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CASE REPORT

An uncommon manifestation of shock: Takotsubo syndrome

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Summary

76-year-old female presented following an episode of collapse. She was hypotensive with the paramedics and remained refractory despite fluid resuscitation. Her initial baseline tests revealed an elevated troponin; she subsequently underwent a coronary angiogram that showed mild coronary artery disease. Left ventriculogram was performed, which showed abnormal mid-wall ballooning and severely impaired systolic function, characteristic of Takotsubo syndrome. Echocardiogram confirmed the presence of diagnosis and presence of left ventricular outflow tract obstruction with high gradient. She was initiated on medical heart failure therapy and improved. Follow-up investigations after 2 months showed complete resolution of systolic dysfunction and symptoms.

Key Words

- reverse Takotsubo cardiomyopathy
- echocardiography
- left ventricular outflow tract obstruction
- mitral annular systolic displacement

Learning points:

- Takotsubo syndrome can present similarly to ACS.
- Early use of echocardiography in the acute setting can provide vital information.
- Takotsubo syndrome can result in hemodynamic instability requiring urgent interventions.
- Other investigative modalities can be used in conjunction with echocardiography to confirm the diagnosis of Takotsubo syndrome.
- Prognosis is generally good in patients with Takotsubo syndrome.

Background

This is a rare case of Takotsubo syndrome presenting in the same manner as ACS. This highlights the use of echocardiography in the acute setting in differentiating acute valve pathology and other causes of cardiogenic shock with the presence of a new murmur.

Case presentation

A 76-year-old female was admitted to Royal Derby Hospital with 1 episode of collapse with associated dizziness and left arm pain. Prior to admission she had a self-limiting diarrhoeal illness. Her past medical history included previous myocardial infarction

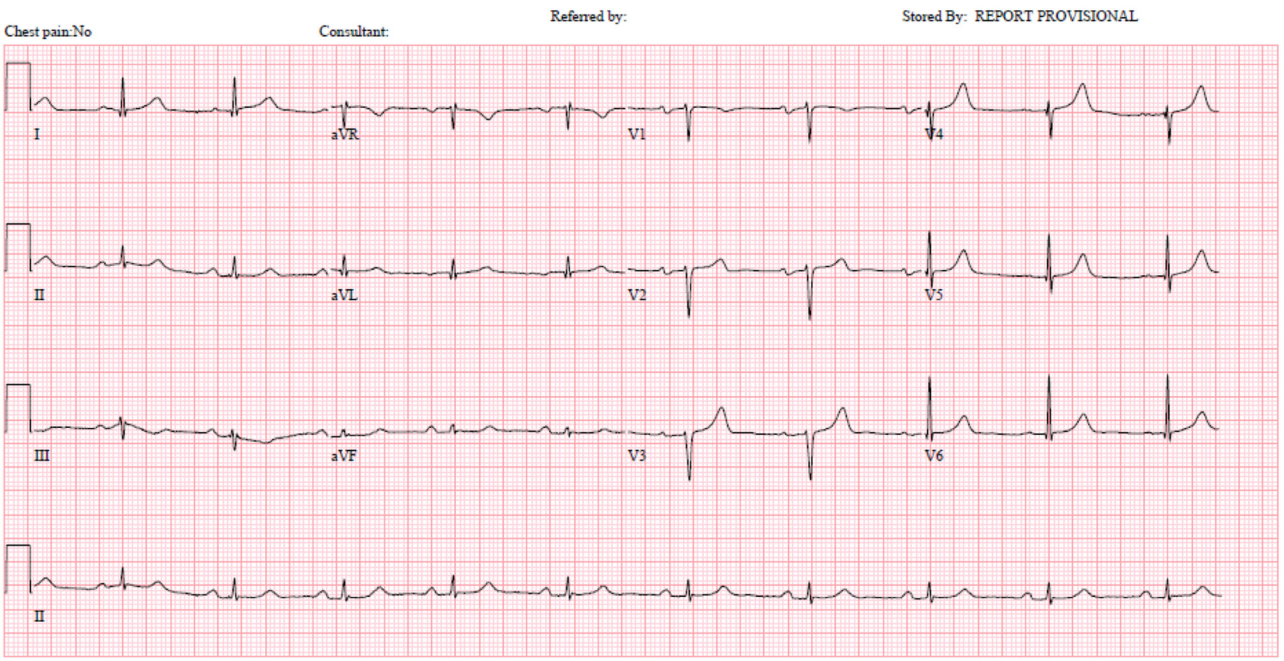

Figure 1
Admission ECG.

