EMERGENCY CASEBOOK

A mimicry of an acute coronary syndrome

Bervin Teo

Emerg Med J 2007;24:e25 (<http://www.emjonline.com/cgi/content/full/24/4/e25>). doi: 10.1136/emj.2006.044891

Background: A 79-year-old woman was out in the garden having lunch on a hot summer's day. She developed stabbing chest pains more severe on her left side, associated with radiation down her left arm. Severity was 7 out of 10. There was no relief of pain with glyceryl trinitrate spray. Risk factors for ischaemic heart disease include hyperlipidaemia, being an ex-smoker 40 years ago, no history of diabetes or hypertension. There was a family history of her father having a myocardial infarction at the age of 54. ECG revealed widespread deep symmetrical T-wave inversion in the chest leads and lateral limb leads.

Investigations: The patient's serum creatine kinase level was 180 IU/l (normal range 30–135), troponin I level was 6.56 g/l (normal range 0–0.10), D-dimer was negative and random serum cholesterol level was 5.3 mmol/l (3.8–5.2). Significant coronary stenoses were excluded. A left ventriculogram revealed a hyperkinetic base and a dyskinetic apical region of the left ventricle. Echocardiography showed normal valves, basal septal hypertrophy and a dilated akinetic apex, with the region of akinesia spanning more than the arterial territory.

Diagnosis: Takotsubo cardiomyopathy.

Management: Treatment with aspirin, ACE inhibitor, β blocker and a statin.

A 79-year-old woman presented to the accident and emergency department with acute left-sided stabbing chest pain, associated with an aching left arm and sweating. There was no radiation to any other areas, and she perceived the severity to be 7 out of 10. The pain was not relieved by glyceryl trinitrate spray given by the ambulance crew. She did not have heartburn. Risk factors for ischaemic heart disease include hyperlipidaemia, being an ex-smoker 40 years ago, no history of diabetes or hypertension. There was a family history of her father having a myocardial infarction at the age of 54. Her medications included atorvastatin 30 mg every night, calcium and vitamin D tablets and alendronate once a week. She is allergic to zinc oxide and penicillin.

On presentation, the patient was afebrile, with a blood pressure of 137/93 mm Hg, and a regular pulse of 70 beats per min, a respiratory rate of 18 breaths per min with saturations of 100% on high-flow oxygen. Jugular venous pressure was not increased. Mild pitting oedema of her lower extremities was noted. Her lungs were clear on auscultation. Abdominal examination was unremarkable. Blood investigations revealed an increased level of troponin I of 6.56 μ g/l (normal range 0–0.10), creatine phosphokinase of 180 IU/l (normal range 30–135) and a white cell count of $14.2 \times 10^9/l$ (normal range 4.0–11.0).

ECG was normal on admission. But subsequent ECGs revealed widespread symmetrical and broad T-wave inversion (fig 1).

She was started on 300 mg aspirin and 300 mg clopidogrel orally. She was also given 70 mg enoxaparin subcutaneously.

Cardiac catheterisation revealed a slightly irregular left coronary artery with no significant obstruction and a large dominant unobstructed right coronary artery. The left ventricle had a large symmetrical apical akinetic region.

Echocardiogram revealed a normal left atrium, right atrium and right ventricle. The left ventricular apex and apical septum is hypokinetic and has an aneurysmal appearance, although it is hypokinetic rather than dyskinetic/akinetic (fig 2). There was basal septal hypertrophy. The overall left ventricular ejection fraction was 60%. Aortic, mitral and tricuspid valves were normal. There was no left ventricular outflow tract gradient.

A diagnosis of takotsubo cardiomyopathy was made. Follow-up echocardiography at 5 weeks revealed normal biventricular function and morphology, with normal valve function. There was basal septal hypertrophy.

COMMENT

Dote *et al*¹ first described this form of cardiomyopathy in Japanese patients. The name relates to the peculiar shape of the left ventricle, which resembles an octopus-fishing pot called takotsubo. Takotsubo cardiomyopathy is increasingly recognised around the world.² The worldwide incidence is unknown. Takotsubo cardiomyopathy accounts for approximately 1% of admissions for suspected acute myocardial infarction in Japan. Most cases are reported in postmenopausal women.^{2,3} Physiological or acute emotional stressors generally precede symptoms.⁴

Takotsubo cardiomyopathy has the following features:

Presentation of acute chest pain or dyspnea after physiological or emotional stress that mimics acute myocardial infarction. Electrocardiographic changes mimicking an acute myocardial infarction. Absence of obstructive coronary vessels on coronary angiogram. Absence of other catecholamine-surge state, including pheochromocytoma, recent head trauma and intracranial bleeding. Recovery of left ventricular function within 2–4 weeks of presentation.³

Presenting with overlapping symptoms and signs, it is difficult to distinguish takotsubo cardiomyopathy from an

Figure 1 Widespread symmetrical and broad T-wave inversion.

Figure 2 Echocardiogram revealed a normal left atrium, right atrium and right ventricle. Left ventricular apex and apical septum is hypokinetic and has an aneurysmal appearance. Basal septal hypertrophy was present. Aortic, mitral and tricuspid values were normal. There was no left ventricular outflow tract gradient.

acute coronary syndrome. The described case mimicked a non-ST segment elevation myocardial infarction.

The presumed cause for the described case is dehydration leading to a reduction in venous return or vasodilatation, with consequent reduction in ventricular volume and generation of obstruction between the basal septum and the anterior mitral leaflet.

High ventricular pressure is required to overcome this obstruction leading to myocardial demand exceeding supply, with the apex bearing the brunt of this ischaemia.

This case illustrates the challenges of distinguishing takotsubo cardiomyopathy from an acute coronary syndrome. Further studies will hopefully enable early diagnosis of takotsubo cardiomyopathy, clarify its aetiology, refine its treatment and help in its prevention.

ACKNOWLEDGEMENTS

We thank Dr Beeton (Consultant Cardiologist) and Mr Satpaul (Echocardiography Department).

Competing interests: None.

Written and verbal consent have been obtained from the patient for publication of images in print and online.

Correspondence to: Dr B Teo, Ashford and St Peter's Hospitals NHS Trust, Ashford Hospital, London Road, Ashford, Middlesex TW15 3AA, UK; bervinteo@yahoo.com

Accepted 5 December 2006

REFERENCES

- 1 Dote K, Sato H, Tateishi H, *et al*. Myocardial stunning due to simultaneous multivessel coronary spasm: a review of 5 cases. *J Cardiol* 1991;**21**:203–14.
- 2 Tsuchihashi K, Ueshima K, Uchida T, *et al*. Transient left ventricular apical ballooning without coronary artery stenosis: a novel heart syndrome mimicking acute myocardial infarction. Angina pectoris-myocardial infarction investigations in Japan. *J Am Coll Cardiol* 2001;**38**:11–18.
- 3 Desmet WJR, Adriaenssens BFM, Dens JAY. Apical ballooning of the left ventricle: first series in white patients. *Heart* 2003;**89**:1027–31.
- 4 Bybee KA, Kara T, Prasad A, *et al*. Systematic review: transient left ventricular apical ballooning: a syndrome that mimics ST-segment elevation myocardial infarction. *Ann Intern Med* 2004;**141**:858–865.