

Case Report

Emotional Turmoil: A Case of Takotsubo Cardiomyopathy in a Young Adult

Aelaf Aseged Mammo¹ , **Amirhossein Farahani²** , **Yasin Salari Sabzevaran²** ,
Sachi Jaydipsinh Chavda³ , **Mirab Singh⁴** , **Hemeesh Tandel⁵** , **Zhang Ming^{6,*}** 

¹Wachemo University, College of Medicine, Nigist Eleni Mohammed Memorial Comprehensive Specialized Hospital, Hossana, Ethiopia

²Xi'an Jiaotong University School of Medicine, Xi'an, China

³Gujarat Medical Education and Research Society Medical College and Hospital, Sola, Ahmedabad, Gujarat, India

⁴Department of Emergency, Medicit Hospital, Kathmandu, Nepal

⁵Chimanlal Ujamshibhai Shah Medical College, Saurashtra University, Surendranagar, Gujarat, India

⁶Department of Internal Medicine, First Affiliated Hospital of Zhejiang University, Hangzhou, China

Abstract

Takotsubo cardiomyopathy (TTC), or "broken heart syndrome," is a transient cardiac condition marked by left ventricular dysfunction, often triggered by emotional or physical stress. This case report discusses a 28-year-old female who developed TTC after the sudden loss of a close family member. She presented to the emergency department with acute chest pain, dyspnea, and anxiety, resembling acute myocardial infarction. ECG showed ST-segment elevations and T-wave inversions, while lab tests revealed elevated cardiac biomarkers, including troponin. An echocardiogram confirmed classic apical ballooning, and coronary angiography ruled out obstructive coronary artery disease, showing normal arteries. The patient received supportive care, including beta-blockers and anxiolytics, and her symptoms improved, with follow-up echocardiography showing normal left ventricular function within weeks. This case highlights the need for awareness of TTC in younger patients under emotional stress and the importance of timely diagnosis and management to avoid unnecessary interventions.

Keywords

Takotsubo Cardiomyopathy, Stress-Induced Cardiomyopathy, Emotional Stress, Chest Pain, Dyspnea

1. Introduction

Takotsubo cardiomyopathy (TTC), commonly referred to as "broken heart syndrome," is a reversible cardiac disorder that manifests as acute left ventricular dysfunction, closely mimicking acute myocardial infarction (AMI) [1]. Initially

reported in Japan during the early 1990s, TTC typically occurs in response to emotional or physical stress, resulting in a unique pattern of myocardial damage that differs from that seen in conventional coronary artery disease (CAD) [2, 3].

*Corresponding author: zhangming1993@yahoo.com (Zhang Ming)

Received: 22 November 2024; **Accepted:** 12 December 2024; **Published:** 17 January 2025



Copyright: © The Author(s), 2025. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

This condition predominantly affects postmenopausal women, although its incidence among younger populations is on the rise. Patients often present with symptoms such as chest pain, dyspnea, palpitations, and gastrointestinal discomfort, which can lead to misdiagnosis as acute coronary syndrome [4]. Diagnostic evaluations usually reveal ST-segment elevation and T-wave inversions on electrocardiograms (ECG), elevated cardiac biomarkers, and echocardiographic evidence of apical ballooning [5]. Notably, coronary angiography typically shows normal coronary arteries, aiding in the differentiation of TTC from other cardiac conditions [6]. Recognizing these factors is essential for early diagnosis and treatment, as most patients experience a favorable outcome, regaining cardiac function within weeks [7].

