Takotsubo cardiomyopathy and acute manic attack

Amr Idris, MD^a, Jared L. Christensen, MD^a, Mohanad Hamandi, MD^a , Swathie Bayya, MD^b, Zuyue Wang, MD^a, Sameh Sayfo, MD^a, Chadi Dib, MD^a, Srinivasa Potluri, MD^a, Molly Szerlip, MD^a, and Karim M. Al-Azizi, MD^a

^aDivision of Cardiology, The Heart Hospital Baylor Plano, Baylor Scott & White, Plano, Texas; ^bDivision of Internal Medicine, The Heart Hospital Baylor Plano, Baylor Scott & White, Plano, Texas

ABSTRACT

Takotsubo cardiomyopathy predominantly occurs in women, with a high incidence in patients with psychiatric diseases. We present a 64-year-old white woman with an acute manic episode complicated by rhabdomyolysis and takotsubo cardiomyopathy.

KEYWORDS Bipolar; mania; rhabdomyolysis; takotsubo cardiomyopathy

CASE REPORT

A 64-year-old white woman with a known bipolar I disorder for many years and hypertension presented to the emergency department with an acute manic episode. The patient had not been eating, drinking, or sleeping for several days and was not taking her medications for bipolar disorder for 4 days prior to admission. She had had a similar manic attack 2 years prior when she stopped taking her longstanding home medications and was not sleeping. She complained of dizziness, two syncopal episodes, chest discomfort, and fatigue. She had been taking ibuprofen three times a day for generalized muscle pain. Upon arrival to the emergency department, her blood pressure was 83/57 mm Hg; heart rate, 86 beats/minute; respiratory rate, 18 breaths/minute; oxygen saturation, 97% on room air; and temperature, 98.4°F (36.8°C). She was alert, oriented, and in no acute distress. She had no jugular venous distention, carotid bruits, or extremity edema. She had normal neuromuscular, cardiac, respiratory, and gastrointestinal examinations. The laboratory findings are summarized in *Table 1*.

An electrocardiogram showed diffuse T wave inversions and a QTc of 595 ms. She was started on 0.9% normal saline for rhabdomyolysis, given one dose of aspirin 324 mg, and started on metoprolol and a heparin drip for possible acute coronary syndrome due to a troponin level of 9.16 ng/mL and chest pressure upon presenting to the emergency department. Her fluoxetine was discontinued due to prolonged QTc on electrocardiogram. A transthoracic echocardiogram showed akinetic distal anterior, apical, and distal

inferior myocardial walls with a hypercontractile base and an estimated left ventricular ejection fraction of 35% (*Figure 1*).

During the patient's hospital stay, her acute manic episode resolved, with improvement of her kidney function and resolution of the rhabdomyolysis. Her chest pressure resolved, and her troponin was trending down. Cardiac catheterization disclosed normal coronary arteries, and her left ventricular end diastolic pressure was 25 mm Hg. A left ventriculogram showed apical ballooning with hypercontractility of basal segments of the posterior, inferior, and anterior walls in addition to akinetic apex and an estimated left ventricular ejection fraction of 20% (*Figure 2*). Repeated electrocardiogram showed improvement of her QTc to 520 ms. The patient was discharged after 5 days of hospitalization to follow up with her psychiatrist within 2 weeks and with cardiology within 4 weeks of discharge. The patient's regular home medications, including clonazepam, fluoxetine, and trazodone and lamotrigine during acute manic episodes, were

Figure 1. Echocardiogram during (a) end systole and (b) end diastole, showing akinetic distal anterior, apical, and distal inferior myocardial walls with a hypercontractile base.

Corresponding author: Karim M. Al-Azizi, MD, Division of Cardiology, The Heart Hospital Baylor Plano, Baylor Scott & White, 1100 Allied Drive, Plano, TX 75093 (e-mail: karim.alazizi@bswhealth.org)

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Received September 27, 2019; Revised October 24, 2019; Accepted October 28, 2019.

