

Cardiac Imaging

The Natural History of a Penetrating Atherosclerotic Ulcer at the Aortic Arch

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A 75-year-old male with known history of hypertension, hypercholesterolaemia, and smoking underwent percutaneous transluminal coronary angioplasty with stent implantation in the left anterior descending artery two years ago. Recently, he had a transthoracic echocardiographic study during which the ascending aorta was measured at 45 mm. He was advised to have a transoesophageal echocardiographic study (TEE).

TEE revealed a crater-like out-pouching lesion on the inferior part of the aortic wall in the distal part of the aortic arch (Figures A1, B1), indicative of a penetrating atherosclerotic ulcer (PAU) with retrograde flow within it identified by colour Doppler. We then applied magnetic resonance imaging with contrast infusion, the gold standard method for identifying any pathology of the aorta. This ruled out any true aortic dissection and confirmed the diagnosis of a small PAU with no intramural haematoma (Figures C1, D1). As the patient was completely asymptomatic and stable, and the PAU was found by accident (chronic lesion), we adopted a conservative strategy. We decided to follow our patient with TEE every three months as it is the cheaper and faster method. More-

over, in this case the two methods resulted in similar findings.

Our patient remained asymptomatic during the next 6 months and neither TEE (Figures A2, B2) nor repeat magnetic resonance imaging (Figures C2, D2) revealed any significant change in the PAU. Growth of an atherosclerotic plaque at the distal edge of the ulcer was identified with TEE (yellow arrows in figures A2 and B2).

PAU has been considered as a type of aortic dissection without an intimal flap.¹ According to the relevant classification proposed,¹ PAU is a class 4 aortic dissection. The natural history, the prognosis^{2,3} and the ideal management of a PAU⁴ in the aortic arch are a matter of controversy. In most cases, the rupture of an atherosclerotic plaque may lead to aortic ulcerations, or penetrating aortic atherosclerotic ulcer with surrounding haematoma, usually subadventitial. From this case we can conclude that in stable patients PAU in the aortic arch may have a favourable short term prognosis, especially when not accompanied by an intramural haematoma.⁵ Although magnetic resonance angiography is the gold standard method, in such patients TEE can contribute reliably to the follow up of PAU in the aortic arch.

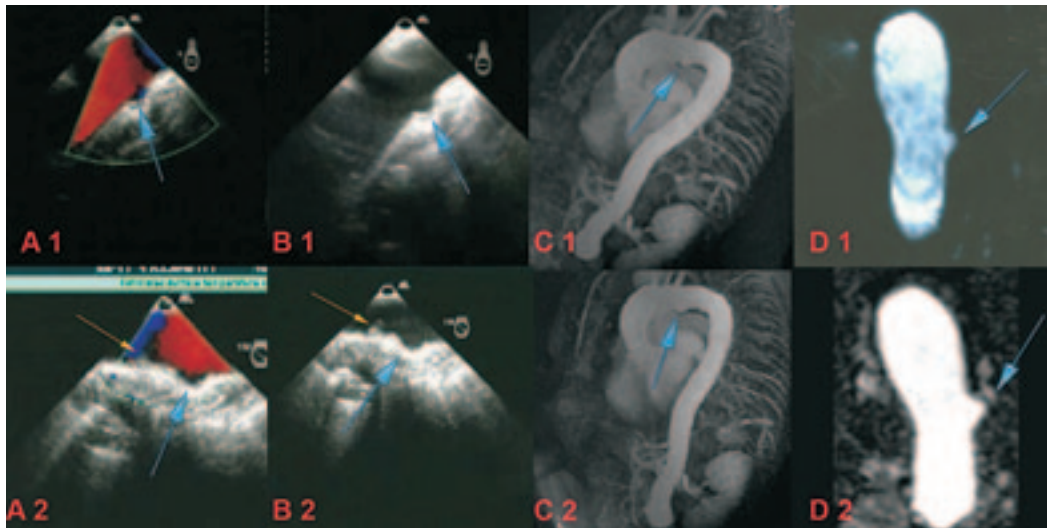


Figure A1. Transoesophageal echocardiography (TEE) with colour Doppler at the aortic arch revealed an atherosclerotic ulcer with retrograde flow within it (small blue-coloured flow at the distal part of the lesion). **B1.** TEE at the aortic arch revealed an atherosclerotic ulcer. **C1.** Magnetic resonance angiography of the aorta, modified longitudinal view: an atherosclerotic ulcer in the distal part of the aortic arch. **D1.** Magnetic resonance angiography of the arch, transverse view: an atherosclerotic ulcer. **A2** and **B2.** Six months later, TEE revealed no significant changes in the dimensions of the atherosclerotic ulcer. Only the growth of an atherosclerotic plaque at the distal edge of the ulcer was identified (yellow arrow). **C2** and **D2.** Six months later, magnetic resonance angiography of the aorta and the arch showed no significant change in the atherosclerotic ulcer.

References

1. Erbel R, Alfonso F, Boileau C, et al: Diagnosis and management of aortic dissection. Recommendations of the task force on aortic dissection, European Society of Cardiology. *Eur Heart J* 2001; 22: 1642-1681.
2. Tittle S, Lynch R, Cole P, et al: Midterm follow up of penetrating ulcer and intramural hematoma of the aorta. *J Thorac Cardiovasc Surg* 2002; 123: 1051-9.
3. Cho KR, Stanson AW, Potter DD, et al: Penetrating atherosclerotic ulcer of the descending thoracic aorta and arch. *J Thorac Cardiovasc Surg* 2004; 127: 1393-1401.
4. Xu SD, Li ZZ, Huang FJ, et al: Treating aortic dissection and penetrating aortic ulcer with stent graft: thirty cases. *Ann Thorac Surg* 2005; 80: 864-869.
5. Ganaha F, Miller C, Sugimoto K, et al: Prognosis of aortic intramural hematoma with and without penetrating atherosclerotic ulcer: a clinical and radiological analysis. *Circulation* 2002; 106: 342-348.
6. Vilacosta I, San Roman JA, Aragoncillo P, et al: Penetrating atherosclerotic aortic ulcer: documentation by transoesophageal echocardiography. *J Am Coll Cardiol* 1998; 32: 83-89.