1.1. Objectives of the Case Report

This case report aims to:

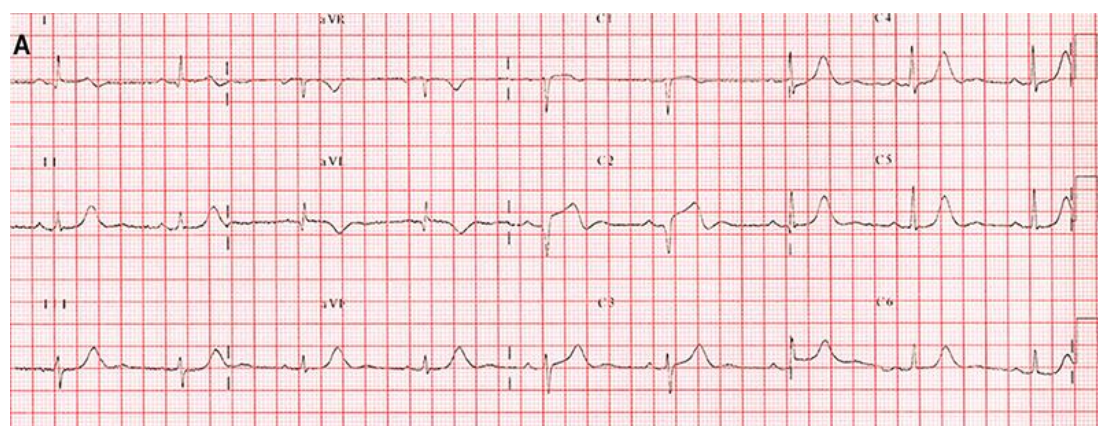
1. Highlight the clinical presentation and diagnostic challenges associated with Takotsubo cardiomyopathy in a young adult.
2. Emphasize the role of emotional stressors in precipitating TTC.
3. Contribute to the existing literature by documenting a case that underscores the importance of recognizing TTC in younger populations.

1.2. Status of Knowledge in Related Fields

Recent studies have expanded the understanding of TTC, revealing its potential occurrence in younger individuals and the critical role of psychological factors in its pathophysiology. Research indicates that while TTC is more prevalent in older women, younger patients can also be affected, often following significant emotional distress [8]. Furthermore, the recognition of TTC as a distinct clinical entity has led to improved diagnostic criteria and management strategies, although many healthcare providers remain unaware of its nuances [9].

2. Case Presentation

A 27-year-old Indigenous male who had an alcohol dependence and no other cardiovascular risk factors, complained of epigastric pain, nausea, vomiting and diaphoresis two days after binge drinking. He later developed chest pain. Physical examination revealed he was tachycardic with heart rate of 110 bpm, and febrile with temperature of 38.4 celsius degree, which manifested right upper quadrant pain. Laboratory investigations showed lipase to be raised with a value of 1310 U/L, leukocytes count of $17.2 \times 10^9/L$ and marginally deranged liver enzymes, uptake of bilirubin was 26 $\mu\text{mol/L}$, alkaline phosphatase 118 U/L, gamma-glutamyl transpeptidases 101 U/L, alanine aminotransferases 109 U/L. Kidney function was also normal (creatinine 76 $\mu\text{mol/L}$) while triglycerides level was high (2.5 mmol/L). Trends of serial troponin were increased from 0.77 ng/mL to 1019.63 ng/mL, ECG revealed ST-segment elevation in anterior leads, therefore, anterior ST-elevation Myocardial Infarction was diagnosed at the initial assessment. He had thrombolysis, put on dual antiplatelet and LMWH therapy and then was shifted to CCU. A repeated ECG demonstrated partial ST segment resolution and q waves. The transthoracic echocardiography was suggestive of significant left ventricular dysfunction with an ejection fraction of 20%. Subsequent studies showed non stenotic lesion of the right coronary artery basal hypokinesis and apical akinesis. The final diagnosis presented was Takotsubo cardiomyopathy (TCM). Use of dual antiplatelet therapy was discontinued and the patient was started on an ACE inhibitor and beta-blocker. Abdominal ultrasound did not reveal any gallstones or common bile duct stones but a computerized tomography [CT] scan suggested uncomplicated acute alcoholic pancreatitis with pancreatic oedema and peripancreatic fat fullness. This was reasonably controlled with IV fluids and upgrading the diet gradually so that the patient was discharged over three days with no more lower abdominal pain. He was discharged on day five. Four weeks later he had mild improvement in his disability, although he complained of dyspnea following activities such as lifting weights or walking for a long distance. He no longer indulged in alcohol consumption again. He was advised to have another echo echocardiogram after three months but he never turned up.



