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Case Report

Trapped thrombus in patent foramen ovale with pulmonary embolism and homonymous paracentral scotoma

Kosuke Ujihira*, Joshua L Hermsen and Satoru Osaki

Division of Cardio-thoracic surgery, Department of Surgery, University of Wisconsin School of Medicine and Public Health, 600 High Land Avenue, Madison, WI 53792, USA

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Abbreviations

PFO: patent fossa ovale

PE: pulmonary embolism

PA: pulmonary artery

LV: left ventricle

CPB: cardiopulmonary bypass

LA: left atrium

ABSTRACT

A 37-year-old female presented with persistent dyspnea and syncope. Computed-tomography scan detected saddle pulmonary embolism, and echocardiogram revealed extensive thrombus crossing the interatrial septum and prolapsing across the mitral valve into the left ventricle. Consequently, the patient was treated with surgical extraction of the thrombus and pulmonary embolectomy.

She was discharged after un-eventful hospital stay save a dark grey spot in her central vision, which was diagnosed as homonymous paracentral scotoma caused by pre-operative cerebral infarction.

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Introduction

Trapped thrombus in a patent fossa ovale (PFO), also referred to as thrombus-in-transit or impending paradoxical embolism, is a rare complication of pulmonary embolism (PE) [1].

The reported short-term mortality rate in this scenario ranges from 14% to 21% therefore, urgent triage and treatment is mandatory [1-3]. Treatment options include anti-coagulation therapy, thrombolysis or surgery. Few studies have examined outcomes for each approach; consequently, the best choice has not been settled and is prone to individual assessment [3, 4].

Case report

A 37-year old female presented to the hospital following an episode of syncope. She reported new and increasing shortness of breath and leg cramps starting 2 weeks prior.

The physical examination was unremarkable except morbid obesity (body mass index; 57 kg/m²). Enhanced CT scan detected saddle PE with extension into bilateral branch pulmonary arteries (PAs). Lower limb Doppler studies revealed near occlusive acute deep vein thrombosis in the right.

*Correspondence to: Kosuke Ujihira, Division of Cardio-thoracic surgery, Department of Surgery University of Wisconsin School of Medicine and Public Health, 600 High Land Avenue, Madison, WI 53792, USA; Tel: 1(608)-440-5615; Fax: 1(608)-263-0547; E-mail: ujihira@surgery.wisc.edu

She was hemodynamically stable; however, transthoracic echocardiogram revealed right ventricular strain and 8-cm long mass inside the cardiac cavity. The highly-mobile mass crossed the interatrial septum and prolapsed across the mitral valve into the left ventricle (LV). This was deemed to be a thrombus-in-transit lodged within the atrial septum, with both atrial components (Figure 1). There was no visible flow across the septum by color flow. The patient was urgently operated within 24hrs of diagnosis. Thrombolytic therapy was not pursued as the patient was judged a very reasonable operative candidate.

