

Takotsubo Cardiomyopathy as an Unusual Complication after Mechanical Thrombectomy for Acute Ischemic Stroke

Sir,

A 67-year-old female known to have chronic obstructive pulmonary disease (COPD), but no other cardiovascular risk factors and not on hormonal therapy, presented with complete left middle cerebral artery (MCA) syndrome. On examination, blood pressure was 140/90 mm Hg, respiratory rate 14, and National Institute of Health Stroke Scale (NIHSS) score was 22. Computed tomography (CT) brain revealed early ischemic changes in the left MCA territory with an Alberta Stroke Program Early CT Score (ASPECTS) score of 8 and [Figure 1] occlusion of the left intracranial internal carotid artery (ICA) and poor collaterals. Intravenous alteplase was started and subsequently, the patient was transferred for endovascular thrombectomy, where successful reperfusion was achieved using aspiration and stent retriever technique [Figure 1]. A check angiogram at the end

of the procedure revealed contrast extravasation near terminal ICA, likely suggestive of arterial perforation and subarachnoid hemorrhage (SAH). Flat-panel detector CT of the head done at angiography suite confirmed minimal SAH in left basal cisterns. However, contrast extravasation spontaneously stopped in subsequent images. Nonetheless, prothrombin complex concentrate was administered to help achieve hemostasis. The patient improved post-procedure and NIHSS dropped to 6. CT brain the next day showed no evidence of SAH or any intracranial bleeding. MRI brain showed diffusion restriction involving the insula, lentiform nucleus, and frontotemporal and occipital lobes.

Post-procedure, the patient had developed increasing dyspnoea. Differential diagnoses kept were worsening of COPD, aspiration pneumonitis, neurogenic pulmonary edema, and pulmonary embolism. However, ECG demonstrated marked ST and T

wave abnormalities in inferior and anterolateral leads [Figure 2]. High-sensitivity troponin-T level was 79 ng/L (normal 0–13). ESR and C-reactive protein (CRP) levels were normal. Transthoracic echocardiogram done by a cardiologist revealed a moderate to severe reduction in left ventricular ejection fraction (LVEF) (30–35%) with a pattern of wall motion abnormalities consistent with Takotsubo cardiomyopathy. An angiotensin-converting enzyme (ACE) inhibitor and beta-blocker were started along with dual antiplatelets and statin. TransThoracic Echocardiogram (TTE), repeated after 3 days, showed improvement in LVEF (45–50%) and wall motion abnormalities, as did troponin levels (27 ng/L). At the time of discharge, dyspnoea had improved; the patient had a good ambulatory function, but speech therapy was still required.

Takotsubo cardiomyopathy (TCM) is transient left ventricular apical ballooning that derives its name from a Japanese octopus catcher pot (Takotsubo) with a short narrow neck and round bottom.^[1] Neurologic diseases such as SAH, epilepsy, intracranial bleeds, meningoencephalitis, migraine, and ischemic stroke are known to trigger TCM.^[2]

Major clinical manifestations mimic those of acute myocardial infarction^[3]; some cases may be mildly symptomatic. However, coronary vasculature is largely normal in TCM.^[3] TCM occurs most commonly in women (89%), with the mean age being 68.^[3] Almost half the cases are triggered by intense emotional or physical stress. The InterTAK Diagnostic Score^[4] helps to assess the diagnosis of TCM using the following characteristics: Female sex, emotional stress, physical stress,

non-ST segment depression, psychiatric and neurologic disorders, and QTc prolongation. A score >70 shows a high probability of TCM. The condition is treated with supportive therapy such as ACE inhibitors, beta-blockers, diuretics, antioxidants, and antiplatelet or low-dose anticoagulation therapy if there is underlying coronary artery disease while avoiding proarrhythmic drugs.^[5] Long-term prognosis is worse for TCM associated with neurological disorders.^[6]

Traditionally, TCM has been described as a rare complication of SAH in 4.4% of patients.^[7] The cause ascribed is massive catecholamine release due to hemorrhage, which in turn triggers cardiomyopathy.^[7] In relation to ischemic stroke and TCM, three patterns have been described: (a) Those caused by central autonomic network dysfunction associated with ischemic stroke, (b) TCM with an left ventricle (LV) thrombus causing a cardioembolic stroke, and (c) unknown cause and effect relation.^[8] Locations in the brain such as insula (particularly right) and medulla play an important role in cardiovascular autonomic function^[9] and are commonly associated with TCM.