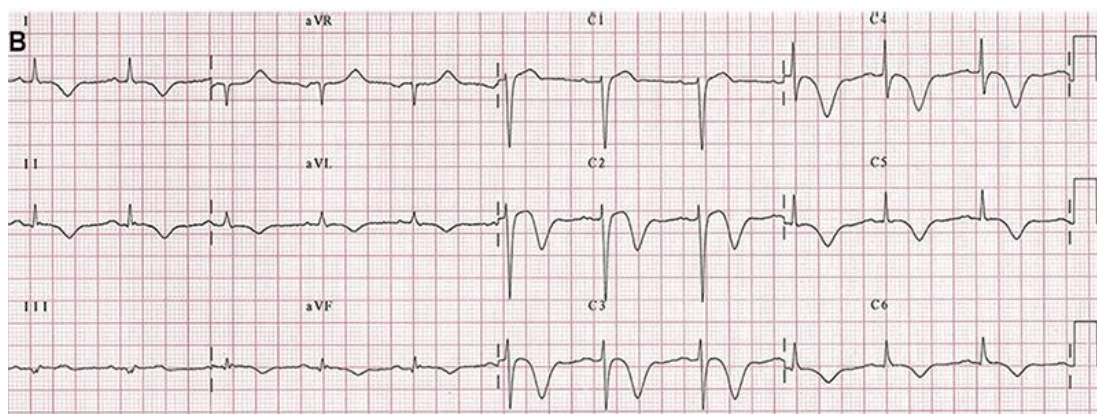


Figure 1. Show ECG of patient in different Lead.

