

CASE REPORT

Paradoxical Embolism in Peripheral Ischaemia: Diagnosis of Venous to Arterial Shunting by Transcranial Doppler

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Introduction

Acute upper limb ischaemia is frequently attributed to cardiogenic embolism but no cause can be found in 12–16% of cases.¹ We report acute upper limb ischaemia due to paradoxical embolism in a young woman. The need to adequately investigate and treat young patients with unexplained embolism is discussed.

pain, lasting a few days, several weeks prior to admission. A full thrombophilia screen was normal.

A contrast transcranial Doppler ultrasound (TCD) study² was performed to investigate a venous to arterial circulation shunt (v-aCS) as a cause of paradoxical embolism. TCD detects microscopic bubbles from agitated saline contrast, as high intensity signals, in the

Case Report

A 39-year-old woman was referred with a pale, cold and paraesthetic left forearm and hand. The left brachial and radial pulses were weak and the ulnar pulse absent. Arch angiography confirmed occlusion of the brachial bifurcation with refilling of the radial artery (Fig. 1). The subclavian, axillary and brachial arteries were otherwise normal. Brachial artery embolectomy retrieved fresh thrombus with restoration of the radial and ulnar pulses and resolution of the presenting symptoms. The patient was then anticoagulated with Heparin.

A postoperative transthoracic echocardiogram (TTE) was normal, no patent foramen ovale (PFO), atrial or ventricular septal defect was seen. A 24 h ECG showed periods of bradycardia consistent with a high level of physical fitness. Lower limb venous duplex identified left tibioperoneal and distal peroneal vein thrombosis. On direct questioning the patient admitted left calf

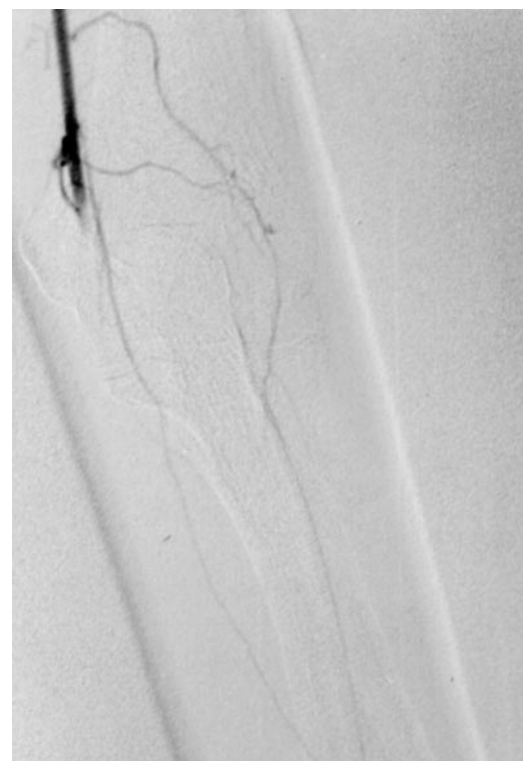


Fig. 1. Left arch angiogram showing brachial artery occlusion.

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middle cerebral artery after injection into an antecubital vein, if a v-aCS is present. This test was strongly positive with over 100 embolic signals detected in both middle cerebral arteries within 12 cardiac cycles. A transoesophageal echocardiogram (TOE) confirmed the presence of an 11 mm PFO.

The patient was anticoagulated with Warfarin and subsequently underwent percutaneous PFO closure using an Amplatzer PFO occluder device (AGA Medical Corp., Golden Valley, MN U.S.A.) without complication.

Discussion

Acute arterial embolism is routinely investigated by TTE but sensitivity for PFO detection is poor when compared with TCD or TOE.² TCD offers a simple, sensitive and non-invasive investigation for PFO³ with the added advantage that other v-aCS such as pulmonary arterio-venous shunts can be detected. PFOs are common, present in up to 35% of the adult population.⁴ Either TOE or the relatively non-invasive TCD technique are essential for the diagnosis of a v-aCS. Our patient would have remained at risk of paradoxical embolisation, which could manifest as stroke in the future, had this investigation not been performed.

Percutaneous PFO closure carries little morbidity and is a viable alternative to surgical closure or

lifelong anticoagulation in young women of childbearing age.⁵ Our patient elected to undergo PFO closure after private internet research and discussion with a Consultant Cardiologist. The patent foramen ovale and cryptogenic embolism trial (PC trial: www.amplatzer.com/physician/pfo/pctrial.html) is a multi-centre randomised clinical trial, currently recruiting such patients, which will hopefully show whether or not percutaneous PFO closure is superior to anticoagulation in paradoxical embolism.

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