Our patient underwent mechanical thrombectomy for a major stroke caused by intracranial ICA occlusion, the physical stress of which may have stimulated the release of catecholamine. Secondly, mechanical thrombectomy with emergent recanalization of large vessels may result in some amount of reperfusion injury which can trigger similar mechanisms resulting in TCM. Thirdly, the location of the stroke itself in this case may be responsible for the development of TCM. Very few cases in the literature^[10] demonstrate an association



Figure 1: (a) CT Brain revealed early ischemic changes in the left MCA territory with an ASPECTS score of 8. (b) CT brain angiography revealed occlusion of the left supraclinoid ICA with poor collaterals. (c) Digital Subtraction Angiogram (DSA) showing occlusion of left supraclinoid ICA. (d) TIC1 3 recanalization achieved after mechanical thrombectomy. (e) Contrast stasis was noted in the cisterns probably as a result of guide wire perforation

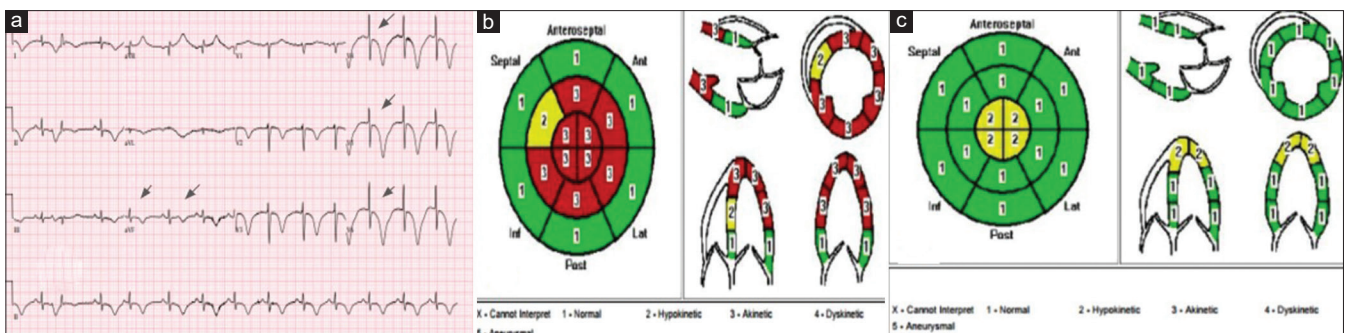


Figure 2: (a) ECG demonstrated marked ST and T wave abnormalities in the inferior and anterolateral leads; (b) ECHO done after three days and; (c) ECHO after two weeks showing resolution of changes

between mechanical thrombectomy for acute ischemic stroke and TCM. Although a coronary angiogram was not done to prove the absence of coronary artery disease, it was not felt to be necessary because of the rapid complete improvement in LV function. With an increasing number of neuro-interventional procedures performed, rare effects of procedural complications on the heart may be increasingly encountered and should be kept in mind. We hope that this case will raise awareness of TCM as a rare complication among patients with ischemic stroke who undergo mechanical thrombectomy.

Abbreviations: COPD: Chronic Obstructive Pulmonary Disease, TCM: Takotsubo cardiomyopathy, NIHSS: National Institute of Health Stroke Scale, ASPECTS: Alberta Stroke Program Early CT Score, EVT: Endovascular Thrombectomy, ICA: Internal Carotid Artery, MCA: Middle Cerebral Artery, SAH: Subarachnoid Hemorrhage, LVEF: Left Ventricular Ejection Fraction, TTE: TransThoracic Echocardiogram, DSA: Digital Subtraction Angiogram.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

**Shashank Nagendra, Babawale Arabambi, Eric E. Smith¹,
Mohammed Almekhlafi²**

Department of Clinical Neurosciences, Stroke Fellow, ¹Department of Clinical Neurosciences, Professor of Neurology, ²Department of Clinical Neurosciences, Interventional Stroke Neurologist, Associate Professor of Clinical Neurosciences, Calgary Stroke Program, Cumming School of Medicine, University of Calgary, Calgary, Canada

Address for correspondence: Dr. Shashank Nagendra,
Unit 210, 2010 Ulster Road, NW, Calgary - T2N 4C2, Canada.
E-mail: shashanknagendra@gmail.com

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