

Pedunculated left ventricular thrombus – report of two cases

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Summary: In two patients presenting with myocardial infarction, one with a subendocardial infarction and the second patient with a classic Q wave infarction, pedunculated left ventricular thrombi were detected in the course of subsequent routine cardiac catheterization. Both patients underwent successful surgical thrombectomy.

Introduction

Left ventricular thrombus formation is common following myocardial infarction and in association with dilated cardiomyopathy and left ventricular aneurysm. The vast majority of these thrombi are sessile and fixed and therefore have a low tendency for embolisation into the systemic circulation. Narrow based or pedunculated thrombi that are freely mobile in the ventricular cavity are comparatively rare. Such thrombi, by virtue of their high propensity for distal embolisation, are of greater importance. Optimal therapeutic strategies remain undefined. Previous published reports have mainly dealt with the detection and management of these cases after distal embolisation had occurred. We report our experience with two cases of pedunculated thrombi discovered in the course of routine cardiac catheterization.

Case reports

Case 1

A 63 year old woman presented with ischaemic cardiac type chest pain. Physical examination was unremarkable with sinus rhythm and blood pressure of 110/70 mmHg. Serial electrocardiography showed a pattern of deep T wave inversion in standard levels 1 and aVL and chest leads V2 to V6, cardiac enzymes suggested a myocardial infarction. Blood count, clotting screen and renal biochemistry were normal. A diagnosis of subendocardial myocardial infarction was made.

Cardiac catheterization was undertaken 2 weeks following her presentation. Left ventricular cine angiography revealed normal systolic left ventricular function. A pedunculated mass was seen attached to the apex of the left ventricle and wavering about in the left ventricular cavity (Figure 1). The coronary arteries were normal. Two dimensional echocardiography corroborated the angiographic findings. In view of the pedunculated nature of the mass and potential for embolisation, she was referred for its surgical removal.

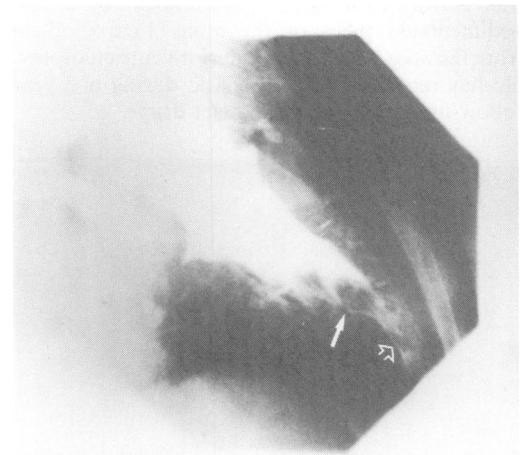


Figure 1 A systolic frame of the left ventricular angiogram obtained 2 weeks following presentation in case 1. A pedunculated mass is seen attached to the apex of the left ventricle (open arrow) and protrudes into the left ventricular cavity (closed arrow).

At operation, the myocardium looked completely healthy. Through a transverse incision in the anterior wall of the left ventricle, an elongated piece of thrombus 1 cm in diameter with a 2.5 cm long stalk firmly attached to the septum close to the apex was removed. Anticoagulants and aspirin were withheld in view of a history of recurrent peptic ulceration. The patient has remained well over a 5-year period of follow-up without any embolic events or echocardiographic evidence for recurrence of thrombus formation.

Case 2

A 56 year old male presented with a 4-week history of unstable angina. Electrocardiogram showed changes consistent with a recent Q wave anterior myocardial infarction. He was mildly hypertensive – BP 140/95 mmHg, in sinus rhythm without heart failure. A subsequent exercise test was positive after only 4 minutes and he therefore underwent coronary angiography 4 weeks after presentation. Left ventricular cineangiography revealed antero-apical akinesia with good inferior, posterior and basal contraction. A mobile pedunculated thrombus was visible attached to the apex close to the interventricular septum. He had two vessel coronary artery disease with subtotal occlusion of the proximal left anterior descending artery and moderate stenosis in the proximal right coronary artery. Two dimensional echocardiographic appearances of the left ventricular mass concurred with those at angiography (Figure 2).

At surgery, the external appearances of the heart did not suggest a transmural infarct. There was no aneurysm formation. Coronary bypass grafting was performed followed by removal of a soft pedunculated piece of thrombus 1 cm × 1.5 cm from the apex through an anterior ventriculotomy. He has remained asymptomatic during a 2 year follow-up period on antiplatelet drugs.

