



Case Report

An Atypical Case of Takotsubo Cardiomyopathy and Transient Global Amnesia

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ABSTRACT

Takotsubo cardiomyopathy (TTC) may clinically mimic an acute coronary syndrome and is most often associated with an acute stressor. In this case report, we describe an atypical case of TTC triggered by multiple subacute stressors rather than 1 acute stressor. We also report TTC and transient global amnesia occurring concurrently. This case highlights that TTC can present without a typical stressor and should nonetheless be considered in the appropriate clinical context. Concomitant presentation with transient global amnesia is uncommon, but may result from the 2 conditions potentially sharing an underlying etiology.

RÉSUMÉ

La cardiomyopathie de Takotsubo (CTT) peut ressembler sur le plan clinique à un syndrome coronarien aigu et est plus souvent associée à un facteur de stress aigu. Dans ce rapport de cas, nous décrivons un cas atypique de CTT provoquée par de nombreux facteurs de stress subaigu plutôt que 1 facteur de stress aigu. Nous faisons également état de la survenue simultanée de la CTT et de l'amnésie globale transitoire. Ce cas illustre que la CTT peut survenir sans facteur de stress typique et qu'elle devrait néanmoins être considérée dans le contexte clinique approprié. La survenue concomitante de la CTT et de l'amnésie globale transitoire n'est pas fréquente, mais peut résulter de 2 affections ayant possiblement en commun une étiologie sous-jacente.

Case

A 62-year-old postmenopausal woman presented with an episode of loss of consciousness while getting her eyebrows groomed in a salon. According to the aesthetician, her eyes were wide open, and the episode lasted 3 to 5 minutes. After regaining consciousness, she had no recollection of the event. She had no prodromal or postictal symptoms. In the ambulance, she experienced heavy, dull chest pain with no radiation. The pain improved with nitroglycerin spray and morphine. She denied shortness of breath, nausea, and diaphoresis. Upon further questioning, the patient revealed no sudden acute stressor, but there were multiple subacute stressors over the preceding few months. There was the death of a family member approximately 1 year ago, and another family member was recently involved in a family court case.

Her medical history also included hypothyroidism, hypertension, and dyslipidemia.

On initial assessment in hospital, her electrocardiogram (ECG) was remarkable for pathologic Q waves present in V1 and V2, with a normal QTc of 429 ms (Fig. 1A). High-sensitivity troponin T was initially 107 ng/L with a creatine kinase of 112 U/L. She was diagnosed as having a suspected acute coronary syndrome and was treated with aspirin, clopidogrel, nitroglycerin spray, and intravenous heparin.

During the early hours of the morning, she developed a short salvo of polymorphic ventricular tachycardia (PMVT) that lasted approximately 8 seconds, along with multiple premature ventricular complexes while asleep (Fig. 1C). She was unresponsive to sternal rub but awoke when addressed loudly by the resident physician. She appeared to be confused at the time of the event when assessed by the resident physician, who saw her a few minutes after the brief arrhythmic event had resolved. Her troponin was markedly elevated at 1307 ng/L with an ECG that was performed shortly after the event showing extension of the preexisting Q waves in the precordial leads now to V3 (Fig. 1B).

The patient did not recall the event when asked in the morning, nor could she recall events from the previous day, suggesting the development of both anterograde and retrograde amnesia after the event. Notably, several months before this event, she had experienced an episode of amnesia while on

Received for publication September 19, 2018. Accepted November 4, 2018.

Ethics Statement: The anonymized case report is submitted in accordance with the standards of the University of Manitoba Biomedical Research Ethics Board.

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See page 37 for disclosure information.

