

Stress Induced Cardiomyopathy: A Case Report and Review of the Literature

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ABSTRACT

In our study, we presented a 48 year old female patient who developed stress cardiomyopathy after undergoing two major surgeries:- left nephrectomy followed by exploratory laparotomy with limited resection of colon with colostomy. Our patient had chest pain and dyspnea. ECG and ECHO findings were consistent with findings of stress cardiomyopathy. The Troponin I and BNP levels were also raised. Our patient developed left ventricular failure which was treated with injection lasix and injection morphine. Further management included beta-blockers, ACE inhibitors, diuretics. Our patient responded to the treatment and improved progressively.

Keywords: Stress induced cardiomyopathy, reversible cardiomyopathy, Takotsubo cardiomyopathy

INTRODUCTION

Stress cardiomyopathy is a unique form of reversible cardiomyopathy¹. It was reported in early 1990's by Japanese authors. Also named Takotsubo cardiomyopathy as the shape of the ventricle at end systole resembled the Japanese fisherman's octopus pot- the takotsubo¹⁻³.

This cardiomyopathy is said to be precipitated by acute emotional stress¹⁻⁸, acute intra cranial events, head trauma, acute medical illness, and surgical procedures. This condition largely affects post menopausal women.

The symptoms and signs mimic acute coronary syndrome with transient

apical and ventricular wall motion abnormality but without evidence of obstructive coronary artery disease or plaque rupture. The electrocardiogram (ECG) findings and cardiac enzymes are similar to those seen in acute coronary syndrome. Recovery occurs within weeks to months^{1,2}.

CASE REPORT

48 year old female diagnosed with left non functional kidney underwent left nephrectomy. The patient had no previous comorbidity and the surgery went uneventful.

Five days later, the patient started having fecal discharge from the wound. On examination, the patient was diagnosed with colonic fistula for which she underwent exploratory laparotomy with limited resection of colon with colostomy. The patient was shifted to ICU for post operative care. Her vitals were as following: - heart rate-104/minute, blood pressure- 140/88 mmHg, SPO2- 99% on room air, respiratory rate- 14/minute.

After 2 days, she started complaining of chest pain and difficulty in breathing. Her vitals were as following:- heart rate-126/minute, blood pressure-130/82 mmHg, respiratory rate- 30/minute, SPO2- 82% on room air. Electrocardiogram (ECG) revealed sinus tachycardia. Troponin I level- 1527.2 pg/ml which was above the normal range. Patient was then put on non invasive ventilation.

Half an hour later, the patient started having copious amount of pink frothy secretions from mouth. The vitals were as following:- heart rate- 138/minute, blood pressure- 106/68 mmHg, respiratory rate- 32/ minute, SPO₂- 65%. Patient was then intubated and put on SIMV mode of ventilator. Injection lasix 40 mg IV stat and injection morphine 6mg IV stat were given. Electrocardiogram (ECG) was repeated and it showed sinus tachycardia, ST elevation in leads V3-V6, 2, 3 and aVF. Cardiology consultation was sought and echocardiogram (ECHO) revealed hypokinetic basal, apical, septal region, mild-moderate Left ventricle systolic dysfunction, minimal pericardial effusion. Brain natriuretic peptide levels (BNP) were 432 pg/ml which were higher than normal.

The patient was diagnosed with stress induced cardiomyopathy. Infusion dopamine was started @ 2.5 microgram/Kg/minute. The patient was put on following medication:- tablet rosuvastatin 40mg HS, tablet torsemide 10 mg, tablet spironolactone 50 mg OD, tablet metoprolol 6.25 mg TDS, tablet ramipril 5 mg OD.

The patient responded to the treatment. Two days later, the patient was shifted to the spontaneous mode of ventilator and was later weaned off the mechanical ventilation and shifted to room air.

DISCUSSION

Takotsubo cardiomyopathy mostly occurs in post menopausal women. In a systematic review of women accounted for 82-100% of patients with average age of 62-75 years, although cases have been described in the age 10-91 years¹. In our case report also, the affected patient is a female.

