13 **Ueno Y**, Nakamura Y, Kinoshita M, *et al.* Can coronary flow velocity reserve determined by transthoracic Doppler echocardiography predict the recovery of regional left ventricular function in patients with acute myocardial infarction? *Heart* 2002;**88**:137–41.
14 **Rigo F**, Varga Z, Di Pede F, *et al.* Early assessment of coronary flow reserve by transthoracic Doppler echocardiography predicts late remodeling in reperfused anterior myocardial infarction. *J Am Soc Echocardiogr* 2004;**17**:750–5.
15 **Rochitte CE**, Lima JA, Bluemke DA, *et al.* Magnitude and time course of microvascular obstruction and tissue injury after acute myocardial infarction. *Circulation* 1998;**98**:1006–14.
16 **Wu KC**, Kim RJ, Bluemke DA, *et al.* Quantification and time course of microvascular obstruction by contrast-enhanced echocardiography and magnetic resonance imaging following acute myocardial infarction and reperfusion. *J Am Coll Cardiol* 1998;**32**:1756–64.
17 **Schiller NB**, Shah PM, Crawford M, *et al.* Recommendations for quantitation of the left ventricle by two-dimensional echocardiography. American Society of Echocardiography Committee on Standards, Subcommittee on Quantitation of Two-Dimensional Echocardiograms. *J Am Soc Echocardiogr* 1989;**2**:358–67.
18 **Ito H**, Tomooka T, Sakai N, *et al.* Lack of myocardial perfusion immediately after successful thrombolysis: a predictor of poor recovery of left ventricular function in anterior myocardial infarction. *Circulation* 1992;**85**:1699–705.
19 **Caiati C**, Montaldo C, Zedda N, *et al.* New noninvasive method for coronary flow reserve assessment: contrast-enhanced transthoracic second harmonic echo Doppler. *Circulation* 1999;**99**:771–8.
20 **Caiati C**, Montaldo C, Zedda N, *et al.* Validation of a new noninvasive method (contrast enhanced transthoracic second harmonic echo Doppler) for the evaluation of coronary flow reserve: comparison with intracoronary Doppler flow wire. *J Am Coll Cardiol* 1999;**34**:1193–200.
21 **Colonna P**, Cadeddu C, Chen L, *et al.* Clinical applications of contrast echocardiography. *Am Heart J* 2001;**141**:S36–44.
22 **Heinle SK**, Noblin J, Goree-Best P, *et al.* Assessment of myocardial perfusion by harmonic power Doppler imaging at rest and during adenosine stress: comparison with (99m)Tc-sestamibi SPECT imaging. *Circulation* 2000;**102**:55–60.
23 **Smart SC**, Sawada S, Ryan T, *et al.* Low-dose dobutamine echocardiography detects reversible dysfunction after thrombolytic therapy of acute myocardial infarction. *Circulation* 1993;**88**:405–15.
24 **Ishihara M**, Sato H, Tateishi H, *et al.* Time course of impaired coronary flow reserve after reperfusion in patients with acute myocardial infarction. *Am J Cardiol* 1996;**78**:1103–8.
25 **Villanueva FS**, Glasheen WP, Sklenar J, *et al.* Characterization of spatial patterns of flow within the reperfused myocardium by myocardial contrast echocardiography: implications in determining extent of myocardial salvage. *Circulation* 1993;**88**:2596–606.
26 **Claeys MJ**, Vrints CJ, Bosmans J, *et al.* Coronary flow reserve during coronary angioplasty in patients with a recent myocardial infarction: relation to stenosis and myocardial viability. *J Am Coll Cardiol* 1996;**28**:1712–9.
27 **Kloner RA**, Ganate CE, Jennings RB. The ''no reflow'' phenomenon after temporary occlusion in the dog. *J Clin Invest* 1974;**54**:1496–508.
28 **Kaul S**, Senior R, Dittrich H, *et al.* Detection of coronary artery disease with myocardial contrast echocardiography: comparison with 99mTc-sestamibi single-photon emission computed tomography. *Circulation* 1997;**96**:785–92.
29 **Villanueva FS**, Camarano G, Ismail S, *et al.* Coronary reserve abnormalities in the infracted myocardium: assessment of myocardial viability immediately versus late after reflow by contrast echocardiography. *Circulation* 1996;**94**:748–54.
30 **Janardhanan R**, Swinburn JM, Greaves K, *et al.* Usefulness of myocardial contrast echocardiography using low-power continuous imaging early after acute myocardial infarction to predict late functional left ventricular recovery. *Am J Cardiol* 2003;**92**:493–7.

