Midventricular type of Takotsubo (stress) cardiomyopathy concurrent to severe coronary vasospasm

Marcos Danillo P. Oliveira^, Adriano Caixeta^

Department of Interventional Cardiology, Hospital São Paulo, Escola Paulista de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil
Correspondence to: Prof. Dr. Adriano Caixeta, MD, PhD. Department of Interventional Cardiology, Hospital São Paulo, Escola Paulista de Medicina, Universidade Federal de São Paulo, Napoleão de Barros, nº 715 - Vila Clementino, Sao Paulo-SP, Brazil. Email: acaixeta@me.com.

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Takotsubo (stress) cardiomyopathy (TSC) is defined by transient left ventricular (LV) dysfunction with a variety of wall-motion abnormalities (1,2). Generally recognized as a benign disorder, it predominantly affects elderly women and is often preceded by emotional and/or physical triggers, but has also been reported without evident ones (3,4). Clinical presentation, electrocardiographic findings and cardiac biomarker profiles are often similar to those of acute coronary syndromes (3).

Among 1,750 patients of The International Takotsubo Registry (www.takotsubo-registry.com), the most common variant was the apical (81.7%), followed by midventricular (14.6%), basal (2.2%) and focal (1.5%) types (3,4).

Catecholaminergic imbalance appears to play a pivotal role for TSC occurrence, and reports of concurrency with coronary artery vasospasm have suggested possible common pathways (5-8).

A 49-year-old woman, current smoker, with anxiety disorder and major depression under psychiatric treatment, just after general anesthetic induction to surgical vascular repair of chronic mesenteric ischemia, developed an episode of ventricular fibrillation, promptly reverted with electrical therapy and cardiopulmonary resuscitation. Pre-operative adenosine myocardial perfusion scintigraphy was unremarkable. The 12-lead electrocardiogram just after return of spontaneous circulation showed ST-segment elevation in leads V4–V6 (*Figure 1*). In addition, she degenerated to severe hemodynamic collapse, stabilized with increasingly doses of norepinephrine and dobutamine. Emergency coronary angiography showed unexpected severe and diffuse right coronary artery (RCA) vasospasm (*Figure 2A*), precluding complete filling of the artery, mimicking its occlusion. Following selective intracoronary injection of nitroglycerin (400 µg), the normal dominant RCA was then revealed (*Figure 2B,C,D*). Left coronary system showed a similar pattern of diffuse (but not so severe) vasospasm (*Figure 3A,B*), also ameliorated after intracoronary nitrate (*Figure 3C,D*), without any significant stenosis. Left ventriculography on right anterior oblique view (*Figure 4A,B*) and left anterior oblique view (*Figure 4C,D*) showed akinesia of all mid portions of anterior, inferior, lateral and septal LV walls, compatible with midventricular type of TSC. Transthoracic echocardiogram (TTE) confirmed those findings. Just after the procedures, still on the cath lab table, there were two new episodes of cardiac arrest (ventricular fibrillation and torsades de pointes ventricular tachycardia), once again promptly reverted. At the intensive cardiac care unit, about 24 hours later, she was already without invasive mechanical ventilatory support, inotropes nor vasopressors, with normal neurological status and no recurrence of arrhythmias. New TTE 4 days later confirmed the initial findings. Cardiac magnetic resonance performed one week after the onset revealed preserved LV ejection fraction, despite hypokinesia of mid segments of all LV walls, without evidence of myocardial infarction. The patient was discharged home at ninth day, with optimal medical treatment (aspirin, rosuvastatin, ramipril and diltiazem), without recurrence of adverse cardiac events.

^ ORCID: Marcos Danillo P. Oliveira, 0000-0001-6953-8544; Adriano Caixeta, 0000-0002-6287-5414.

