Takotsubo cardiomyopathy: an uncommon cause of reversible heart failure

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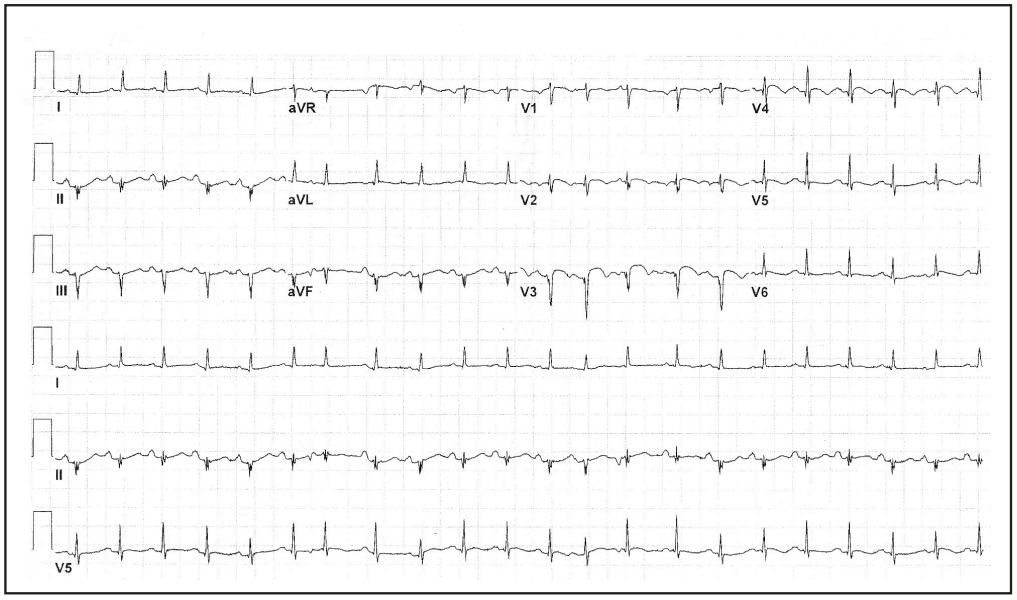

Fig. 1 ECG shows ST segment elevation in leads V2–3 and T wave inversions in leads V2–5.

ABSTRACT

Takotsubo cardiomyopathy is increasingly being diagnosed as a cause of acute coronary syndrome in postmenopausal women. It may also present as reversible acute left heart failure with an excellent prognosis for recovery. Although rare, it may be an underdiagnosed condition in the medical intensive care units among patients admitted with non-cardiac acute conditions. Therefore, intensivists must be aware of the possibility of this condition; this can help to avoid unnecessary costly investigations and provide an early, definite prognosis.

Keywords: acute coronary syndrome, heart failure

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INTRODUCTION

Takotsubo cardiomyopathy is a rare cause of acute reversible heart failure that most commonly affects postmenopausal women undergoing severe physical or mental stress. The pathognomonic feature of this condition is the peculiar pattern of left ventricular (LV) dysfunction, which is reversible over time.

Our report describes a woman diagnosed with acute coronary syndrome after undergoing an intestinal resection for acute intestinal obstruction. Although emotional stress is thought to be the most common cause of this peculiar syndrome, our patient had a surgical event that precipitated this condition. The identification of this problem among patients admitted into non-cardiac intensive care units is essential for proper treatment and prognostication.

CASE REPORT

A 70-year-old Caucasian woman was admitted to our unit with a one-day history of severe shortness of breath, which required intubation and mechanical ventilation. The patient had undergone segmental intestinal resection for intestinal obstruction three days earlier at another facility. She was referred to us as her electrocardiogram (ECG) showed ST segment elevations in leads V2–3 with T wave inversions in V2–5 (Fig. 1). Troponin, creatine phosphokinase (CPK) MB, and total CPK values (0.22 ng/ml [N < 0.04 ng/ml], 5.7 ng/ml [N < 5.0 ng/ml] and 94

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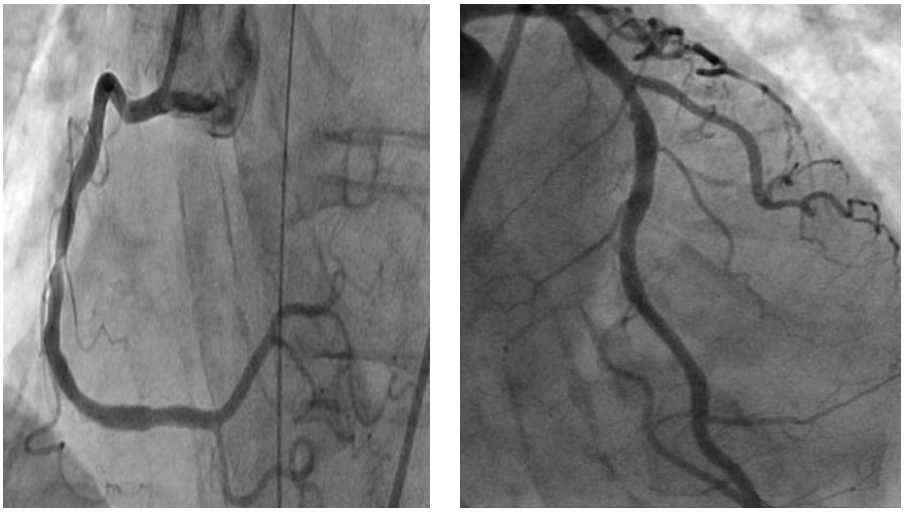

Fig. 2 Coronary angiogram shows insignificant focal obstruction in the right coronary artery with TIMI 3 flow distally. The left coronary artery is normal, with no evidence of obstruction.

