

Takotsubo Cardiomyopathy

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Abstract

Takotsubo Cardiomyopathy (TCM), also known as transient left ventricular (LV) apical ballooning syndrome, is usually preceded by psychological or physical stress, characterized by transient LV dysfunction, and almost always seen in postmenopausal women. Currently, the precise mechanisms of TCM are unknown. However, the evidence available points to catecholamine-mediated mechanisms with likely mediation via cardiac sympathetic nerves. We present a case of acute superior mesenteric artery embolization induced TCM manifesting as acute ST-segment elevation myocardial infarction in a 66-year-old male.

Keywords: Takotsubo cardiomyopathy; Acute thrombotic superior mesenteric artery; Stress-induced cardiomyopathy; Transcatheter thrombus aspiration.

Case Presentation

We introduce a case of a 66-year-old male with a clinical history of hypertension, who presented to the emergency room with acute upper abdominal pain accompanied by bloody stool. Electrocardiography and transthoracic echocardiography performed on arrival revealed no abnormality. No neurological or cardiorespiratory symptoms were found. Physical examination found no positive results. Thoracoabdominal computed tomography angiography (CTA) was performed to rule out an intestinal infarction. CTA revealed a superior mesenteric artery embolization (Figure 1A, 1B). He was transferred to cardiac catheterization laboratory for emergent trans catheter thrombus aspiration (Figure 2A, 2B). Fourteen

hours after the procedure, the patient did experience chest pain, and electrocardiography showed marked ST elevation in leads II, III, aVF, and V1-V6 (Figure 3). Her blood pressure was 120/70 mm Hg, and her heart rate was 88 beats/min. Cardiac enzyme measurement revealed a creatine kinase-myocardial band level of 76 IU/L (reference range, <13 IU/L) and a troponin I level of 16.8 ng/mL (reference range, <0.04 ng/mL). Bedside transthoracic echocardiography revealed left ventricular (LV) hypokinesis and apical akinesis. The presumed diagnosis at the time was acute myocardial infarction. His family members did not agree with emergency percutaneous coronary intervention. Emergency coronary artery computed tomography angiography revealed non-obstructive disease (Figures 4A-4C).

Left ventriculography showed apical akinesis and basal hyper kinesis with an ejection fraction of 45% (Figures 5A, 5B). A diagnosis of TCM was made. He did not develop heart failure throughout his hospital stay. Seven days later,

her follow-up echocardiogram revealed reduction of her myocardial akinesis and improvement of the ejection fraction to 60%.

Figures 1A, 1B: Thoracoabdominal computed tomography angiography revealed a superior mesenteric artery embolization (white arrow).



Figures 2A, 2B: Mesentery artery radiography revealed a total occlusion in the middle of superior mesenteric artery (A) and superior mesenteric artery patency after trans catheter thrombus aspiration (B).

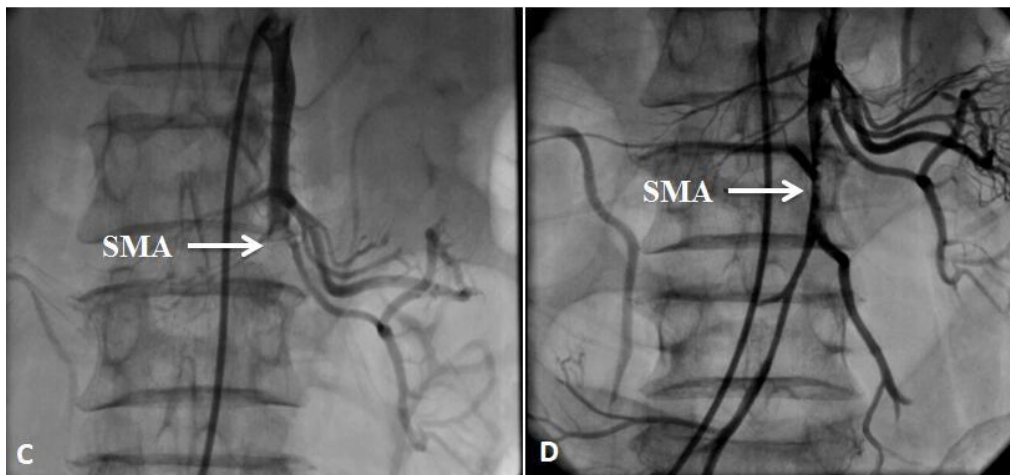


Figure 3: Electrocardiographic changes in patients on fourteenhours after the procedure(ST-segment elevation in leads I, II, aVF, and V1–6).