This stress related cardiomyopathy occurs during enhanced sympathetic tone and is precipitated by excessive endogenous or exogenous catecholamines seen in intracranial haemorrhage, ischemic stroke, head trauma, pheochromocytoma and in critically ill patients.

The pathophysiology is explained by multivessel epicardial coronary artery spasm, coronary microvascular impairment, direct catecholamine cardiotoxicity and neurogenic stunned myocardium². However catecholamine implicated mechanism seems to be the best explained pathogenesis^{9,10}.

The most common symptoms are chest pain and dyspnea mimicking acute coronary syndrome. The ECG findings include ST segment elevation in precordial leads, T wave inversion and Q wave formation. The echocardiogram (ECHO) findings include apical and mid-ventricular dysfunction, isolated mid-ventricular and basal dysfunction, isolated basal dysfunction and global hypokinesis. In our case report also, the patient presented with similar findings.

Researchers at the Mayo Clinic⁶ have proposed a diagnostic criteria in 2004 which was later modified in 2008: (1) transient hypokinesis, akinesis, or dyskinesis in the left ventricular mid segments with or without apical involvement, (2) regional wall motion abnormalities that extend beyond a single epicardial vascular distribution, and frequently but not always a stressful trigger, the absence of obstructive coronary disease or angiographic evidence of acute plaque rupture, (3) new ECG abnormalities (ST segment elevation and/or T wave inversion) or modest elevation in cardiac troponin, and (4) the absence of pheochromocytoma and myocarditis. The modified Mayo Clinic criteria were satisfied in our patient.

The right ventricle is also affected in some patients. Such cases are accompanied with lower left ventricle ejection fraction and pleural effusion⁹. Right and/or left ventricle thrombi and embolic events have been identified in some patients. Non fatal recurrent stress cardiomyopathy events have also been reported⁷. Patients with stress cardiomyopathy have been found to have higher prevalence of neurologic or psychiatry disorders⁸. However, our patient had no such history.

There is no specific treatment for left ventricle failure of Takotsubo cardiomyopathy. Treatment with combined alpha and beta receptor blockers seem rational. The use of long term adrenoreceptor blocker (ARB) therapy prevents recurrence. The uses of angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARB) have been associated with improved survival at 1 year⁸. In our patient, we started with injection lasix, injection morphine, tablet metoprolol, ramipril, torsemide, spironolactone and rosuvastatin. The patient showed significant improvement.

Intraaortic balloon pump is useful when shock occurs^{1,2}. Short duration of anticoagulation with warfarin may be considered in patients with persistent significant reduction of left ventricular function to prevent left ventricular thrombus and embolization^{1,7}.

Prognosis in a patient of stress cardiomyopathy is generally favourable^{1,10}. Heart failure with or without pulmonary edema is the most common clinical complication. Mortality in patients ranges between 1-2%^{2,10}.

CONCLUSION

Stress cardiomyopathy is a reversible cardiomyopathy, also known as Takotsubo cardiomyopathy. It usually occurs in post menopausal women and is precipitated by acute intracranial events, head trauma, acute medical illness, and surgical procedures. The symptoms and signs mimic acute coronary syndrome. There is no specific treatment. The use of alpha and beta blockers, angiotensin receptor blockers, angiotensin converting enzyme inhibitors seems rational. Prognosis in a patient of stress cardiomyopathy is generally favourable.

Acknowledgement: None

Conflict of Interest: None

Source of Funding: None

Declaration of Patient Consent:

Appropriate patient consent was taken prior to publication in the journal.

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How to cite this article: Chaudhary S, Atwal MA. Stress induced cardiomyopathy: a case report and review of the literature. *International Journal of Science & Healthcare Research*. 2021; 6(2): 280-282. DOI: <https://doi.org/10.52403/ijshr.20210449>