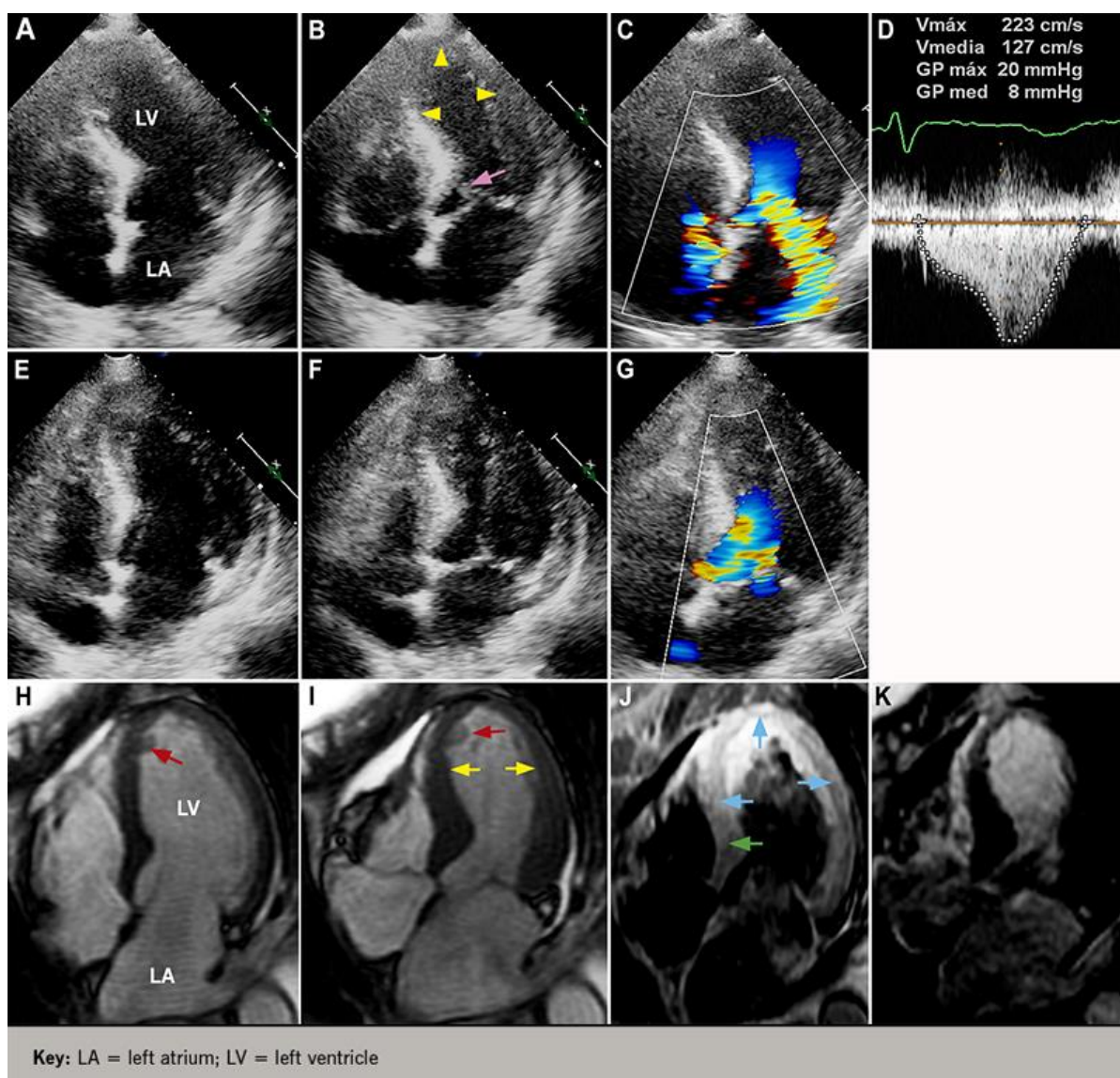


Figure 2. Show Echocardiogram of patient Left Ventricle.



Figure 3. Pancreatic edema with surrounding fat stranding of the pancreas on abdominal CT.

3. Discussion

3.1. Clinical Presentation of Takotsubo Cardiomyopathy

Symptoms

- a. Chest Pain: Patients often report sudden, severe chest pain, which is the most common presenting symptom. The pain is usually located in the center of the chest and can be described as a pressure or tightness [10].
- b. Dyspnea: Shortness of breath is frequently reported, often accompanying chest pain [11].
- c. Palpitations: Many patients experience irregular heartbeats or a sensation of a racing heart [12].
- d. Nausea and Vomiting: Gastrointestinal symptoms can also occur, contributing to the overall discomfort.
- e. Syncope: Some patients may experience fainting or near-fainting episodes.

3.2. Physical Examination Findings of Cardiomyopathy

1. Physical Examination Findings
 - a. Vital Signs: Patients may present with tachycardia (increased heart rate) and hypotension (low blood pressure).
 - b. Signs of Heart Failure: In severe cases, signs of heart failure such as peripheral edema or jugular venous distention may be observed.
2. Electrocardiogram (ECG) Changes
 - a. ST-Segment Elevation: Many patients exhibit ST-segment elevation on the ECG, which can mimic an ST-elevation myocardial infarction (STEMI) [13].
 - b. T-Wave Inversions: T-wave inversions are also common and can indicate myocardial ischemia.
3. Laboratory Findings
 - a. Elevated Cardiac Biomarkers: Cardiac enzymes such as troponin are often elevated, indicating myocardial injury.
 - b. B-Type Natriuretic Peptide (BNP): Levels may be elevated, reflecting heart strain.
4. Imaging Studies
 - a. Echocardiography: This is crucial for diagnosis, revealing characteristic left ventricular apical ballooning and regional wall motion abnormalities [14].
 - b. Coronary Angiography: Typically shows no significant coronary artery disease, which helps differentiate TTC from myocardial infarction [15].
5. Triggers
 - a. Emotional Stress: Many cases are precipitated by significant emotional stressors, such as the loss of a loved one or severe anxiety [16].
 - b. Physical Stress: Physical events, such as surgery or severe illness, can also trigger TTC [17].

