi. The patient had an emergent surgery to remove the cardiac and pulmonary thrombi. The intraoperative transesophageal echocardiogram revealed the same findings like as transthoracic echocardiogram (Fig. 1B). The operative finding showed a 25 cm-long

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Fig. 1. Transthoracic (A) and transesophageal (B) echocardiography revealed a long, worm-like, freely floating mass in both right and left cardiac chambers which was trapped in atrial septum (arrow). This mass was extended to both ventricles crossed atrioventricular valves.

thrombus entrapped into the PFO. This thrombus was successfully removed and the PFO was directly closed (Fig. 2). The pulmonary arterial embolectomy was performed simultaneously and he recovered uneventfully. The microscopic examination revealed fresh thrombi with multifocal organized areas.

DISCUSSION

Embolic stroke, renal infarction, or an acute limb infarction can be occurred as a systemic manifestation of paradoxical embolism usually through the PFO. PFO can be found on autopsy in up to one third of the healthy population.⁴⁾ Embolus usually originates from the thrombus in the veins of the lower extremities and, occasionally, pelvic veins. Thrombus in the lower extremities can be associated with immobilization, hypercoagulable state, or occult malignancy. In our case, the thrombus can be occurred as a consequence of immobilization after the colon cancer surgery. Because right atrial pressure is lower than that of left atrium, embolism through the PFO can occur at the time of pressure reversal across the defect during cough or Valsalva maneuver. However, in case of acute pulmonary embolism like our case, elevated right atrial pressure promote this right to left shunt phenomenon, and can cause systemic embolism more easily. Fortunately, trapping of the huge thrombus by



Fig. 2. A: After the opening of the right atrial wall, we found a huge thrombus trapped at the patent foramen ovale. B: Surgical specimen of the thrombus. The total length was about 25 cm. (PFO: patent foramen ovale, TV: tricuspid valve).

the PFO might protect him from further pulmonary or systemic embolization.

In most cases of paradoxic embolism reported until now, transthoracic and transesophageal echocardiography are main diagnostic tools.⁵⁾ Transthoracic echocardiography can give an assessment for the right ventricular hemodynamics and the pulmonary arterial pressure in the diagnosis of acute pulmonary embolism. Echocardiography can be performed rapidly and easily even at the bedside and is very valuable tool to diagnose acute pulmonary embolism especially in patients with hemodynamic instability. In some cases, echocardiography can demonstrate floating emboli in transit from their origin to pulmonary artery and embolus through the PFO.⁶⁻⁸⁾ Like other cases, transthoracic echocardiography played a major role in the detection of acute pulmonary embolism and potentially lethal thrombi.

In this case, PFO can a route for venous thrombi to the arterial circulation especially in the patient with high embolic risks including immobile state after orthopedic surgeries. Fortunately, prompt echocardiographic exam found the pulmonary thromboembolism and trapped thrombus into the PFO before catastrophic embolization.

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