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Inverted Takotsubo Edema as an Expression of Endothelial Microvascular Dysfunction?

Takotsubo invertido

¿Edema como expresión de disfunción microvascular endotelial?

CHRISTIAN A. CAROLI^{MTSAC, 1}, BETINA YAMAN^{MTSAC, 2}

Takotsubo is an acute cardiomyopathy not caused by epicardial coronary artery disease. It is triggered by clinical situations of stress and at presentation mimics an acute coronary syndrome. (1) It was first identified as apical ballooning, but recently hypokinesia has also been observed at the mid-ventricular or basal segments; therefore it is called inverted or reverse takotsubo. (2) There are indications of the role of microvascular dysfunction as a central pathophysiological mechanism.

These images correspond to a 63-year-old hypertensive woman, with no history of cardiovascular disease, but with a long history of anxiety disorders. The patient arrived at the emergency room complaining of a prolonged angina-like chest pain. The ECG showed symmetric positive T waves with unclear territoriality, with troponin T 0.11 ng/mL, in the context of a difficult family situation. A coronary angiography with ventriculography revealed coronary arteries without angiographic lesions, ventricular enlargement, and hypokinesia at the basal and mid-ventricular segments with apical hyperkinesia (Figure 1: A diastole / B systole; see Video 1 on the website).

The patient was diagnosed with inverted takotsubo. Findings were confirmed with echocardiography and MRI (Figure 2 A-F) within 24 hours of admission, showing ventricular enlargement (38.1 mm/m² CS, ESV 58.6 mL/m², EDV 95.5 mL/m²), EF 39% with severe basal and mid anteroseptal, anteromedial and anterobasal hypokinesia, reduced wall thickening, and mild-to-moderate mitral regurgitation. There was absence of fibrosis with delayed gadolinium enhancement and myocardial wall edema in T2 (See Video 2 on the website). The patient had a favorable outcome and was discharged after three days. Outpatient follow-up echocardiography at 1 month showed preserved diameters with good ventricular function.

This case highlights the images of inverted takotsubo. The electrocardiographic presence of subepicardial ischemia with unclear territoriality should be taken into account in this cardiomyopathy, in addition to the known image of apical subendocardial ischemia (negative T waves). (3) Following the reduction of myocardial perfusion, the injury is manifested with wall motion disorders and edema with absence of delayed gadolinium enhancement, enabling the differentiation of this entity from myocarditis or coronary syndrome. (4) In addition, from the metabolic viewpoint, "reverse perfusion-metabolism mismatch" has been reported, which consists in post-ischemic stunning. (5) There are several pathophysiological hypotheses; recently, the key role of microvascular endothelial dysfunction has gained strength in connection with vasospasm angina, (6) though associated with catecholaminergic discharge. Indeed, Sato et al. demonstrated the presence of coronary spasm

(23%) and diffuse vasoconstriction (54%) with the intracoronary acetylcholine provocation test in patients with takotsubo.

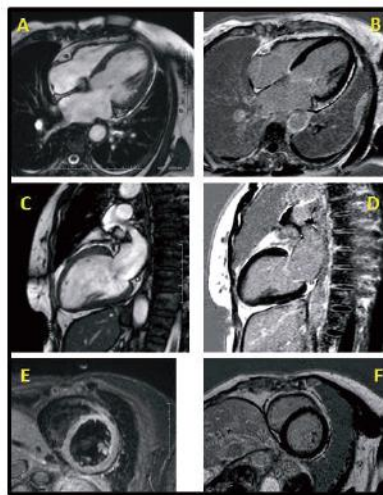


Fig. 2. See description in the text.

Conflicts of interest

None declared (See authors' conflicts of interest forms in the website/ Supplementary Material).

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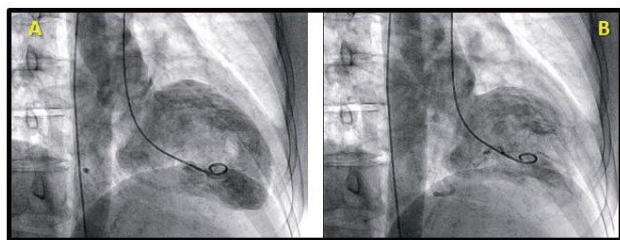


Fig. 1. See description in the text.

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