Table 1. Laboratory data during hospital admission

Variable	Day 1 (admission)	Day 2	Day 3	Day 4	Day 5
Thyroid-stimulating hormone	1.37				
Red blood cells ($\times 10^6$ cells/mL)	3.68	3.33	3.41	3.55	
White blood cells ($\times 10^3$ cells/mL)	25.1	20.6	13.9	11.4	
Hemoglobin (g/dL)	11.3	10.4	10.7	10.9	
Hematocrit (%)	34.6	30.8	31.3	32.6	
Platelets ($\times 10^3$ cells/mL)	312	269	281	297	
Sodium (mEq/L)	141	142	140	138	134
Potassium (mEq/L)	4.5	3.7	4.0	2.9	3.6
Chloride (mmol/L)	114	110	100	91	90
CO ₂ (mEq/L)	16	22	33	40	43
Blood urea nitrogen (mg/dL)	79	63	35	22	18
Creatinine (mg/dL)	4.42	3.07	1.38	1.09	1.12
Glucose (mg/dL)	90	80	105	106	99
Calcium (mg/dL)	6.9	7.1	8.1	8.4	8.5
Magnesium (mg/dL)	2.8				
Phosphorus (mg/dL)	5.4			1.8	
Albumin (g/dL)	3.2	2.8	2.8	3.0	2.8
Aspartate aminotransferase (U/L)	1001	850	676	552	339
Alanine aminotransferase (U/L)	417	393	448	407	371
Bilirubin (mg/dL)	0.4	0.4	0.4	0.6	0.4
Alkaline phosphatase (U/L)	63	60	63	56	58
Troponin I (ng/mL)	9.16	7.92	1.99		
Creatinine kinase (U/L)	42,929	34,952	18,724	9734	4684
B-type natriuretic peptide	736				

restarted prior to discharge in addition to metoprolol succinate and as-needed furosemide. An echocardiogram at 1 month disclosed an estimated ejection fraction of 55% to 60% with normal wall motion.

DISCUSSION

Takotsubo cardiomyopathy (TC) is a form of nonischemic, stress-induced cardiomyopathy with sudden transient left ventricular myocardial weakening. TC is often precipitated by a physical or emotional stressor, but it has also been reported without a known trigger. Acute or chronic neurological or psychiatric illness has been reported in over 50% of TC patients, with 4% of TC patients having mood disorders and 1% having anxiety disorders; in addition, there is a

Figure 2. (a, b) Cardiac catheterization showing normal coronary arteries. (c, d) Ventriculogram showing apical ballooning during diastole and systole.

higher risk of recurrence of TC in patients with preexisting psychiatric illness.^{1,2} In a case series, two-thirds of patients diagnosed with TC had underlying anxiety or depression.³ It was not reported whether acute exacerbation of these psychiatric illnesses contributed to TC development. One case of TC has been reported in bipolar patients with acute mania.⁴ Older age and female sex are well-established factors for psychiatric illnesses including depression, and TC is more prevalent in this age group.⁵ In addition, some psychiatric medications and electroconvulsive therapy have been implicated as possible triggers of TC.^{6,7}

TC presents with signs and symptoms that are similar to those of acute coronary syndrome. The electrocardiogram in TC may be completely normal; however, several abnormalities including ST segment changes and QT, PR, T, or Q wave abnormalities may be seen.¹ Our patient's electrocardiogram exhibited both diffuse T wave inversions and a prolonged QT interval. Using echocardiogram or left ventriculogram findings, TC can be classified as focal, basal midventricular, and apical. Our patient had apical TC, which is the most reported type, found in more than 80% of patients with TC.¹ TC should be differentiated from other causes of acute heart failure given the elevated brain natriuretic peptide, left ventricular end diastolic pressure, and low left ventricular ejection fraction in these conditions. When a patient with TC undergoes cardiac angiography, the coronary arteries show no angiographic evidence of coronary artery disease. Therefore, TC should be differentiated from myocardial infarction, as both have different management and prognosis. Unfortunately, there are no current trials evaluating the treatment of TC; most current treatments are hypothetical and directed toward relieving symptoms, possibly decreasing the likelihood of future events, and following guideline-directed medical therapy for heart failure.

In summary, physicians should be aware of the typical and atypical features of TC in patients presenting with clinical features of acute coronary syndrome when no significant

obstructive disease is found to explain their symptoms, especially when stressful stimuli are present and when patients have psychiatric or neurological problems at the time of presentation. Future research is warranted regarding optimal treatment of patients with TC and underlying psychiatric disease.

ORCID

Mohanad Hamandi <http://orcid.org/0000-0002-9746-5685>

Karim M. Al-Azizi <http://orcid.org/0000-0003-0195-4984>

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