with no resultant left ventricular impairment and gastroesophageal reflux disease. Initial examination findings revealed a shocked patient with a pansystolic murmur. Her hypotension remained refractory to fluid resuscitation. Admission ECG that shows normal sinus rhythm with no evidence of ST segment or T-wave changes is as shown (Fig. 1). She was transferred to CCU for further monitoring.

Investigation

Her admission baseline bloods were unremarkable except for an elevated HS-Troponin T of 586 ng/L (normal values: 0–13 ng/L) and a CK of 101 IU/L (normal values 24–170 IU/L). Her subsequent Hs-Troponin T level was 373 ng/L and CK was 229 IU/L. She was empirically treated for an acute coronary syndrome (ACS) with dual antiplatelets, fondaparinux and secondary prevention therapies.

In view of the refractory hypotension and pansystolic murmur, an urgent echocardiogram was performed to exclude mitral valve prolapse. This showed preservation of the basal inferolateral wall and apex but all remaining regions were akinetic. The LV systolic function was severely impaired (Figs 2 and 3). There was evidence of systolic anterior motion

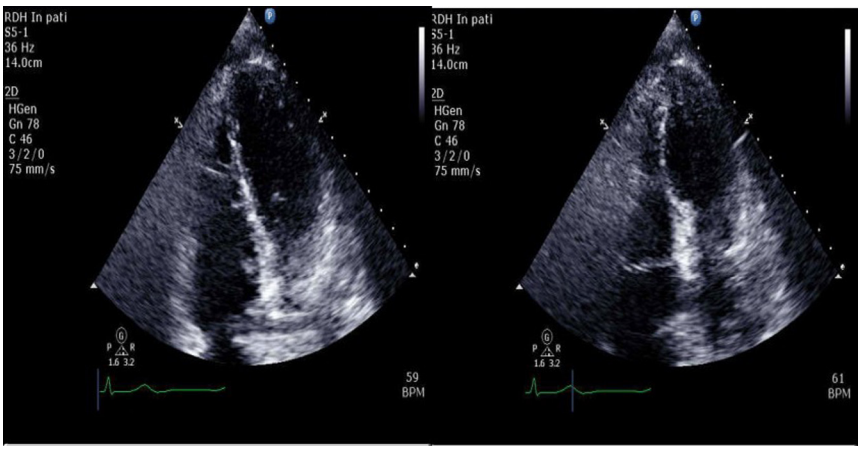

Figure 2
Echocardiogram (4-chamber view) showing akinetic walls with preserved apex.

(SAM) of the anterior mitral valve leaflet and a raised left ventricular outflow tract (LVOT) gradient of 57 mmHg.

A coronary angiogram was performed, which showed mild mid-LAD stenosis, which however was not significantly flow limiting (Fig. 4). Left ventriculogram revealed basal/mid-cavity ballooning in characteristic of Takotsubo syndrome (Fig. 5).

Treatment and outcome

No coronary intervention was required for the patient. Based on the echo and LV gram finding, she was initiated on heart failure treatments and was discharged home with outpatient follow-up.

Outpatient echocardiogram and cardiac MRI, which were performed 2 months post discharge showed complete

