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Takotsubo Cardiomyopathy and Resultant Cardiogenic Shock After Mitral Valve Repair

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Case Presentation: A 51-year-old woman was diagnosed with asymptomatic severe mitral regurgitation (MR) in August 2009 on routine physical exam. She was found to have posterior leaflet prolapse due to P2 chordae rupture and was followed by serial echocardiograms. In September 2010, she was found to have elevated right ventricular systolic pressure of 84 mm Hg by exercise echocardiography. Subsequent diagnostic catheterization revealed normal resting hemodynamics, angiographically normal coronary arteries, and confirmed severe MR. The patient underwent minimally invasive mitral valve repair with annuloplasty ring placement. Her operative course was uncomplicated and she was transferred to the intensive care unit (ICU) on no vasopressor agents. She was extubated on postoperative day (POD) #1. Two hours later, the patient developed chest pain. An echocardiogram demonstrated an ejection fraction (EF) of 50% to 55%, a hypokinetic anterior septum, no MR, and no pericardial effusion. Fifteen minutes later, chest pain recurred and the patient developed nonsustained ventricular tachycardia. An electrocardiogram demonstrated anterolateral ST-segment elevation and the patient became hypotensive, requiring vasopressors. Emergent coronary arteriogram revealed no significant coronary stenosis. Left ventriculogram revealed no MR, an EF of 25%, and normal contraction of the base with hypokinesis of the rest of the left ventricle with apical ballooning. Hemodynamics (right atrium 20 mm Hg, pulmonary artery 40/20/26 mm Hg, pulmonary capillary wedge pressure 28 mm Hg, and cardiac index 1.8 $L/m/m^2$) were consistent with cardiogenic shock. An intra-aortic balloon pump (IABP) was placed. The patient improved clinically and the IABP was removed on POD #3. The patient was discharged home on POD #9. An echocardiogram performed at that time revealed recovery of left ventricular function with an EF of 55% confirming the diagnosis of takotsubo cardiomyopathy.

Discussion: The occurrence of acute-onset transient left ventricular dysfunction in patients with electrocardiographic abnormalities suggestive of myocardial ischemia in the absence of significant coronary disease has been referred to as takotsubo cardiomyopathy, stress-induced cardiomyopathy, or catecholamine-induced cardiomyopathy. This condition is now considered a well-known entity, often occurring in postmenopausal women during stressful physical and emotional situations. While takotsubo cardiomyopathy has been found to commonly occur preoperatively, intraoperatively, and postoperatively after general surgery, only rare cases involving cardiac surgery have been reported in the literature.

Conclusion: Practitioners must have a heightened index of suspicion for takotsubo cardiomyopathy in the perioperative period. Furthermore, strategies need to be developed for the management and education of individuals who develop this syndrome and require future surgery.