Postictal Cardiomyopathy

Bassil Said[1], Venkata Pendela[1], Erfan Alotaki[2], and Bipul Baibhav[2]

[1]Rochester General Hospital
[2]Rochester Regional Health

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Abstract

Stress cardiomyopathy (SC) is a syndrome characterized by transient regional systolic dysfunction of the left ventricle (LV), in the absence of obstructive coronary artery disease. The diagnosis of SC represents a challenge as it is essentially a diagnosis of exclusion. We report the case of a 21-year-old man who sustained mid-ventricular (MV) SC after a seizure. Our case represents a combination of a predisposing acute neuronal injury in a man that led to the development of an MV SC variant, where cardiac MRI played an essential role in the diagnosis.

Article type: Cardiac MRI Rounds

Postictal Cardiomyopathy

Bassil Said, MD[1], Venkata Satish Pendela, MD[1], Erfan Alotaki, MD[2], Bipul Baibhav, MD[2]

1. Department of Internal Medicine, Rochester General Hospital, Rochester, NY.
2. Sands Constellation Heart Institute, Rochester Regional Health, Rochester, NY.

Corresponding Author: Bassil Said, MD

Department of Internal Medicine, Rochester General Hospital, Rochester, NY.

1425 Portland Ave, Rochester, NY 14621

Fax: (585) 922-4440, Email: bassil.said@rochesterregional.org

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Background

Stress cardiomyopathy (SC) is a syndrome characterized by transient regional systolic dysfunction of the left ventricle (LV), in the absence of obstructive coronary artery disease. The most common presentation of the syndrome is left ventricular apical ballooning. A less common variant is referred to as the "mid-ventricular" type (MV), which is characterized by isolated akinesis of the mid-ventricular segments.

Case Presentation

A 21-year-old male presented after a witnessed seizure. Shortly after the presentation, he had a cardiac arrest and was successfully resuscitated. An electrocardiogram revealed sinus tachycardia with left bundle branch block. Serum troponin-I was elevated (31 ng/ml). Urine toxicology screen ruled out recreational drug use.

A transthoracic echocardiogram (TTE) revealed a left ventricular (LV) ejection fraction (EF) of 30% and hypokinesia of the MV segment of the LV with normal contractility of the apex and basal segments (Video A). Left and right heart catheterization revealed normal coronary arteries, normal right heart filling pressures, and a preserved cardiac output (Figure A). A viral myocarditis panel including Coxsackie B, EBV, CMV, HHV-6, Parvovirus B-19, and HSV was negative. A cardiac MRI (Video B, C, D, E) revealed severe hypokinesis of the MV segment of the LV with normal contractility of apical and basal segments. There was no evidence of myocardial edema and there was no abnormal delayed gadolinium enhancement to suggest myocardial infarction, scarring, or infiltrative disease (Figure B). He improved clinically with supportive measures and a TTE before discharge showed an LVEF of 50% with normal LV contractility (Video F).

Discussion

SC triggered by nervous system disease has been described in multiple reports. The relationship between both entities is still not clear. A systematic review conducted by Porto et al. in 2013 of 124 reported cases concluded that this entity involves the cardiac apex more frequently and is more common among women. The seizure was the associated nervous system disease in 1.8% of cases, of which only 5.6% were males and 72.2 % of cases had the typical apical type of SC.

Cardiac Magnetic Resonance Imaging is a well-established imaging modality that helps in assessing the functional and tissue properties of the heart. It can non-invasively distinguish stress cardiomyopathy syndrome from other conditions such as myocardial infarction, myocarditis, or myocardial infiltrative disease. The involvement of the right ventricle in this syndrome which is found in almost one-third of the cases was reported only through cardiac MRI. The MRI data from the study conducted by Leurent et al. showed that the pathogenesis in SC is neither ischemic nor fibrotic as the delayed gadolinium enhancement is almost never found in these patients. Stress cardiomyopathy is a diagnosis of exclusion. In our patient, the cardiac MRI confirmed the wall motion abnormalities and helped in the exclusion of other possible differentials.

Conclusion

Our case represents a unique combination of a predisposing acute neuronal injury in a man that led to the development of an MV SC variant, where cardiac MRI played an essential role in ruling out other diagnostic possibilities.

Author Contributions:

B.B. and E.A. conceived of the concept. B.S. took the lead in writing the manuscript and designing the supplementary material. V.P. contributed to the final version of the manuscript. B.B. provided critical revision of the article.

Supplementary Material : The following supplementary material is available online:

- **Video A:** Initial Transthoracic echocardiogram four-chamber view revealing severe isolated hypokinesis of the mid-left ventricular segment with normal contractility of the apical and basal segments. (AVI)
- **Figure A:** Angiography of the right (right side) and left (left side) coronary circulation revealing normal coronary arteries.
- **Video B:** Cardiac MRI short-axis view of the apex revealing normal contractility. (MPEG)
- **Video C:** Cardiac MRI short-axis view of the mid-left ventricular segment revealing severe hypokinesis. (MPEG)
- **Video D:** Cardiac MRI short-axis view of the basal segment revealing normal contractility. (MPEG)
- **Video E:** Cardiac MRI four-chamber view revealing severe isolated hypokinesis of the mid-left ventricular segment with normal contractility of the apical and basal segments. (MPEG)
- **Figure B:**
- Two-chamber view late gadolinium enhancement cardiac MRI revealing no delayed myocardial gadolinium enhancement.

- Three-chamber view late gadolinium enhancement cardiac MRI revealing no delayed myocardial gadolinium enhancement.
- Four-chamber view late gadolinium enhancement cardiac MRI revealing no delayed myocardial gadolinium enhancement.
- **Video F:** Follow up Transthoracic echocardiogram four-chamber view revealing marked improved of contractility of the left ventricle. (AVI)