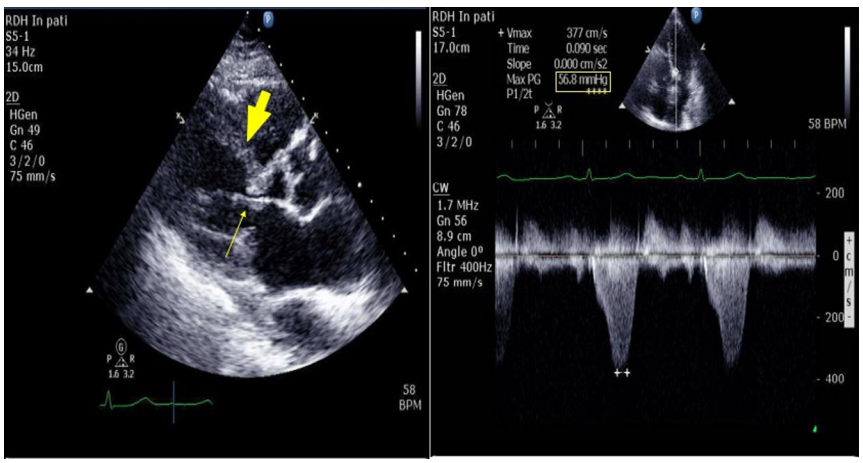

Figure 3
Echocardiogram showing systolic anterior motion (SAM) of anterior mitral valve leaflet (arrow) against interventricular septum (arrowhead) and raised left ventricle outflow tract gradient (LVOT) of 57 mmHg on Doppler.

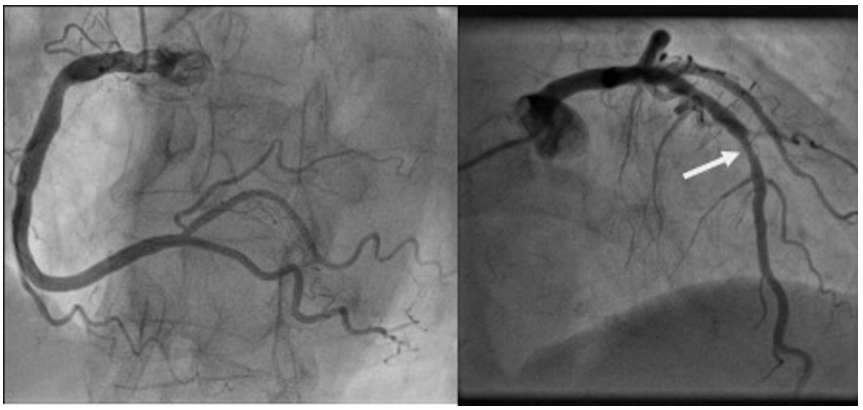

Figure 4
Angiogram showing normal RCA and mild mid-LAD disease (arrow).

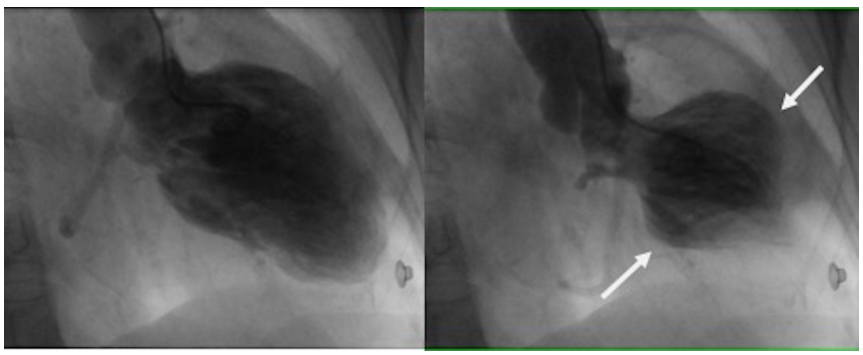

Figure 5
Left ventriculogram showing basal/mid-cavity ballooning.