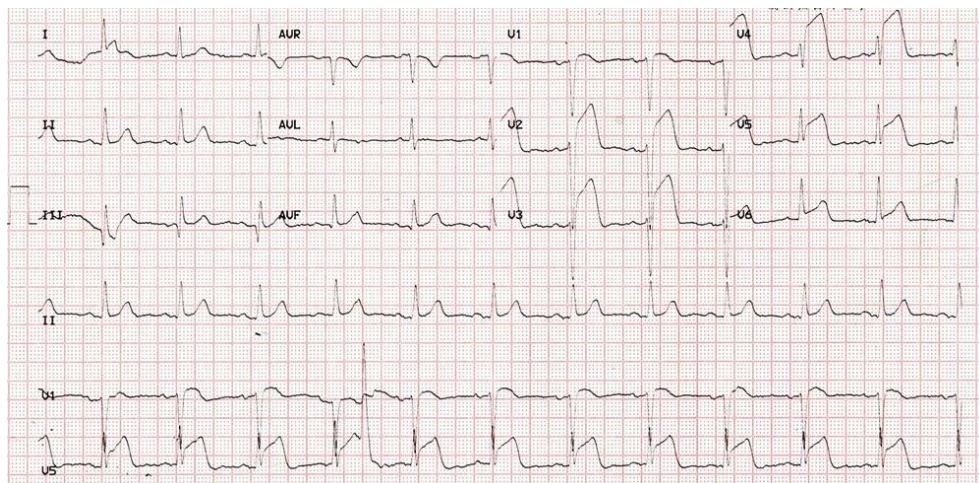


Figure 4A - 4C: Coronary artery computed tomography angiography showed the intact coronary arteries (**A** - left anterior descending; **B** -left circumflex artery; **C** - right coronary artery).

