Midventricular Takotsubo cardiomyopathy associated with ventricular fibrillation during general anaesthesia in a 34-year-old woman: Insight from cardiac computed tomography and magnetic resonance imaging

Syndrome de Takotsubo médioventriculaire associé à une fibrillation ventriculaire lors d’une anesthésie générale chez une patiente de 34 ans: intérêt du scanner et de l’IRM cardiaque

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A 34-year-old woman was referred to the emergency department for right lower quadrant abdominal pain. She had no cardiovascular risk factors or medical history, except for four previous general anaesthesias for minor surgery, with no complications. She did not complain of chest pain and troponin concentration was not elevated. Neutrophils were elevated on blood count (11,000/mL) and C-reactive protein concentration was normal. Abdominal CT showed a moderately hypertrophied appendix (10-mm diameter) with small adjacent peritoneal effusion consistent with appendicitis. Exploratory laparoscopy was then decided upon. Ten minutes after induction of anaesthesia (using sufentanil, propofol and cisatracurium), she developed circulatory inefficiency secondary to ventricular fibrillation. Successful defibrillation was obtained after two external electric shocks.

Abbreviations: CT, computed tomography; LGE, late gadolinium enhancement; LV, left ventricular; MRI, magnetic resonance imaging.

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Surgery was delayed. Transthoracic echocardiography revealed a global hypokinesia of the left ventricle with significant impairment of LV ejection fraction (35%). The electrocardiogram recorded at rest after resuscitation was strictly normal. The next day, prospectively triggered cardiac CT (GE Discovery 750HD, GE Healthcare, Waukesha, WI, USA) was performed (dose-length product, 76 Gy·cm; ≈1.5 mSv), which eliminated coronary artery disease or anomalous origin of coronary arteries. To limit artefacts in this tachycardic patient (heart rate, 85 beats per minute)

**Figure 1.** Cardiac CT (A–C): multiplanar reconstructions in end-systole showing hypokinesia of the midventricular part of the left ventricle; cardiac MRI at baseline (D–F): end-diastolic (D) and end-systolic (E) two-chamber views showing circumferential midventricular akinesia with normal thickening of basal and apical segments, but no late gadolinium enhancement (F); cardiac MRI at 1 month (G–I) showing complete recovery of regional LV function.
Midventricular Takotsubo cardiomyopathy during general anaesthesia with a contraindication to beta-blocker therapy, we centered the prospective acquisition window on the end-systole (phase 40%). Multiplanar reconstructions showed hypokinesis of the midventricular part of the left ventricle, contrasting with the normal thickening of the basal and apical sectors (Fig. 1A–C). Midventricular Takotsubo cardiomyopathy was therefore considered and cardiac MRI was performed the day after. Cardiac MRI (Siemens Symphony TIM, 1.5T, Erlangen, Germany) confirmed the circumferential midventricular akinesia with normal thickening of basal and apical segments (Fig. 1D: end-diastole; E: end-systole; Appendix A: Videos 1 and 2) and no LGE (F). Follow-up MRI at 1 month showed complete recovery of global and regional LV function (G: end-diastole; H: end-systole; Appendix A: Videos 3 and 4) and absence of LGE (I), thus confirming the diagnosis of acute reversible midventricular Takotsubo cardiomyopathy associated with ventricular fibrillation and general anaesthesia.

Takotsubo cardiomyopathy, also known as stress-induced or LV ballooning syndrome, leads to acute myocardial stunning with transient LV dysfunction, probably related in part to catecholamine overload. Although affecting particularly postmenopausal woman in the context of acute stress by mimicking acute myocardial infarction in the territory of the left anterior descending artery, our report confirms the heterogeneity of epidemiological and clinical presentations. Besides, in the present report, the midventricular Takotsubo pattern was shown after the episode of ventricular fibrillation by cardiac CT and MRI. Thus this anomaly could be either the cause or the consequence of the ventricular fibrillation. This report supports the need for better understanding the pathophysiology of this cardiomyopathy. In this case, the combination of cardiac CT and MRI was particularly helpful.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

Appendix A. Supplementary data