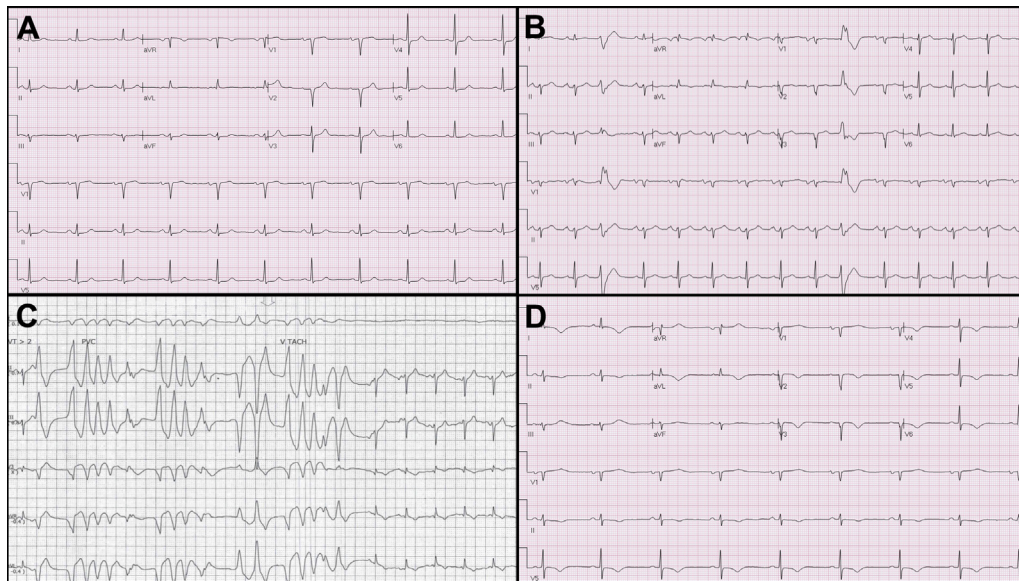


Figure 1. (A) Electrocardiogram (ECG) on admission showing old septal Q waves. (B) ECG obtained after polymorphic ventricular tachycardia (PMVT). Q waves are more prominently seen in V1-V3, with occasional premature ventricular contraction. (C) PMVT observed on telemetry. (D) Day 3 ECG. Dynamic T-wave inversions in precordial leads.

vacation. She had developed both retrograde and anterograde amnesia shortly after awakening in the morning. She had been taken to the emergency department and was diagnosed with transient global amnesia (TGA) on that occasion.

Given the overnight events, coronary angiography was urgently performed in the early morning and revealed minimal, nonobstructive coronary artery disease. Left ventricular angiography demonstrated preserved movement of the base and the apical cap of the left ventricle, but with midventricular wall hypokinesis and a left ventricular ejection fraction (LVEF) of 43% (Fig. 2). The troponin subsequently trended down to 470 ng/L. A repeat ECG on day 3 showed T-wave inversions in the precordial leads and a slightly prolonged QTc of 481 ms (Fig. 1D).

Given the coronary and left ventricle angiography findings, a putative diagnosis of Takotsubo cardiomyopathy (TTC) was made. Because of the anticipated natural history of the condition, echocardiography was delayed to allow for assessment of interval improvement in the apical wall motion abnormalities. On day 4, a transthoracic echocardiogram was performed and demonstrated mild concentric left ventricular hypertrophy with mild diastolic dysfunction, mild global left ventricle hypokinesis without localized wall motion abnormalities or apical ballooning, and a low-normal LVEF of 50%. Cardiac magnetic resonance imaging showed mild generalized hypokinesis, an LVEF of 47%, and no evidence of regional wall motion abnormalities or apical ballooning. There was no identifiable pattern of infarction, myocarditis, or infiltrative myocardial process on gadolinium administration.

Although elevated catecholamine states, such as pheochromocytoma, may be associated with TTC, investigations for pheochromocytoma were not performed because our patient did not demonstrate any clinical manifestations of this condition. She had no other significant events for the remainder of her hospital stay, and at discharge, her cardiac

medications included metoprolol and telmisartan. Given the recurrent episodes of both retrograde and anterograde amnesia, her case was discussed with the neurology department, and an electroencephalogram and outpatient neurology consultation are currently pending.

Discussion

TTC, also known as “transient apical ballooning syndrome or stress-induced cardiomyopathy,” is an increasingly recognized syndrome that may clinically mimic an acute coronary syndrome. This condition is predominantly seen in postmenopausal women and constitutes approximately 2% of all hospitalizations with acute coronary syndrome.¹ Our patient’s initial clinical presentation, elevated cardiac troponin level, typical apical ballooning pattern on imaging, absence of significant flow-limiting epicardial coronary stenoses, and subsequent spontaneous resolution of the wall motion abnormalities confirmed this to be TTC.

Most cases of TTC are often preceded by a physical or emotional stressor, that is, the death of a loved one, confrontational arguments, financial crises, and so forth.² Approximately one-third of patients with TTC have no identifiable stressors. Our patient is of interest because she had a background of ongoing stress, but only developed symptoms while she was relaxing in a salon. It is now recognized that the term “stress cardiomyopathy” is a misnomer because there have been several reported cases without an identifiable acute stressor.² Our patient eventually revealed multiple subacute ongoing family stressors. These subacute stressors may have had the potential to trigger TTC, although the delay between the stressors and clinical presentation is fairly atypical.