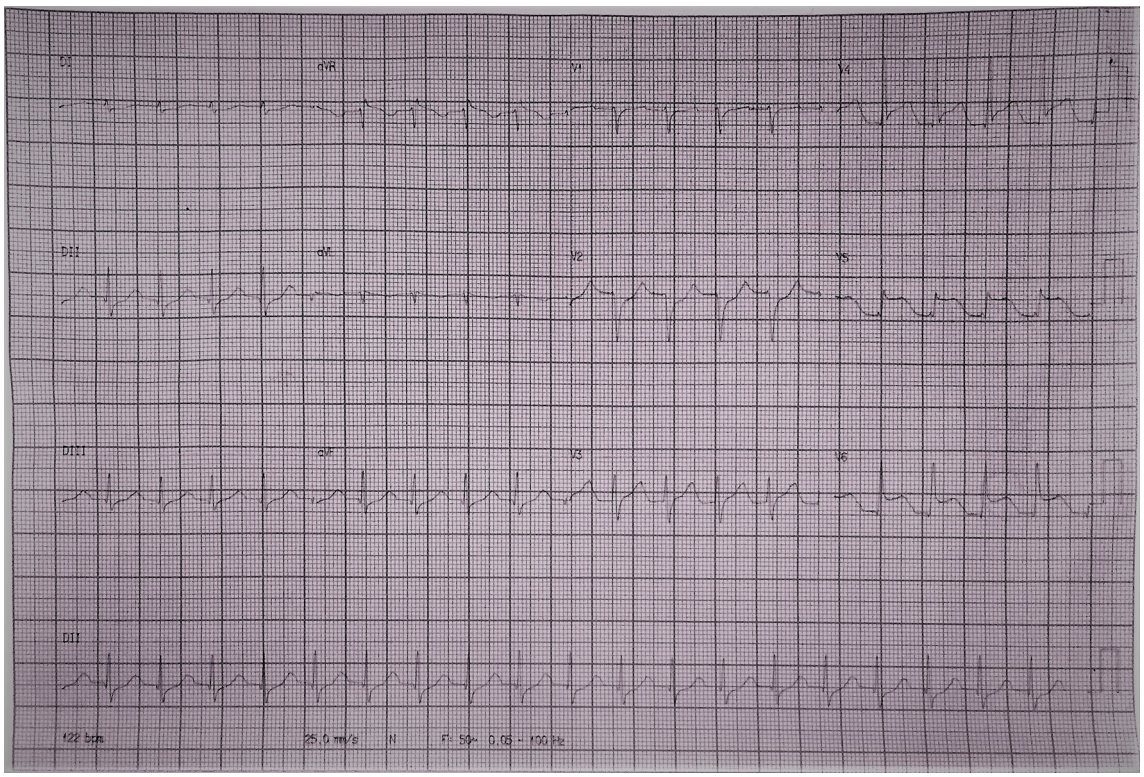

Figure 1 Initial 12-lead electrocardiogram just after return of spontaneous circulation showing ST-segment elevation in leads V4–V6.

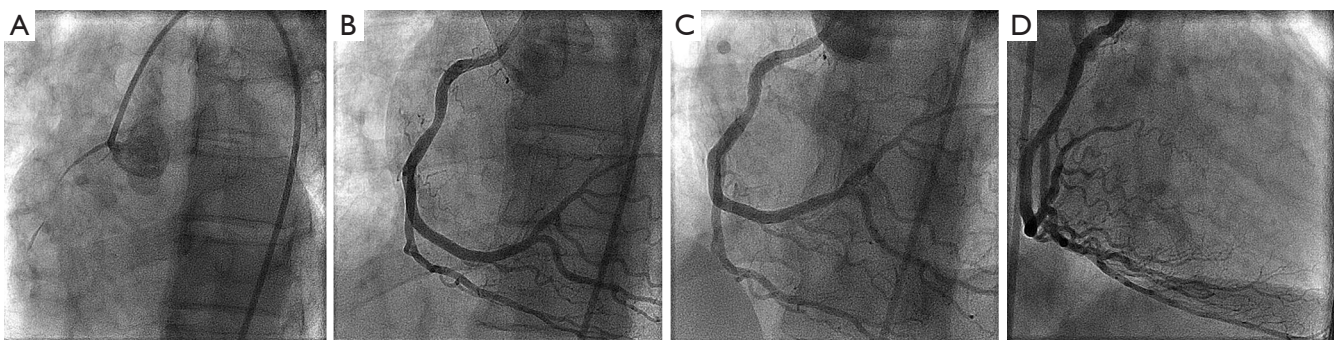

Figure 2 Coronary angiography. (A) Severe and diffuse RCA vasospasm, mimicking its occlusion; (B,C,D) following selective intracoronary injection of nitroglycerin, the normal dominant RCA was then revealed. RCA, right coronary artery.

