

Introduction of Endovascular Thrombectomy to The Island Nation — The Maldives

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Abstract:

Over the years multiple treatment trials were researched up on for acute management of ischemic stroke to reduce mortality risk and morbidity rate among adults who suffered. Here, we report a case of 63 years Muslim diabetic female with multiple co-morbidities of coronary heart disease, pulmonary disease, and internal carotid artery aneurysm presented with thrombotic occlusion of left middle cerebral artery who underwent Maldives first ever endovascular thrombectomy using combined technique.

Key Words: Ischemic Stroke, Cerebrovascular Accident, Endovascular Thrombectomy, Intravenous Thrombolysis

Around the globe, an estimation of around 2.7 million mortalities is the result of ischemic stroke with many of the etiologies being a result of large vessel occlusion.^{1,2} Over the years multiple treatment trials were researched up on for acute management of ischemic stroke to reduce mortality risk and morbidity rate among adults who suffered.^{3,4} Endovascular treatments which gave promising results, were also time-sensitive in nature and delays were proven to associate with fatal outcomes.^{1,5}

A major cause of death and disability globally, cerebrovascular accidents are caused by the blockage or rupture of blood vessels that supply the brain tissue.² Intra-arterial occlusion in stroke events occur due to atherosclerotic plaques stenosing or a thrombus obstructing the vessels which supply the brain, leading to loss of nutrients, oxygen and hindering blood flow which could lead to neuronal damages and associated neurological deficits.⁶ Due to the complexity and variety of stroke presentation in clinical settings, identifying the predisposing factors for cerebrovascular accidents is more challenging compared to other diseases such as myocardial infarctions which almost always involves

atherosclerosis of large vessels eventually hindering or blocking blood flow in coronary arteries.⁴ Ischemic and hemorrhagic strokes are the most general classification of cerebrovascular accidents, with both types having a significantly high burden rate, causing long-term adult disability.⁴ Subclassification of the most common stroke presentation, ischemic stroke, is dependent on the etiologies suspected to predispose to the event such as cardioembolic, atherosclerotic and lacunar causes.⁴ A significant amount of evidence indicates specific causes for stroke, including hereditary abnormalities or genetic disorders, dissections, and vasculitis.⁴ Regardless of the similarities between the risk factors leading to ischemic strokes and hemorrhagic strokes such as intraparenchymal and subarachnoid hemorrhage, notable differences have been proven to exist between them.⁴

Case Description:

We report the case of 63-year-old activities of daily life independent South Asian, Maldivian, Muslim female with underlying hypertension, type 2 diabetes mellitus, dyslipidemia, chronic obstructive pulmonary disease, and coronary artery disease.

Patient first presented with sudden onset of decreased responsiveness, disorientation, friability to speak and inability to recognize people since 5:30pm on 13th November 2021. Patient also had right sided weakness and deviation of her mouth to the ipsilateral side. She did not have any seizures or sudden jerky movements and neither had any loss of consciousness or history of trauma to her head.

With the onset of symptoms, patient was presented to a local hospital, where a plain computed tomography (CT) of head and CT Angiography of cranial and neck vessels with contrast was performed which revealed complete thrombotic occlusion of M1 branch of left middle cerebral artery (MCA) causing early ischemic infarction in left parietal region.

At the time of presentation to our hospital, history was taken from the patient's relatives. As per the history obtained, she had previously done a cardio-angiogram for mild coronary arterial disease which showed proximal left anterior descending (LAD) artery eccentric 30-40% disease, mild right circumflex artery (RCA) tubular 30-40% stenosis and paroxysmal atrial fibrillation. She also had a history of internal carotid artery (ICA) aneurysm for which she had undergone aneurysm clipping in December 2018.

At the time of admission her GCS was E3V2M5, and her pupils were measuring up to 3mm. Both eyes were equally reactive to light. Further neurological exams revealed a 5/5 score on her left upper and lower limbs, motor power and complete paralysis of her right upper and lower limbs with a motor power score of 0/5. The patient's plantar reflexes were down going on her right lower limb and upgoing in her left lower limb.