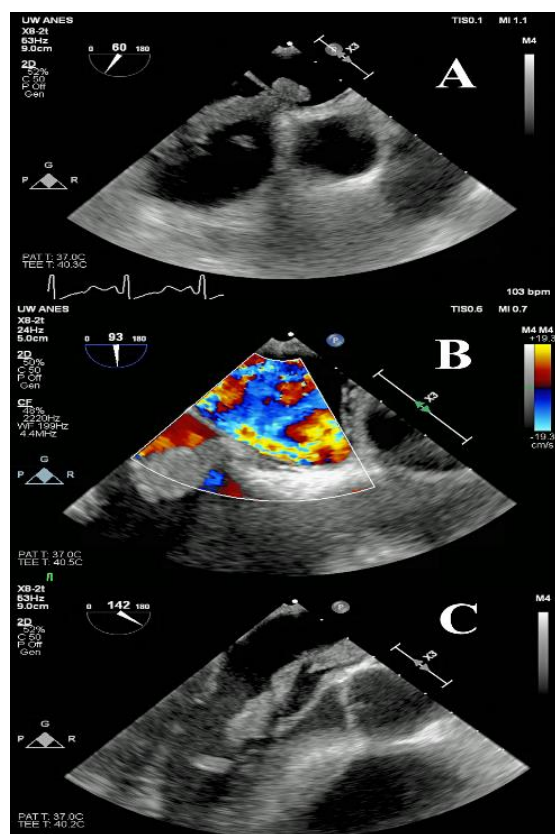


Figure 1: Pre-operative image. Figure 1. (A) Serpentine thrombus trapped in PFO. Interatrial septum was sandwiched between multi-lobular thrombi in both atria. (B) Color flow could not show visible flow across the septum. (C) The thrombus in the left heart was actively mobile, prolapsed across the mitral valve to the LV. Max length of the thrombus was about 8cm from the distal end in superior vena cava to the end in LV.

Procedure and Outcome

The operation was conducted through a median sternotomy, and cardiopulmonary bypass (CPB) was established via a central aortic and bicaval venous cannulation. Cardiac arrest was induced by cold blood cardioplegia, and the right atrium was opened.

There was a large thrombus extending from the superior vena cava, not from the inferior vena cava, to left atrium (LA) though a PFO. The fossa ovale was incised inferiorly starting just beneath the thrombus allowing carefully removal in one piece (Figure 2A). After removal of intracardiac thrombus, PFO was closed directly. Then the main PA was opened, and a large volume of clot removed from both branch arteries.

Embolectomy with a Fogarty catheter was performed to remove distal clots in the lobar arteries. The patient was successfully weaned from CPB on epinephrine at 0.05mcg/kg/min and inhaled nitrous oxide at 40ppm to support right ventricle. Her post-operative course was smooth, and she was discharged on the ninth postoperative day.

Post-operatively she complained of a dark grey spot in her central vision on the right, which she had noticed before admission to the hospital. MRI and examination by an ophthalmologist revealed right homonymous paracentral scotoma, which was attributed to a pre-operative thromboembolic event (Figure 2B). This symptom showed improvement without specific therapy, and at 5 months follow-up her only complaint was related to her vision.

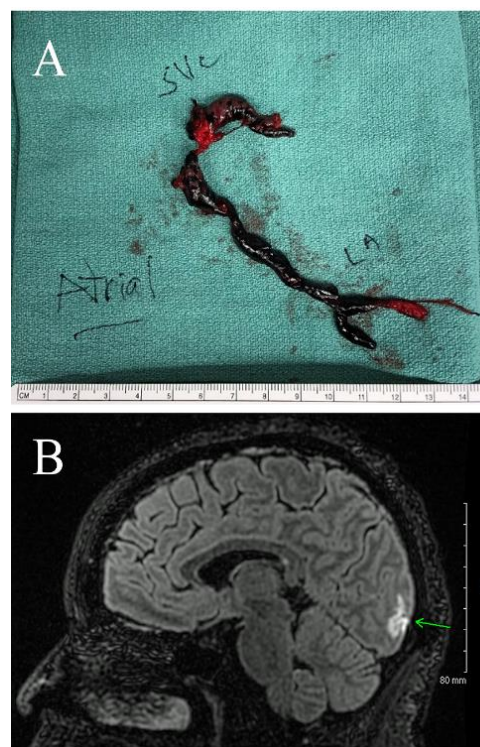


Figure 2: Post-operative images. (A) Histological examination revealed bland thrombi. (B) MRI detected subacute cerebral infarction in the left occipital pole.

Discussion

In recent systematic reviews of the treatment for thrombus-in-transit In recent systematic reviews of the treatment for thrombus-in-transit [3, 4] the benefits of surgery have been described. Surgical thromboembolectomy and PFO closure significantly reduced composite 30-day and 60-day mortality and systemic embolism; overall mortality at 60-day was 13.9% while the rate for surgery (6.3%) compared favorably to that of thrombolysis (35.7%) and anticoagulation alone (18.5%) [3].

These results are difficult to generalize given the rarity of this clinical scenario as well as a wide range of patient comorbidity; therefore, best treatment for individual patients should be made via thorough discussion including all specialties potentially involved. Decisions must be made quickly however, as the mortality following systemic embolization of a

thrombus-in-transit is high, and two-thirds of these patients die within the initial 24hrs following diagnosis [4].

Funding statement and Conflict of interest statement

None.

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