Table 1. Clinical predictors for the diagnosis of Takotsubo syndrome.

Criteria	Points	Analysis Comments
Female sex	25	Most Weighted Criteria: Female sex has the highest points, highlighting its significance in diagnosing the syndrome.
Emotional trigger	24	Most Weighted Criteria: Emotional trigger also has high points, indicating its importance in diagnosis.
Physical trigger	13	-
Absence of ST-segment depression*	12	-
Psychiatric disorders	11	-
Neurological disorders	9	-
QTc prolongation	6	-
Total	100	Scoring System Purpose: Likely used to assess the probability of Takotsubo syndrome in patients.

*Note: Absence of ST-segment depression is considered except in lead aVR.

This table combines both the criteria and their analysis, providing a comprehensive overview of the scoring system and its implications.

4. Conclusion

Takotsubo cardiomyopathy is characterized by a unique clinical presentation that can closely resemble acute coronary syndrome. Recognizing the symptoms, understanding the triggers, and utilizing appropriate diagnostic tools are essential for timely and accurate diagnosis. The prognosis is generally favorable, with most patients experiencing recovery of cardiac function within weeks.

Abbreviations

BNP	B-Type Natriuretic Peptide
ECG	Electrocardiogram
TTC	Takotsubo Cardiomyopathy
CT	Computerized Tomography

Authors' Contributions

The project was a collaborative effort involving several key contributors. Amirhossein Farahani, Yasin Salari Sabzevaran, and Hemeesh Tandel focused on data curation, ensuring the integrity and organization of the data, as well as developing the methodology and conducting thorough analysis. Aelaf Aseged Mammo and Gulnaz Bahtiyarova were instrumental in the conceptualization of the project, gathering necessary resources, and writing the original draft to articulate the findings effectively.

Conflict of Interest

Authors declare no competing conflict of interest.

