- 17 **Watanabe J**, Levine MJ, Bellotto F, *et al*. Left ventricular diastolic chamber stiffness and intramyocardial coronary capacitance in isolated dog hearts. *Circulation* 1993;**88**:2929–40.
- 18 **Domenech RJ**. Regional diastolic coronary blood flow during diastolic ventricular hypertension. *Cardiovasc Res* 1978;**12**:639–45.
- 19 **Jeremy RW**, Hughes CF, Fletcher PJ. Effects of left ventricular diastolic pressure on the pressure–flow relation of the coronary circulation during physiological vasodilatation. *Cardiovasc Res* 1986;**20**:922–30.
- 20 **Resar J**, Livingston JZ, Halperin HR, *et al*. Effect of wall stretch on coronary hemodynamics in isolated canine interventricular septum. *Am J Physiol* 1990;**259**:H1869–80.
- 21 **Daher E**, Dione DP, Heller EN, *et al*. Acute ischemic dysfunction alters coronary flow reserve in remote nonischemic regions: potential mechanical etiology identified in an acute canine model. *J Nucl Cardiol* 2000;**7**:112–22.
- 22 **Joye JD**, Lasorda D, Farah T, *et al*. Coronary flow reserve in non-infarct related arteries in patients with acute myocardial infarction: relationship to infarct size [abstract]. *Circulation* 1996;**94**:I–22.
- 23 **Haas F**, Nguyen N, Schad H, *et al*. Effect on coronary artery flow reserve and resistance in the remote area after acute coronary artery occlusion in the pig model. *J Nucl Cardiol* 1999;**6**:507–13.
- 24 **Pizzuto F**, Voci P, Mariano E, *et al*. Coronary flow reserve of the angiographically normal left anterior descending coronary artery in patients with remote coronary artery disease. *Am J Cardiol* 2004;**94**:577–82.
- 25 **Shimada K**, Sakanoue Y, Kobayashi Y, *et al*. Assessment of myocardial viability using coronary zero flow pressure after successful angioplasty in patients with acute anterior myocardial infarction. *Heart* 2003;**89**:71–6.
- 26 **Moon JC**, De Arenaza DP, Elkington AG, *et al*. The pathologic basis of Q-wave and non-Q-wave myocardial infarction: a cardiovascular magnetic resonance study. *J Am Coll Cardiol* 2004;**44**:554–60.

IMAGES IN CARDIOLOGY

doi: 10.1136/hrt.2006.097063

Vascular tumour blush of cardiac angiosarcoma on coronary angiography

A 27-year-old woman presented with progressive dyspnoea, orthopnoea, left-sided pleuritic chest pain (improved on upright posture), 20 mm of pulsus paradoxus, distant heart sounds, and impending pericardial tamponade (confirmed on two-dimensional echocardiogram). One litre of bloody fluid was removed by pericardiocentesis.

A two-dimensional Doppler echocardiogram and transoesophageal echocardiogram demonstrated a 5 cm right atrial mass laminating the lateral and posterior walls of the atrium. A coronary angiogram showed normal coronaries, ejection fraction of 60%, and tumour blush with arterial supply from a right atrial branch and from the mid to distal right coronary artery in a retrograde fashion (see panel and supplementary video). The patient underwent mediastinotomy with biopsy of the lesion that disclosed an angiosarcoma.

Only one in four of all primary cardiac tumours is malignant, and angiosarcomas constitute about a third of these. Fewer than 200 published cases have been reported. Diagnosis in the past was made usually on necropsy. Use of transthoracic echocardiography, transoesophageal echocardiography, CT and magnetic resonance imaging has facilitated increasing diagnosis before death. Most patients present with right-sided heart failure or cardiac tamponade. Pericardiocentesis yields bloody fluid that often does not contain malignant cells even when the tumour has invaded the pericardium, and biopsy may be necessary for definitive diagnosis. Metastasis is usually present at the time of presentation. Extensive surgical resection with adjunctive multimodal treatment, including combination chemotherapy with dacarbazine, doxorubicin, ifosfamide, and cyclophosphamide and radiation, may lead to long-term survival.

To view video footage visit the *Heart* website—<http://heart.bmj.com/supplemental>

A K Malani, M Hindupur, C Gupta
drmalani@yahoo.com