There is still ongoing discussion with regard to the underlying mechanism and etiology of this cardiac syndrome. Patients with TTC may have approximately 2 to 3 times

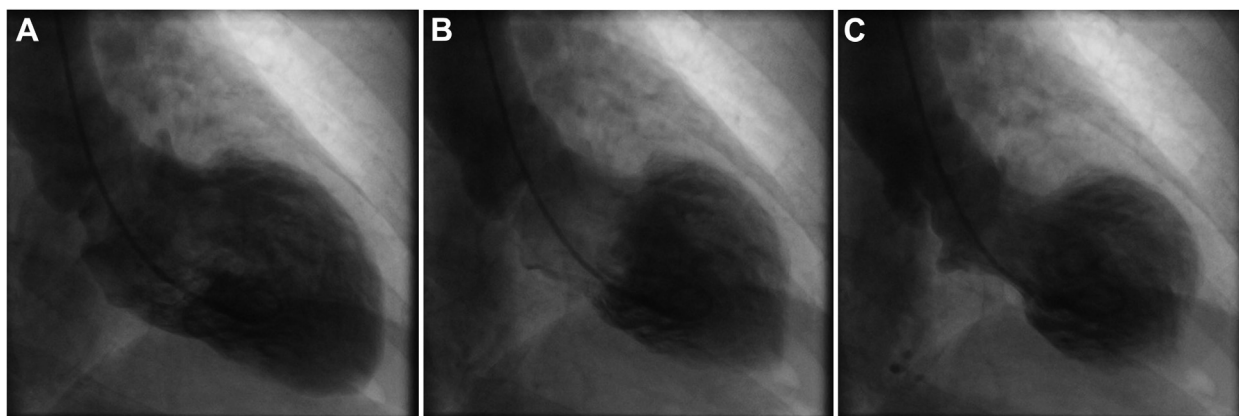


Figure 2. Left ventricular angiogram in (A) end diastole, (B) mid systole, and (C) end systole.

higher levels of plasma catecholamines vs age- and sex-matched patients with myocardial infarction.³ The most widely accepted mechanism is that the catecholamine surge may lead to cardiotoxicity and direct myocardial stunning. This pathogenic mechanism is further supported by a case series of TTC induced by the administration of intravenous epinephrine and dobutamine.⁴ Other potential mechanisms that have been noted in the literature include acute multivessel spasm and microvascular dysfunction.³

Our patient had an episode of TGA a few months before this event. TGA is defined as an episode of anterograde and retrograde amnesia that normally lasts less than 24 hours. Epileptic amnesia is an alternative explanation for this presentation and cannot be entirely ruled out. However, the lack of witnessed automatisms or other features of epilepsy as noted by the resident on-call makes epilepsy less likely. Moreover, although epilepsy is usually associated with a history of prior recurrences, she had experienced only 1 other episode of amnesia. Because the ventricular arrhythmia that occurred in our patient was fairly brief, it was unlikely to be the cause of her amnesia. To further confirm the cause of her amnesia, she has been referred to the neurology department and is awaiting an electroencephalogram.

TGA and TTC can occur concurrently.⁵ The pathogenic mechanism behind TGA remains inconclusive, but similarly to TTC, a catecholamine surge may be part of the underlying pathophysiology. In fact, TGA has been reported as a potential complication after a dobutamine stress echocardiogram.⁶ It has been suggested that increased sympathetic tone leads to increased central venous pressure and thus cerebral venous pressure. The resulting cerebral venous congestion in areas involved with memory formation, such as the hippocampus, may thus play a role in the pathophysiology of TGA.⁵ The association between these 2 presentations should be kept in mind when investigating for either condition.

Ventricular arrhythmias have been commonly reported in TTC cases, often occurring in the first few days of hospitalization.⁷ In many TTC cases with torsades de pointes, there is a known risk factor, such as congenital long QT syndrome, bradycardia, or hypokalemia.⁷ Our patient had no family history of sudden death or long QT syndrome. Before the PMVT, her QTc was within the normal range. Thyroid-

stimulating hormone, Ca²⁺, and Mg²⁺ levels were all normal, suggesting these were not implicating secondary causes of long QT syndrome. In a recent study, patients who presented with life-threatening arrhythmias (LTAs) had more in-hospital events, including cardiogenic shock and insertion of intra-aortic balloon pumps.⁸ The 1-year mortality and cardiovascular death rates were also higher in patients with LTA compared with the patients without LTA. Predictors for LTA include an ejection fraction < 30% and prolonged QRS > 105 ms.⁸ Our patient did not have an LVEF as low as 30%, nor did she have a prolonged QRS. Despite our patient having a short run of PMVT, there was improvement in her LVEF within days of presentation and no evidence of further ventricular arrhythmias over 5 days of monitoring. Therefore, it was deemed that the risk of recurrent ventricular arrhythmias was low.

The novel finding from this case report is that TTC was triggered in our patient from multiple ongoing subacute stressors rather than 1 acute stressor. Furthermore, it further confirms that TTC and TGA may occur concurrently, because the 2 conditions may share an underlying etiology.

Conclusion

We present a unique case of TTC in the presence of subacute stress in association with a previous episode of TGA and an amnesic episode in hospital. The association between TGA and TTC may share an underlying pathogenic mechanism. Ventricular arrhythmias are not infrequent in TTC and may pose further challenges in the management of this condition.

Disclosures

The authors have no conflicts of interest to disclose.

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