References

- [1] Akashi YJ, Goldstein DS, Barbaro G, Ueyama T. Takotsubo cardiomyopathy: a new form of acute, reversible heart failure. *Circulation*. 2008 Dec 16; 118(25): 2754-62. <https://doi.org/10.1161/CIRCULATIONAHA.108.767012>
- [2] Singh B, Manita B, Suman F, Kumari N, Shiza ST, Samreen I, Shah S, Mokhtar SM, Patel U, Devi J, Reza RR, Mohamed KH, Ahmad S, Nasir H. A Systematic Review of COVID-19 Vaccine-Induced Takotsubo Cardiomyopathy: A 2023 Update. *Cureus*. 2023 Dec 11; 15(12): e50319. <https://doi.org/10.7759/cureus.50319>
- [3] Matta AG, Carrié D. Epidemiology, Pathophysiology, Diagnosis, and Principles of Management of Takotsubo Cardiomyopathy: A Review. *Med Sci Monit*. 2023 Mar 6; 29: e939020. <https://doi.org/10.12659/MSM.939020>
- [4] Chams S, El Sayegh S, Hamdon M, Kumar S, Kulairi Z. Zumba-induced Takotsubo cardiomyopathy: a case report. *J Med Case Rep*. 2018 Jun 10; 12(1): 160. <https://doi.org/10.1186/s13256-018-1696-x>
- [5] Vazirani R, Rodríguez-González M, Castellano-Martínez A, Andrés M, Uribarri A, Corbó Pascual M, Alfonso F, Blanco-Ponce E, Lluch-Requerey C, Fernández-Cordón C, Al-mendro-Delia M, Cruz OV, Núñez-Gil JJ; RETAKO Investigators. Pediatric takotsubo cardiomyopathy: A review and insights from a National Multicentric Registry. *Heart Fail Rev*. 2024 Jul; 29(4): 739-750. <https://doi.org/10.1007/s10741-024-10401-1>
- [6] Habib M, Aronson D. Thromboembolic Complications in Takotsubo Cardiomyopathy. *Semin Thromb Hemost*. 2024 Oct 8. Epub ahead of print. PMID: 39379040. <https://doi.org/10.1055/s-0044-1791511>
- [7] Desai R, Singh S, Patel U, Fong HK, Kaur VP, Varma Y, Madan D, Patel S, Mahuwala Z, Sachdeva R, Kumar G. Frequency of takotsubo cardiomyopathy in epilepsy-related hospitalizations among adults and its impact on in-hospital outcomes: A national standpoint. *Int J Cardiol*. 2020 Jan 15; 299: 67-70. <https://doi.org/10.1016/j.ijcard.2019.07.034> Epub 2019 Jul 13. Erratum in: *Int J Cardiol*. 2020 Jun 1; 308: 12.
- [8] Garg N, Raavi L, Maheshwari S, Celik NB, Rastogi A, Garg P. Complex Presentation of Pheochromocytoma: Hypertensive Encephalopathy and Takotsubo-Like Cardiomyopathy in a Young Female. *Am J Case Rep*. 2024 Sep 8; 25: e944024. <https://doi.org/10.12659/AJCR.94402>
- [9] Scafa-Udriste A, Horodinschi RN, Babos M, Dinu B. Diagnostic challenges between takotsubo cardiomyopathy and acute myocardial infarction-where is the emergency?: a literature review. *Int J Emerg Med*. 2024 Feb 15; 17(1): 22. <https://doi.org/10.1186/s12245-024-00595-4>
- [10] Aparisi Á, Uribarri A. Takotsubo syndrome. *Med Clin (Barc)*. 2020 Oct 23; 155(8): 347-355. English, Spanish. <https://doi.org/10.1016/j.medcli.2020.04.023>
- [11] Amin HZ, Amin LZ, Pradipta A. Takotsubo Cardiomyopathy: A Brief Review. *J Med Life*. 2020 Jan-Mar; 13(1): 3-7. <https://doi.org/10.25122/jml-2018-0067>
- [12] Khan AN, Malik ES. Takotsubo cardiomyopathy: A case report. *J Pak Med Assoc*. 2023 Apr; 73(4): 919-921. <https://doi.org/10.47391/JPMA.6361>
- [13] Chahal GS, Polena S, Fard BS, Natesan S, Sharma S, Gintautas J. Takotsubo cardiomyopathy: case report and review of the literature. *Proc West Pharmacol Soc*. 2008; 51: 48-51.
- [14] Khwaja YH, Tai JM. Takotsubo cardiomyopathy with use of salbutamol nebulisation and aminophylline infusion in a patient with acute asthma exacerbation. *BMJ Case Rep*. 2016 Oct 28; 2016: bcr2016217364. <https://doi.org/10.1136/bcr-2016-217364>

- [15] Clark LC, Khunger A, Aji W. Takotsubo cardiomyopathy in a female presenting with status asthmaticus: a case report and review of literature. *Egypt Heart J*. 2022 Oct 1; 74(1): 72. <https://doi.org/10.1186/s43044-022-00310-9>
- [16] Khan I, Atoot A. An unusual presentation of takotsubo syndrome in an elderly patient. *Oxf Med Case Reports*. 2024 Feb 16; 2024(2): omad144. <https://doi.org/10.1093/omcr/omad144>
- [17] Coons JC, Barnes M, Kusick K. Takotsubo cardiomyopathy. *Am J Health Syst Pharm*. 2009 Mar 15; 66(6): 562-6. <https://doi.org/10.2146/ajhp080225>