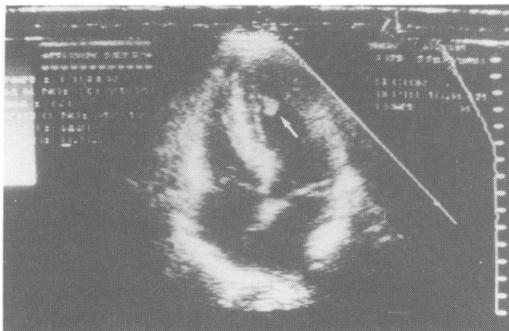


Figure 2 Two dimensional echocardiogram of patient 2 displaying the apical four chamber view. A discrete pedunculated mass is apparent arising from the apico-septal region of the left ventricle (arrow).

Discussion

Although left ventricular thrombus formation is a common echocardiographic and autopsy finding following acute myocardial infarction,¹ discrete pedunculated thrombi that are freely mobile in the left ventricular cavity are rarely encountered. Reports in the literature are sporadic^{2,3} and primarily concern cases where the diagnosis was made after a systemic embolic episode. We report here two patients in whom such thrombi were detected during routine cardiac catheterization. In both cases, surgical thrombectomy was sought in view of their highly mobile nature and potential for major distal embolisation.

The acute inflammatory changes that occur in the course of the reparative process of acute myocardial infarction forms a nidus for mural thrombus formation.^{4,5} In the cardiomyopathic ventricle, on the other hand, the mode of thrombogenesis would appear to be different; encouraged by a chronic low flow state and strands of endocardial fibrosis. In both situations, thrombus formation covers a wide area of the endocardial surface in the majority of cases. The exact mode of genesis of the pedunculated variety where a discrete mass of thrombus is firmly connected by a long stalk to the ventricular wall or septum, is not known. Kessler *et al.* suggested partial detachment of a poorly organized mural thrombus as the likely mechanism.³ Layering of thrombus on a small area of endocardial ischaemia or infarction is an alternate possibility.

Most prospective echocardiographic studies addressing embolic potential of left ventricular thrombi have identified 'protrusion' and 'mobility' as high risk for subsequent embolism.⁶ None of these studies particularly refer to the pedunculated type of thrombus. Information on outcome in patients, where such thrombi were elected to be treated conservatively, is afforded by Hartman *et al.*⁷ All of 4 patients who had pedunculated thrombi on diagnostic angiography but who did not have thrombectomy during subsequent coronary bypass grafting, suffered systemic embolism. There is, therefore, little doubt that detection of a pedunculated thrombus merits urgent therapeutic intervention.

The optimum therapeutic modality, however, remains unclear. Conventional anticoagulation with heparin and warfarin have been shown to hasten the regression of left ventricular thrombi,⁵ and may have a similar effect on the pedunculated variety. However, the time course for achieving effective dissolution with conventional anticoagulation is too long to leave a patient exposed to the potential devastating effect of a major embolism. Thrombolytic therapy is a valid option for patients in whom a recent cardiac event (less than 4 weeks

old in a series by Kremer *et al.*) is responsible for the thrombosis.⁸ Surgical removal of such thrombi is easily achieved and is clearly the treatment of choice where associated coronary artery disease warrants aorto-coronary bypass surgery. The small apical left ventriculotomy entailed in surgical thrombectomy has little effect on long term ventricular function. Risks of surgical thrombectomy would be expected to be the same as for any cardiopulmonary bypass procedure, i.e. 1% mortality, but are largely dependent on the severity of associated coronary disease and extent of left ventricular dysfunction. A meaningful randomized trial of surgical removal versus thrombolytics in the treatment of pedunculated left ventricular thrombi is unlikely to be achieved in view of the extreme rarity of the condition. Recurrence of thrombosis or embolism following surgical thrombectomy is rare – of 12 cases reported in the literature, recurrent embolism has been documented in only one

patient.⁹

Given the high sensitivity of two dimensional echocardiography for detection of left ventricular thrombi,⁶ both cases in this report would have been identified prior to the invasive investigations had these patients undergone echocardiographic studies in the post infarction period. At present, there is no uniform agreement regarding the value of routine echocardiographic examination in patients with acute myocardial infarction. Our data offer support for such a policy although the financial implications are substantial. Although the limited experience in the present report cannot be used to draw any definitive conclusions regarding the optimum management of pedunculated thrombus, it adds to the meagre information that exists in the literature on these morphologically unique thrombi whose echocardiographic appearance is quite often disconcerting to the physician.

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