

- angina and non-Q-wave myocardial infarction: results of the TIMI IIIB trial. *Circulation* 1994;**89**:1545-56.
- 14 **Boden WE**, O'Rourke RA, Crawford MH, *et al*. Outcomes in patients with acute non-Q-wave myocardial infarction randomly assigned to an invasive as compared with a conservative management strategy. *N Engl J Med* 1998;**338**:1785-92.
 - 15 **FRISC II Investigators**. Invasive compared with non-invasive treatment in unstable coronary-artery disease: FRISC II prospective randomised multicentre study. *Lancet* 1999;**354**:708-15.
 - 16 **McCullough PA**, O'Neill WW, Graham M, *et al*. A prospective randomized trial of triage angiography in acute coronary syndromes ineligible for thrombolytic therapy: results of the medicine versus angiography in thrombolytic exclusion (MATE) trial. *J Am Coll Cardiol* 1998;**32**:596-605.
 - 17 **Fox K**, Poole-Wilson P, Henderson R, *et al*. Interventional versus conservative treatment for patients with unstable angina or non-ST-elevation myocardial infarction: the British Heart Foundation RITA 3 randomised trial. *Lancet* 2002;**360**:743-51.
 - 18 **Michalis LK**, Stroumbis CS, Pappas K, *et al*. Treatment of refractory unstable angina in geographically isolated areas without cardiac surgery. Invasive versus conservative strategy (TRUCS study). *Eur Heart J* 2000;**21**:1954-9.
 - 19 **Spacek R**, Widimsky P, Straka Z, *et al*. Value of first day angiography/angioplasty in evolving non-ST segment elevation myocardial infarction: an open multicenter randomized trial. The VINO study. *Eur Heart J* 2002;**23**:230-8.
 - 20 **Wallentin L**, Lagerqvist B, Husted S, *et al*. Outcome at 1 year after an invasive compared with a non-invasive strategy in unstable coronary-artery disease: the FRISC II invasive randomised trial. *Lancet* 2000;**356**:9-16.
 - 21 **PRISM Study Investigators**. A comparison of aspirin plus tirofiban with aspirin plus heparin for unstable angina. *N Engl J Med* 1998;**338**:1498-505.
 - 22 **Braunwald E**. Unstable angina: a classification. *Circulation* 1989;**80**:410-14.
 - 23 **French JK**, Scott DS, Whitlock RML, *et al*. Late outcome after coronary artery bypass grafting in patients aged <40 years. *Circulation* 1995;**92**(suppl):II-14-19.
 - 24 **Solomon DH**, Stone PH, Glynn RJ, *et al*. Use of risk stratification to identify patients with unstable angina likeliest to benefit from an invasive versus conservative management strategy. *J Am Coll Cardiol* 2001;**38**:969-76.
 - 25 **Cohen M**, Hawkins L, Greenberg S, *et al*. Usefulness of ST-segment changes in greater than or equal to 2 leads on the emergency room electrocardiogram in either unstable angina pectoris or non-Q-wave myocardial infarction in predicting outcome. *Am J Cardiol* 1991;**67**:1368-73.
 - 26 **Yusuf S**, Zucker D, Peduzzi P, *et al*. Effect of coronary artery bypass graft surgery on survival: overview of 10-year results from randomised trials by the coronary artery bypass graft surgery trialists collaboration. *Lancet* 1994;**344**:563-70.
 - 27 **Mathew V**, Farkouh ME, Gersh BJ, *et al*. Early coronary angiography improves long-term survival in unstable angina. *Am Heart J* 2001;**142**:768-74.
 - 28 **Hamm CW**, Ravkilde J, Gerhardt W, *et al*. The prognostic value of serum troponin T in unstable angina. *N Engl J Med* 1992;**327**:146-50.
 - 29 **Stubbs P**, Collinson P, Moseley D, *et al*. Prospective study of the role of cardiac troponin T in patients admitted with unstable angina. *BMJ* 1996;**313**:262-4.
 - 30 **Newby LK**, Christenson RH, Ohman EM, *et al*. Value of serial troponin T measures for early and late risk stratification in patients with acute coronary syndromes. *Circulation* 1998;**98**:1853-9.
 - 31 **Heeschen C**, Hamm CW, Goldmann B, *et al*. Troponin concentrations for stratification of patients with acute coronary syndromes in relation to therapeutic efficacy of tirofiban. *Lancet* 1999;**354**:1757-62.