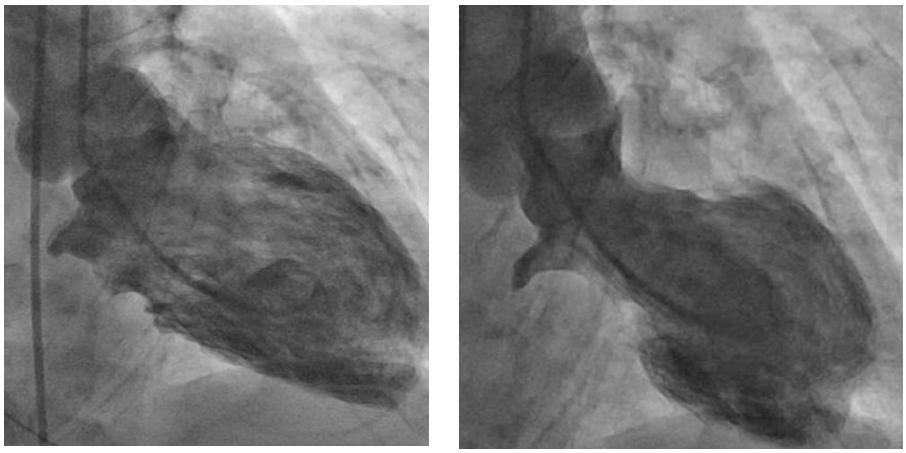

Fig. 3 Left ventriculogram shows grossly impaired contractility of the ventricle, with preservation of basal contractility. This characteristic systolic image of the heart gives the disease its name due to its resemblance to a trap used to capture octopuses in Japan.

U/L [N < 230 U/L], respectively) supported a diagnosis of ST elevation acute myocardial infarction (MI). Thrombolysis was not considered, as more than 12 hours had passed since the onset of the patient's complaint. Brain natriuretic peptide level was found to be elevated (752 µg/mL).

Physical examination revealed bibasal fine chest crepitations and a third heart sound. Transthoracic two-dimensional echocardiogram showed akinetic distal segment of all the walls, with an ejection fraction (EF) of 20% and an elevated LV end diastolic pressure. Interestingly, the basal segment had normal movement. Urgent coronary arterial catheterisation and left ventriculography revealed nonocclusive right coronary artery disease, with TIMI stage 3 flow beyond the focal obstruction and a normal left coronary artery (Fig. 2). There was global LV functional impairment with unaffected contraction in the basal parts (Fig. 3). The patient was treated with beta blockers, angiotensin-converting enzyme inhibitors and diuretics, and required mechanical ventilatory support for five days. She was discharged after Day 8.

A repeat transthoracic echocardiogram recorded prior to discharge showed significantly improved pump function (EF > 30%) with partially restored wall motion. The patient was followed-up at an outreach centre, where her repeat echocardiogram at the end of eight months showed an EF of 50%, with an E/A ratio of 0.7 on transmitral Doppler flow and E/E' of 9.1 on tissue Doppler study. The mitral annular velocity (E') was found to be 6.9 cm/sec, which indicated mild diastolic dysfunction. There was no echocardiogram dating back to a period before her admission, and thus, the possibility that she had some underlying diastolic dysfunction before her admission remains.

DISCUSSION

Although first described in 1990, Takotsubo cardiomyopathy remains a rare cause of acute coronary syndrome, accounting for only 2% of all cases of MIs worldwide.[1,2] The actual incidence is probably much higher, as this condition is also seen in very sick patients admitted for non-cardiac conditions.[3] The most common features on admission are chest pain and dyspnoea, mimicking an acute MI.[4]

The following are the chief defining features of this disease:[5] (a) It is primarily a disease of elderly postmenopausal women who present with widespread ST-T wave changes, accompanied by evolving T wave changes on ECG that are not ascribable to lesions in a single-vessel territory; (b) A history of physical or emotional stressor is usually present; (c) QT prolongation is common, but Q waves are not; (d) Although ECG changes may appear remarkable, cardiac enzymes are usually not substantially elevated; (e) A hypokinetic/akinetic apex with basal wall hyperkinesis is typical of this condition, with wall motion abnormalities involving multiple artery territories; and (f) LV apical akinesia is thought to be characteristic of this condition, although it is infrequently encountered.

Other conditions that may produce similar ECG and echocardiogram changes include head trauma, intracranial bleed and hypertrophic cardiomyopathy. These conditions must be excluded by appropriate means. Data from previous studies have shown that patients recover normal EFs within 1–4 weeks.[6] Sharkey et al reported an increase in mean EF at presentation from 29% to 63% within a mean period of six days,[7] while the increase reported by Wittstein et al was from 20% to a normal level (60%) over a 2–4 week period.[8]

In this case study, recent surgery had precipitated the patient's heart failure, and the combination of moderately high levels of cardiac enzymes and rapid clinical improvement in cardiac function satisfies the abovementioned criteria. The patient was followed-up at one of our peripheral clinics, and repeat ECG at monthly intervals showed gradually improving LV function; she achieved a normal EF of 50% after eight months, with residual mild diastolic dysfunction. However, it is not clear if this was a pre-existing condition. A similar case of a transient LV apical ballooning from Singapore has been described in 2005, with resolution of the defect at six months.[9] All such patients need repeat echocardiogram to document recovery, and their heart failure medications can be stopped if recovery is complete. Intensivists and critical care specialists need to be aware of the possibility of Takotsubo cardiomyopathy in patients admitted to the intensive care unit, where its occurrence may be more frequent than previously expected. Fortunately, the in-hospital mortality rate of cases reported in the literature is only 1.1%.[10]

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