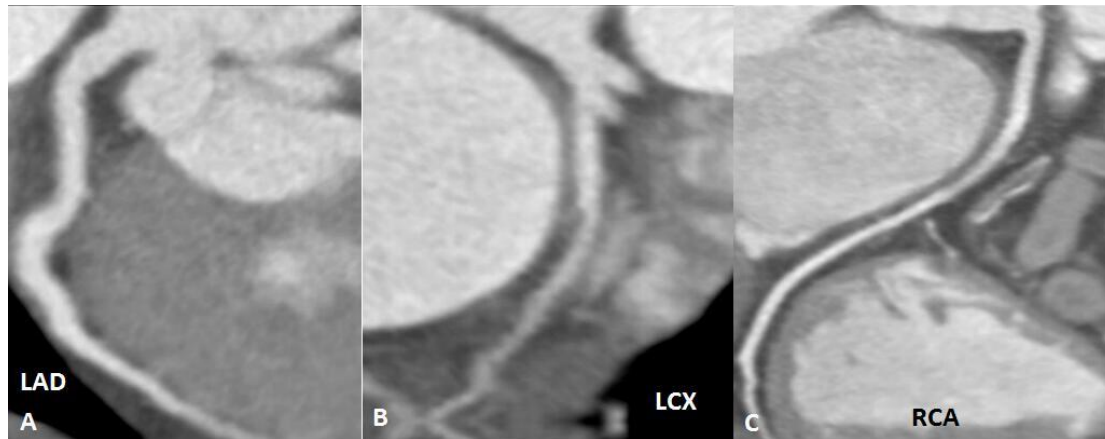
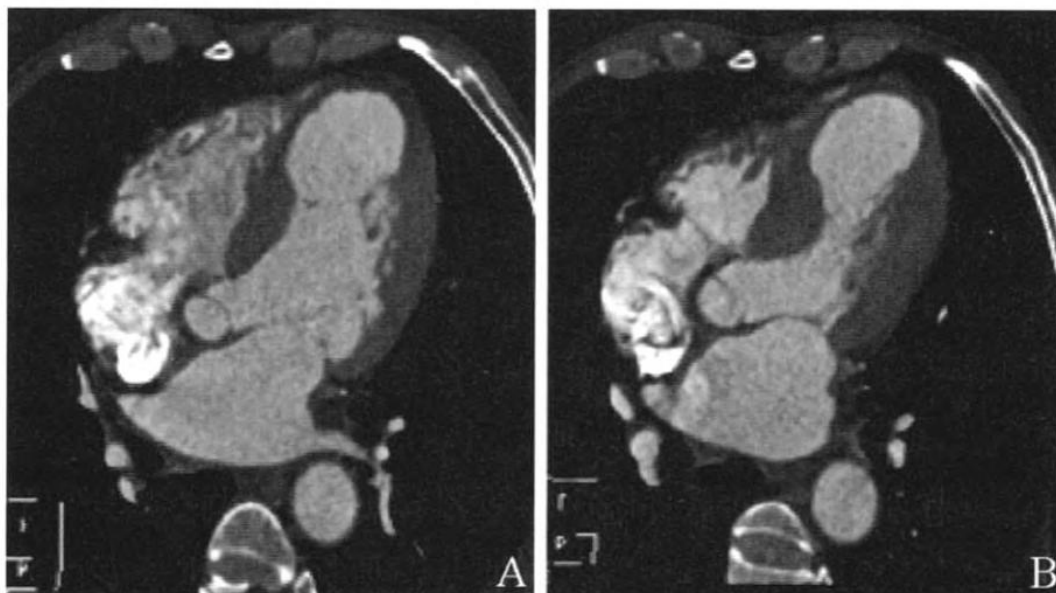


Figure 5: Cardiac computed tomography showed left ventriculograms showing apical akinesis (red arrow) and basal hyperkinesis (white arrow) indicating Takotsubo cardiomyopathy (**A** - diastolic phase; **B** - systolic phase).



Discussion and Conclusion

TCM, also known as transient LV apical ballooning syndrome, is usually preceded by psychological or physical stress, characterized by transient LV dysfunction, and almost always seen in postmenopausal women [1]. Currently, the precise mechanisms of TCM are unknown. However, the evidence available points to catecholamine-mediated mechanisms with likely mediation via cardiac sympathetic nerves [2]. As knowledge of the precise mechanisms improves, more precise diagnostic criteria may be defined. It is now recognized that Mayo Clinic criteria for TCM [3]. The diagnosis of TCM depends on coronary angiography. As well as absence of a culprit lesion, there is the characteristic akinesis of the distal half of the anterior and inferior walls and apex on left ventricular angiography.

This patient measurement satisfied the diagnostic criteria proposed by Mayo Clinic criteria for TCM. TCM occurs at a time of surging catecholamine levels, which can be precipitated by emotional or physical stress or occur without an identifiable precipitant [4]. Catecholamine levels are characteristically far higher than in matched patients with acute anterior myocardial infarction and similar degrees of left ventricular dysfunction and heart failure [5]. On myocardial biopsy, the histological appearances are very similar to contraction band necrosis seen in pheochromocytoma [5]. In a rodent model, TCM can be prevented with α - or β -blockade [6]. In addition, oestrogen down regulates cardiac adrenoceptors and attenuates their response to activation, providing a plausible reason why the condition is largely confined to postmenopausal women [7].

To our knowledge, this is the first report to describe TCM after acute superior mesenteric artery embolization and emergent trans catheter thrombus aspiration. We think that this patient suffered TCM from the stimulation of serious abdominal pains and the operation, and which induced

releasing of catecholamine by psychological or physical stress. Fortunately, he did not develop heart failure throughout his hospital stay. Seven days later, her follow-up echocardiogram revealed reduction of her myocardial akinesis and improvement of the ejection fraction to 60%.

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