IMAGES IN CARDIOLOGY

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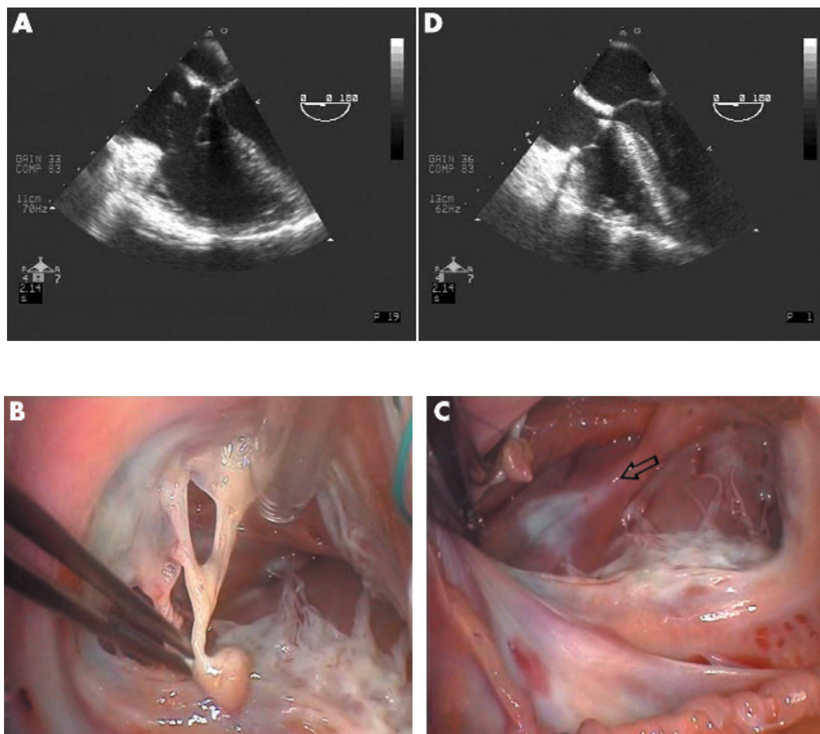
Traumatic tricuspid insufficiency

A 19 year old man sustained a blunt thoracic trauma in a high velocity accident. Initial examination revealed severe thoracic injuries with bilateral haemopneumothorax, pulmonary contusion and postero-inferior mediastinal haematoma without oesophageal perforation. An ECG demonstrated right bundle branch block. Transoesophageal echocardiography revealed severe tricuspid valve insufficiency with complete prolapse of the anterior valve leaflet in the right atrium (panel A). Because of good haemodynamic tolerance, surgical correction was deferred until resolution of associated thoracic injuries.



The patient was operated on six weeks later, and a complete transection of the base of the anterior papillary muscle was demonstrated (panel B). In addition significant annular dilatation had developed. No leaflet or chordal lesions were noted. Surgical correction was performed by papillary muscle reimplantation, which was facilitated by the existence of a fibrotic scar marking the native implantation site on the anterior wall of the right ventricle (panel C, arrow). Annular dilatation was corrected by implantation of an annuloplasty ring.

Postoperative transoesophageal echocardiography showed satisfactory leaflet coaptation and only trivial residual valvular regurgitation (panel D). Subsequent patient recovery was uneventful.

C Radu
E Vermes
M Kirsch
ncostin.radu@gmail.com