On examination, the patient was afebrile with a temperature of 37.1 degrees Celsius and was tachycardiac with a pulse rate of 117 beats per minute. Her blood pressure measured 130/70 mm/Hg.

Patient was taken to catheterization laboratory where neurosurgery team performed Maldives first ever endovascular thrombectomy (Left MCA M1 branch EVT using combined technique).



Figure 1- DSA: Left MCA M1 Occlusion

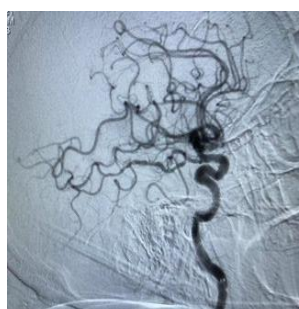


Figure 2 – DSA: Recanalization of MCA M1. Post-Endovascular Mechanical Thrombectomy

Post procedure brain CT was repeated which revealed findings consistent with left ganglio-capsular hematoma compressing the lateral ventricles and a midline shift of 4.5mm to the right was noted which correlated with the expected hemorrhagic transformation of ischemic stroke.

Post-surgical procedure, further bleed into the brain was prevented and patient underwent rehabilitation care and was managed conservatively.

Discussion:

The main goal of acute ischaemic stroke management involves restoration of cerebral circulation by achieving reperfusion by recanalizing the occluded vessel.⁷ This is done to salvage the penumbra which consists of ischaemic but viable cerebral tissue.⁷ Acute reperfusion strategies such as intravenous thrombolysis (IVT), and endovascular thrombectomy are the main treatment modalities for acute ischemic stroke.⁷

Endovascular therapy for ischemic stroke was introduced and practiced in highly developed countries since the 1980s. However, it took 2 decades for the globe to witness mechanical clot retrieval. It is vital to deliver timely management for stroke patients to decrease the mortality

and increase the likelihood of a disability free life.⁵ Intravenous tissue plasminogen activator (IV tPA) has been shown to improve functional outcomes when given within 3 hours after the onset of an ischemic stroke, and within 4.5 hours in some people.⁵ Although intracranial large vascular occlusions (LVO) are usually resistant to IV tPA alone, patients with cardioembolic, big vessel, and small vessel stroke all appear to benefit from IV tPA in a similar way.⁵ Patients who report to stroke facilities within 24 hours of stroke onset are eligible to undergo MT after initial clinical examination comparing present status to their neurological baseline.⁸

Thorough evaluation should be performed in patients to assess their eligibility for Endovascular mechanical thrombectomy via computed tomography (CT) or multimodal magnetic resonance imaging (MRI).^{9,10} A systemic approach to determine the prognosis of stroke patients and functional outcome of endovascular thrombectomy includes The Alberta Stroke Program Early CT Score (ASPECTS) scoring system. This system has been shown to play a key role in successfully determining and predicting the outcome of endovascular thrombectomy procedures as well.⁹

Compared to Endovascular mechanical thrombectomy, IVT has several limitations and must be delivered promptly within 4.5 hours of onset. Additionally, thrombolysis treatment carries the risk of fatal cerebral hemorrhage and several patients with large or proximal clots may not achieve sufficient reperfusion.^{11,12,13,14} Therefore, over the past 20 years, numerous focused trials have been conducted to treat proximal clots that are resistant to thrombolysis, by using interventional and mechanical methods.¹²

Conclusion:

Mechanical thrombectomy is a time sensitive treatment for ischemic stroke with better prognosis when given within the 6-hour period of stroke onset. Increase in time gap between onset and administration of IV tPA and mechanical thrombectomy, leads to a poorer prognosis. Mechanical thrombectomy is now made available in Maldives which reduced the need for referral to higher facilities for patients who are burdened with the disease.

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