

Paradoxical Embolism: An Unusual Cause of Acute Limb Ischemia

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Abstract: The authors report a clinical case of paradoxical embolism in a 22 years old female patient who has been admitted in hospital with acute left lower limb ischemia. In her previous medical history, we noticed 3 times early miscarriage. While investigating for etiologies, Trans Thoracic Echocardiogram (TTE) showed atrial septal defect (ASD) with right-to-left shunt, thrombus in the right atrium and severe pulmonary stenosis. We performed embolectomy and the patient was transferred to the cardiology unit for pulmonary dilatation before performing surgical ASD repair later.

Keywords: paradoxical embolism - acute ischemia - atrial septal defect - thrombosis.

INTRODUCTION

Paradoxical embolism (PE) is most often defined as the passage of a thrombus from the venous circulation to the arterial circulation by right-to-left shunt through a patent oval foramen (PFO) [10]. In young patients, PFO is often reported as the cause of transient ischemic accident or stroke [2] but is rarely suspected in peripheral vascular ischemia [4]. We report a case of acute ischemia of the left lower limb by paradoxical embolism in a 22-year-old patient with atrial septal defect (ASD) and pulmonary stenosis.

THE CASE

Miss OD is a 22-year-old patient with a previous medical history of 3 early spontaneous miscarriages in whom anti-phospholipid syndrome was suspected without confirmation. She was hospitalized 3 months earlier in cardiology for severe pulmonary stenosis with right ventricle (RV) systolic dysfunction, RV thrombus associated with multiple venous thromboses: left lower limb and brachiocephalic venous thrombosis up to jugular vein. ECG showed extreme sinus tachycardia at 125 bpm and RV hypertrophy. Chest angioCT did not show pulmonary embolism. Then she was given a medical treatment including furosemide, captopril and acenocoumarol. Later she was urgently admitted in our department for acute pain of the left foot rising to the leg; there was edema with trophic disorders in the big toe and the second toe. The clinical examination found a syndrome of the left lower limb acute ischemia as it was pulseless and cold. On cardiac auscultation, there was a systolic murmur at the pulmonic valve area. The rest of the physical examination was normal. Complete blood count was normal; INR was 2.05, prothrombin 36.1% and platelets normal. We could not perform Angio-scan of the aorta so we decided for surgical revascularization. The

common femoral artery was completely blocked by emboli and Fogarty embolectomy yielded to multiple fibro-cruroric thrombi of different ages (Fig. 1) leading to good flow and back flow of both femoral artery and deep artery of the thigh. In the early post-operative course there was a good revascularization of the left lower limb.



Fig-1: blood clots of different ages.

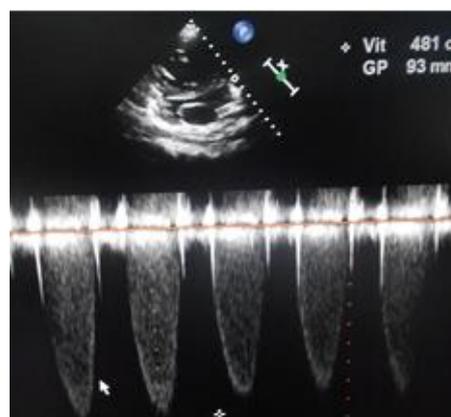


Fig-2: Pulmonary stenosis (mean gradient 93 mm Hg)

However at day 6 after surgery, the worsening of oxygen saturation down to 76% indicated a TTE which confirmed the pulmonary valve stenosis with a right RV – PA mean gradient of 93 mm Hg (Fig. 2) in addition to dilated right cavities with preserved RV systolic function, moderate tricuspid regurgitation, thrombus in the right atrium at the roof of SVC (Fig. 3), and ASD of 24 mm diameter with an exclusive right – to left shunt (Fig. 4). LVEF was decreased to 40%.



Fig-3: thrombus in the right atrium

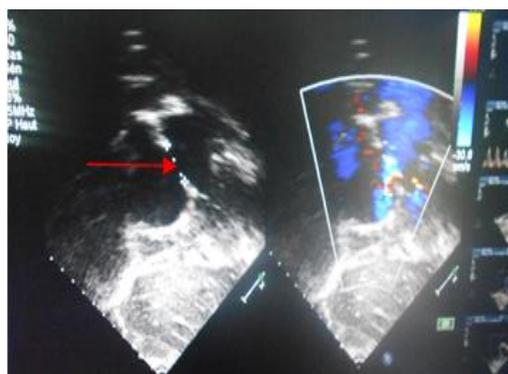


Fig-4: atrial septal defect with right - to - left shunt.

The patient was transferred to cardiology where medical treatment including oxygen was continued. Evolution was good and the patient discharged at month 1 with a plan to undergo pulmonary dilation in cardiology prior surgical repair of the ASD.

DISCUSSION

The PE was first reported by Cohnheim in 1877 [10] who described the path of an embol through a heart septal defect. It accounts for less than 2% of all arterial embolisms [3]. This etiology was not suspected at the admission as the diagnosis of PE is randomly made. In order to facilitate the etiological presumption, Meister [8] proposed four diagnostic criteria: unexplained embolism in arterial territory, venous thrombosis (excluding pulmonary veins), cardiac septal defect and right – to left shunt. Our patient presented all these 4 criteria and the stated the diagnosis. In clinical

practice, diagnosis is facilitated by TOE which is 3 times more sensible than TTE to detect both intra-cardiac thrombi and shunt [1]. Likewise our patient, other authors have reported the association of ASD and severe pulmonary stenosis [5, 12]. In this situation, the risk of PE is increased due to pulmonary hypertension reversing ASD shunt [12]. Arterial embolism in the lower limbs is very rare. According to Juglar *et al.* [6] this location represents 25% of PE cases far less than cerebral localization which is between 37 to 50% of the cases. In our patient and the majority of studies [4, 9-11], the embolus were fibrino-cruroric. Nevertheless, fatty, air or amniotic emboli are described [6]. DVT is not common in young patients. In our patient the anti-phospholipid syndrome was mentioned as the source of thrombosis although specific antibody was not detected [7]. The extent of the embolism outside the left femoral localization could not be developed exhaustively. Similarly, the decrease in left ventricular systolic function observed in our patient is often associated with coronary embolism and indicates coronary angiography or a coronary scan [5, 7]. However, admission ECG showed no evidence of progressive coronary ischemia.

CONCLUSION

Paradoxical embolism represents a small proportion of the etiologies of ischemia of the lower limbs. Nevertheless, in the absence of obvious cause, this diagnosis is to suspect and require seeking for four clinical and echographic criteria.

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