IMAGES IN CARDIOLOGY

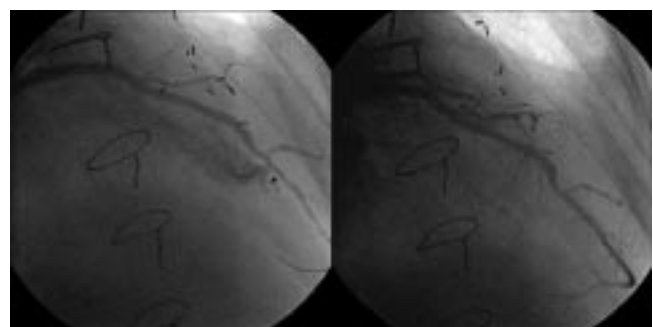
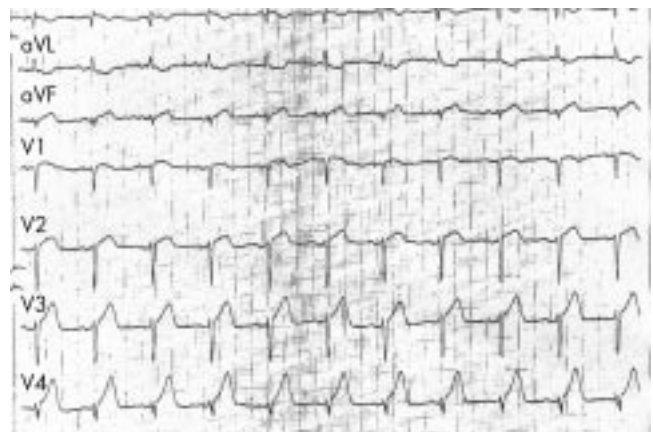
Acquired coronary artery fistula leading to acute myocardial infarction after endomyocardial biopsy

A 55 year old man with type A aortic dissection underwent an emergency Bentall operation in 1995. Intraoperatively, he developed myocardial infarction. This resulted in progressive heart failure, eventually requiring heart transplantation in January 2002. The transplantation was successful and uncomplicated.

He was admitted for routine endomyocardial biopsy on 11 March 2002. A total of six biopsy fragments were removed and the patient was stable during the procedure. He experienced chest pain two hours later. A 12 lead ECG showed new onset ST segment elevation of 2 mm over the precordial leads (V2-V4) (upper panel), compatible with a diagnosis of anterior myocardial infarction. A coronary angiogram revealed the presence of a large fistula draining from the distal part of the left anterior descending coronary artery to the right ventricle (lower left panel). No significant stenosis or other abnormalities were observed elsewhere in the coronary system. A PTFE covered stent 3.0 × 12 mm (Jostent Coronary Stent Graft, Jomed, Germany) was percutaneously deployed and completely sealed off the fistula (lower right panel).

Cardiac enzymes were raised and peaked at 1549 IU/l (creatin kinase (CK) normal < 103 IU/l), 211 IU/l (CK-MB normal < 24 IU/L), and 4.24 ng/ml (troponin T). Two dimensional echocardiogram showed a newly developed apical and distal septal hypokinesia. There was no pericardial effusion. In-hospital outcome was uneventful and the patient was discharged two days later.

This case shows that an acute myocardial infarction caused by coronary steal phenomenon resulting from a coronary fistula can be a potentially serious complication during endomyocardial biopsy. Percutaneous implantation of a PTFE covered stent seems an effective treatment.



C H Lee
P A Lemos
P W Serruys
serruys@card.azr.nl