

## CARDIOMYOPATHY CAUSED BY STRESS DUE TO FEAR OF UNDERGOING MAGNETIC RESONANCE IMAGING

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### Keywords

Cardiomyopathy,  
Magnetic resonance,  
Stress,  
Takotsubo

### ABSTRACT

*Takotsubo cardiomyopathy is a primary and acquired form of non-ischemic cardiomyopathy. Usually, a psychologically, emotionally, or physically stressful event precedes it. We have documented a case of a 67-year-old woman who experienced chest pain after undergoing magnetic resonance imaging (MRI). Electrocardiography (ECG) indicated changes and cardiac markers consistent with acute coronary syndrome (ACS). Coronary angiography revealed no coronary artery disease. Left ventriculography showed depressed LV systolic function with anteroapical akinesia, consistent with Takotsubo cardiomyopathy. After the cardiac catheterization and echocardiography patient is diagnosed with Takotsubo cardiomyopathy. Clopidogrel and atorvastatin were discontinued and the patient was treated with metoprolol, aspirin, and lisinopril. Two weeks later, during her follow-up, she described no symptoms and the control echocardiogram showed normal findings.*

### INTRODUCTION

Takotsubo cardiomyopathy is a primary and acquired form of non-ischemic cardiomyopathy<sup>1</sup>. This heart condition, known as stress cardiomyopathy, transient left ventricular apical ballooning syndrome, or broken heart syndrome, causes a temporary disorder in the way the left ventricular apex moves. Usually, a psychologically, emotionally, or physically stressful event precedes it. The exact cause of the disease is not fully understood, but it is believed that factors such as too much adrenergic stimulation, vascular spasm, microvascular dysfunction, temporary blockage of the left ventricular outflow tract, or regional myocarditis may play a role<sup>2,3</sup>.

The disease is frequently seen in postmenopausal women. It usually develops as a result of an emotionally or physically stressful event. Although the disease presents itself almost identical to acute myocardial infarction, coronary angiography does not reveal any lesion that may explain left ventricular wall motion disorder. Elevations in cardiac biomarkers are consistent with acute coronary syndrome. The most commonly observed electrocardiography (ECG) finding is anterior ST-segment elevation. However, it is also possible to observe ST-segment depression and T-wave inversion<sup>3,4</sup>.

Volume: 1  
Issue: 2  
Page: 87-89

Received:  
27.06.2023

Accepted:  
05.08.2023

Available Online:  
15.10.2023



DOI:10.5281/zenodo.8414570

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The Mayo Clinic uses specific diagnostic criteria to diagnose diseases<sup>5</sup>.

1. Transient hypokinesia or akinesia of the middle and apical regions of the left ventricle
2. Normal coronary arteries confirmed by arteriography (luminal narrowing of less than 50% in all the coronary arteries) in the first 24 h after the onset of symptoms
3. ECG findings including ST-segment elevation or depression
4. Absence of recent significant head injury, intracranial hemorrhage, suspicion of pheochromocytoma, myocarditis, or hypertrophic cardiomyopathy

Although the prognosis of the disease is generally good, severe complications such as hypotension, acute heart failure, ventricular rupture, LV apex thrombus, and malignant arrhythmia have been reported<sup>5</sup>. We have documented a case of a 67-year-old woman who experienced chest pain after undergoing magnetic resonance imaging (MRI). Electrocardiography (ECG) indicated changes and cardiac markers consistent with acute coronary syndrome (ACS). Further diagnosis revealed Takotsubo cardiomyopathy.

### CASE REPORT

67 years old woman who is scheduled to undergo MRI due to severe neck pain developed typical chest pain during MRI. According to the patient's history, she experienced claustrophobic fear, panic, and anxiety during the MRI procedure. Shortly after that, she began to feel retrosternal, pressure-like chest pain. She has no known cardiac history. She has a history of hypertension. On physical examination, the arterial blood pressure was 130/80mm Hg and the heart rate was 72 beats/min and regular. Electrocardiography (ECG) showed T wave inversion in DI, aVL, and V1-V6. The blood analysis revealed Hb:11,6 g/dL, creatinine:1,0 mg/dL and troponin 946 pg/ml. The echocardiographic examination showed akinesia of the apical segment of the left ventricular. The ejection fraction was %35-40 and grade 1 mitral regurgitation was present. The patient was using lisinopril and hydrochlorothiazide. The patient was loaded with oral 300 mg clopidogrel, 300 mg aspirin, 40 mg atorvastatin and given 5000 U heparin intravenously.

Coronary angiography revealed no coronary artery disease. Left ventriculography showed depressed LV systolic function with anteroapical akinesia, consistent with Takotsubo cardiomyopathy. After the cardiac catheterization and echocardiography patient is diagnosed with Takotsubo cardiomyopathy. Clopidogrel and atorvastatin were discontinued and the patient was treated with metoprolol, aspirin, and lisinopril. Two weeks later, during her follow-up, she described no symptoms and the control echocardiogram showed normal findings.

### DISCUSSION

Takotsubo cardiomyopathy is a type of acquired, non-ischemic cardiomyopathy that affects the heart. It is also known as stress cardiomyopathy, transient left ventricular apical ballooning syndrome, or broken heart syndrome. One of its main features is the reversible wall motion disorder of the left ventricular apex. Generally, there is a stressful psychological, emotional or physical event before<sup>2,3</sup>. The disease is frequently seen in postmenopausal women. It usually develops as a result of an emotionally or physically stressful event. Although the disease presents itself almost identical to acute myocardial infarction, coronary angiography does not reveal any lesion that may explain left ventricular wall motion disorder. Clinical presentation, elevation in cardiac markers' and ECG findings are consistent with acute coronary syndrome however they have two different pathophysiologies<sup>3,4</sup>.

The specific cause of the disease is unknown, but it is believed that a variety of factors such as excessive adrenergic stimulation, vascular spasm, microvascular dysfunction, temporary blockage of the left ventricular outflow tract, or regional myocarditis may contribute to its development. The most commonly discussed mechanism for this condition is stress-induced catecholamine release<sup>2,3</sup>.

To our best knowledge, this is the first case of Takotsubo cardiomyopathy triggered by MRI fear. Our patient was undergoing an MRI procedure when she developed cardiac symptoms. According to her history, it is clear that during the procedure she had a severe panic attack and fear due to being in an MRI machine which triggered excessive sympathetic stimulation. Excessive sympathetic stimulation and the consequent release of catecholamines have been known to trigger microvascular spasm and direct toxicity in the heart muscle, which is believed to be the primary cause of Takotsubo cardiomyopathy<sup>3</sup>.

While Takotsubo cardiomyopathy is typically a rare and harmless condition, certain patients may experience severe complications such as low blood pressure, fluid buildup in the lungs, heart muscle tearing, and unexpected death. Due to the rising cases of Takotsubo cardiomyopathy, it is important to consider it as a potential differential diagnosis for acute myocardial infarction.

### **Acknowledgments**

None.

### **Conflict of Interest**

No conflict of interest is reported by the authors.

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