TTE performed four weeks later revealed complete reversal of initial midventricular systolic dysfunction.

The exact pathophysiological mechanism of TSC is still unknown. Neuro-cardiac action with coronary artery vasospasm, like in the present case, may play a special role (8). The spectrum of TSC is wide and ranges from low to very high risk in the acute phase. The relatively rapid recovery of LV function and a selection bias of previous reports toward low-risk patients generated the misapprehension that it is a universally benign disease. This condition, however, represents an acute heart failure syndrome with substantial morbidity and mortality (3).

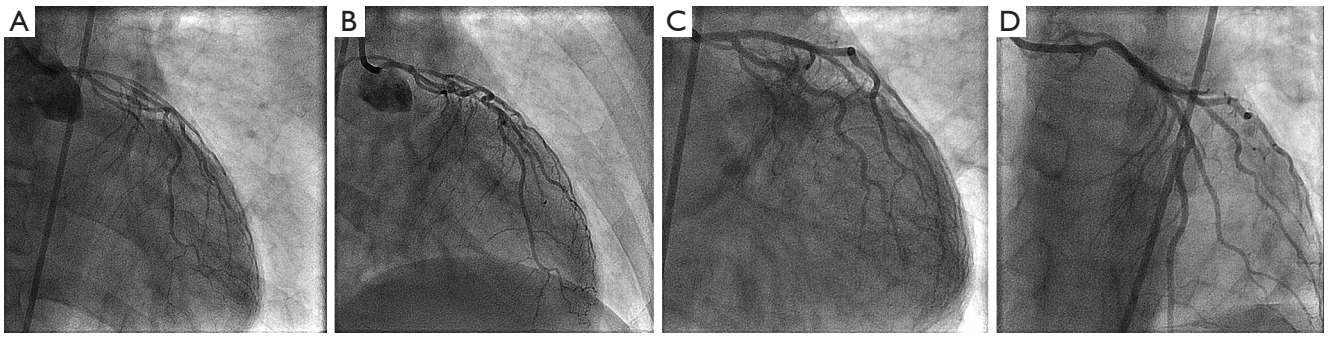

Figure 3 Coronary angiography. (A,B) Diffuse left coronary artery vasospasm; (C,D) after intracoronary nitroglycerin, no significant stenosis were revealed.

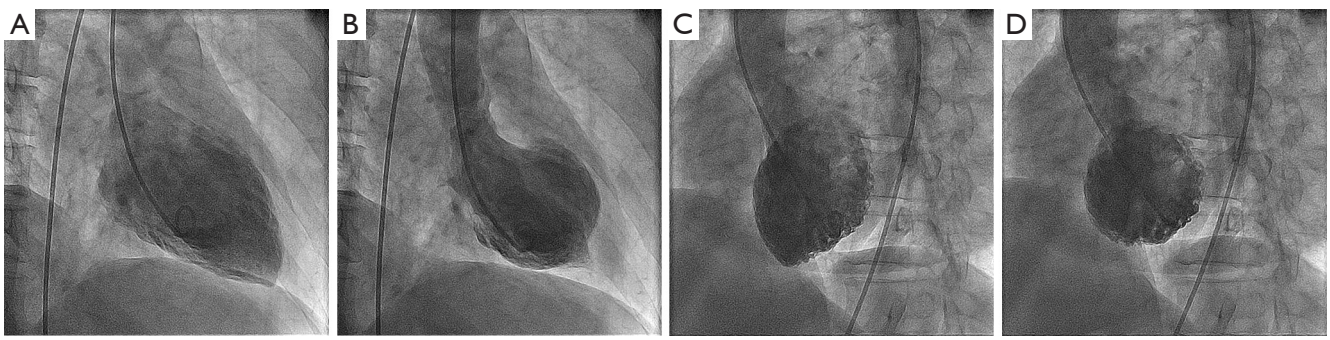

Figure 4 Left ventriculography (diastole and systole) on right anterior oblique view (A,B) and left anterior oblique view (C,D) showing akinesia of all mid portions of anterior, inferior, lateral and septal LV walls, compatible with midventricular type of TSC. LV, left ventricle; TSC, Takotsubo stress cardiomyopathy.

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Footnote

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Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/jxym-20-90). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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