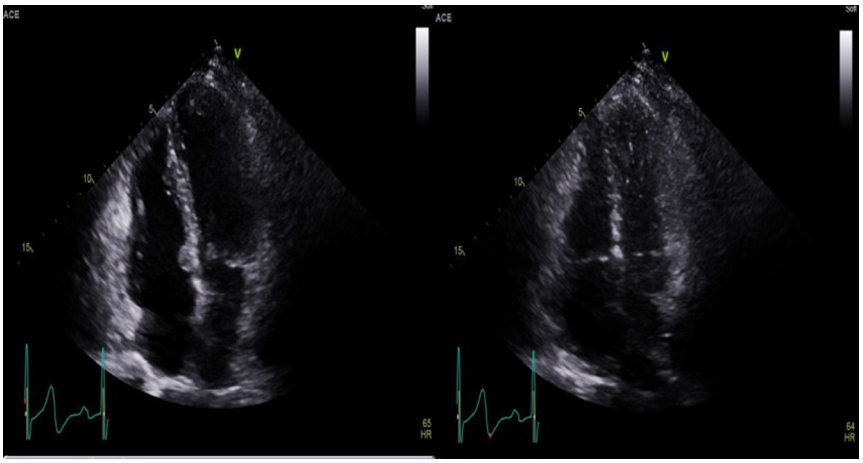

Figure 6
Echocardiogram on follow-up showing resolution of wall motion abnormality.

resolution of her LV dysfunction, LVOT gradient and abnormal wall motion (Figs 6 and 7). She was reviewed in clinic and has made a full recovery.

Discussion

Takotsubo syndrome (TTS), also known as 'broken heart syndrome', is an acute and transient heart failure syndrome (1). It can mimic ACSs but commonly does not have associated significant coronary artery stenosis. It is postulated that a catecholamine surge during emotional or physical stress is responsible. Typically, it involves the apical segments of the left ventricle in a pattern described as 'apical ballooning'. In contrast, in variants of TTS, there is sparing of the apex with involvement of other parts of the ventricles. It has a female preponderance affecting those of a younger age (2). This patient had a self-limiting diarrhoeal illness, which may have precipitated this catecholamine response.

In this patient, there was sparing of the basal and apical segments of her left ventricle on echocardiography This is in keeping with the typical circumferential pattern of LV dysfunction characteristic of TTS (3). The increased gradient across the LVOT signifies the presence of LVOT obstruction due to TTS, which shows the importance of early echocardiogram to identify potential complications that will influence management.

Typically, LVOT obstruction occurs in TTS due to the hyperdynamic contraction of the basal segments of the left ventricle impairing cardiac output and causing cardiogenic shock (4). Due to the reduced cardiac output from the severely impaired ventricle, compensatory basal hyper-contractility occurs. This hyper-contractility leads to the dynamic LVOT obstruction, which in turn leads to a vicious cycle by further worsening the cardiac output and increasing the adrenergic drive. Therefore, the use of inotropic support for other causes of cardiogenic shock may worsen the situation instead of improving it. The most appropriate treatment strategy is to ensure, adequate fluid resuscitation and beta-blockade. The presence of LVOT obstruction with gradient >25 mmHg is hemodynamically significant and is associated with acute heart failure, cardiogenic shock and in-hospital mortality (5). A gradient of ≥40 mmHg is considered higher risk of in-hospital mortality and should be monitored in high dependency or coronary care units (1). The improvement in hemodynamics after fluid resuscitation and after initiation of beta-blockers

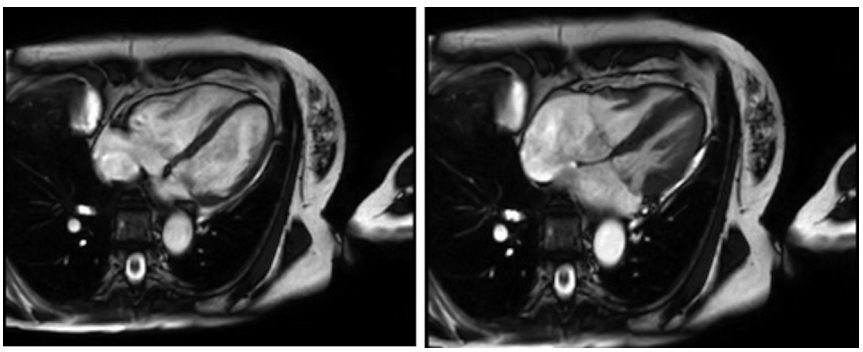

Figure 7
MRI showing resolution of wall motion abnormality.

highlights the diagnostic role of echocardiography in this unique setting of shock.

Declaration of interest
The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of this case report.

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Patient consent
Patient consent was obtained.

Author contribution statement
Y X G drafted the case presentation, investigations and treatment. S S B assisted with initial corrections and discussion. M A was the consultant in charge of the patient's care.

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