CATHALOGUE

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CASE REPORT

Successful Mechanical Thrombectomy in Acute Ischemic Stroke Due to Right MCA Occlusion: A Case Study

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Abstract

Background: Acute ischemic stroke is a significant cause of morbidity and mortality, with rapid intervention being crucial to improving outcomes. This case report describes a successful mechanical thrombectomy using the ADAPT technique in a patient with complete occlusion of the right middle cerebral artery (MCA).

Case Presentation: A 70-year-old male with a history of left bundle branch block (LBBB) and reduced ejection fraction (EF) presented with acute left-sided weakness and expressive aphasia. Neurological assessment revealed complete motor loss in the left limbs, with a National Institutes of Health Stroke Scale (NIHSS) score of 16 and an Alberta Stroke Program Early CT Score (ASPECT) of 8/10.

Results: Urgent imaging ruled out hemorrhage and confirmed a 100% occlusion of the right MCA. Mechanical thrombectomy was performed using the ADAPT technique, successfully restoring cerebral blood flow. Post-procedure, the patient exhibited marked improvement in neurological function.

Conclusion: This case underscores the importance of rapid diagnosis and timely intervention in acute ischemic stroke. The use of mechanical thrombectomy with the ADAPT technique proves effective in revascularization and significantly enhances patient outcomes.

Keywords

Acute Stroke Management, Endovascular Thrombectomy, Cerebral Revascularization, Stroke Intervention Techniques, Ischemic Stroke Treatment

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Introduction

Acute ischemic stroke (AIS) represents a critical neurological emergency characterized by the sudden onset of focal neurological deficits due to the interruption of blood flow to the brain. Prompt diagnosis and timely intervention are essential to mitigate the risk of severe disability or mortality associated with this condition[1-4]. Among the various etiologies of AIS, right middle cerebral artery (MCA) occlusion is prevalent, often resulting in significant motor, sensory, and cognitive impairments that can drastically affect patients' quality of life.[2,4]

The pathophysiology underlying right MCA occlusion involves the disruption of perfusion to the right hemisphere, which governs crucial functions such as spatial awareness, emotional regulation, and voluntary movement of the left side of the body. Consequently, the clinical manifestations can range from mild weakness to profound disabilities, necessitating urgent therapeutic measures[4].

Mechanical thrombectomy has emerged as a cornerstone in the management of large vessel occlusions (LVOs) in AIS, revolutionizing the treatment landscape. This minimally invasive procedure aims to restore cerebral blood flow by physically removing the thrombus obstructing the artery. Evidence from recent studies has demonstrated that thrombectomy, particularly when performed within the therapeutic window, significantly improves functional outcomes and reduces mortality rates compared to conventional medical therapies alone[5].

In this case study, we present a successful instance of mechanical thrombectomy in a patient with acute ischemic stroke secondary to right MCA occlusion. We aim to highlight the procedural nuances, patient outcomes, and the broader implications for clinical practice in managing this challenging condition.

Case Presentation

A 70-year-old male with a medical history significant for left bundle branch block (LBBB) and reduced ejection fraction (EF) as demonstrated on echocardiography presented to the emergency department with a sudden onset of left-sided weakness and loss of speech. Prior to this event, the patient had been hospitalized in the Coronary Care Unit (CCU) for management of acute left ventricular failure, indicating a background of significant cardiac morbidity.

Diagnostic Assessment

Upon clinical evaluation, the patient exhibited notable neurological deficits. He demonstrated complete paralysis in both the left upper limb and left lower limb, with motor power rated at 0/5. In contrast, motor power in the right upper and lower limbs was normal, rated at 5/5. Facial examination revealed significant asymmetry, with mouth deviation towards the right side, indicative of right hemisphere involvement. The National Institutes of Health Stroke Scale (NIHSS) score was 16, indicating a moderate to severe stroke with significant neurological impairment. Prior to the event, the patient had a modified Rankin Scale (mRS) score of 0, reflecting no disability. Imaging via CT scan yielded an Alberta Stroke Program Early CT Score (ASPECT) of 8/10, suggesting a relatively preserved area of the brain despite the acute ischemic event, which indicated the potential for recovery if timely intervention were implemented.
Urgent CT brain imaging was conducted to evaluate the extent of the patient's condition, effectively ruling out hemorrhagic stroke. Following the initial imaging, a cerebral angiogram was performed, which confirmed a 100% occlusion of the right middle cerebral artery (MCA). This finding provided crucial information for determining the appropriate management strategy and underscored the need for prompt intervention to restore cerebral blood flow.

This clinical picture, characterized by acute hemiparesis and expressive aphasia, coupled with

the imaging findings, strongly suggested acute ischemic stroke secondary to right MCA occlusion.

Therapeutic Intervention

Given the complete occlusion observed, the decision was made to proceed with mechanical thrombectomy. The ADAPT (A Direct Aspiration First Pass Technique) approach was employed, which successfully cleared the thrombus in the second attempt. This technique involves direct aspiration of the thrombus, offering a rapid and effective means of revascularization.

Follow-Up and Outcomes

Post-Procedure Day 1: The patient demonstrated notable improvement in motor function, exhibiting partial recovery of movement in the left upper and lower limbs. Initial assessments revealed increased muscle tone and the ability to perform simple movements, indicating a positive response to the mechanical thrombectomy.

Post-Procedure Day 3: Continued progress was observed, with a significant reduction in aphasia and marked improvement in limb strength. The patient was able to articulate simple phrases and follow basic commands, reflecting enhanced neurological recovery. Further rehabilitation efforts were initiated to optimize recovery and address the remaining deficits.

Discussion

The management of acute ischemic stroke, especially when involving large vessel occlusions, is critically time-sensitive. Delays in intervention can lead to irreversible brain damage, highlighting the importance of rapid diagnosis and treatment[6-8]. Mechanical thrombectomy has emerged as a pivotal therapeutic strategy in this context, particularly for patients with occlusions of the major cerebral arteries, such as the middle cerebral artery (MCA).

In this case, mechanical thrombectomy was performed using the ADAPT (A Direct Aspiration First Pass Technique) approach, which has gained prominence due to its ability to effectively restore cerebral perfusion with minimal procedural complications. The ADAPT technique allows for direct aspiration of the thrombus, facilitating rapid reperfusion of the affected vascular territory. This method not only accelerates the restoration of blood flow but also reduces the duration of ischemia, thereby minimizing potential brain injury [9].

Early intervention proved to be crucial for this patient, as evidenced by the significant neurological recovery observed within just a few days post-procedure. The timely execution of mechanical thrombectomy enabled the preservation of viable brain tissue, as indicated by the favorable ASPECT score, which reflected a relatively intact area of the brain at the time of treatment[10]. The positive outcomes underscore the importance of a multidisciplinary approach in stroke management, where prompt imaging, swift decision-making, and the application of advanced interventional techniques converge to enhance patient prognosis.

Furthermore, this case reinforces the necessity of ongoing research and clinical trials to refine thrombectomy techniques and optimize patient selection criteria. As we continue to improve our understanding of the time-sensitive nature of acute ischemic stroke management, we can better implement strategies that not only save lives but also significantly enhance the quality of recovery for stroke survivors.

Conclusion

Timely mechanical thrombectomy is crucial in managing acute ischemic stroke due to large vessel occlusion, as illustrated by this case study. The application of the ADAPT technique demonstrated its reliability and effectiveness in achieving successful revascularization of the right middle cerebral artery, leading to significant neurological recovery for the patient. This case emphasizes the importance of rapid assessment and swift decision-making in stroke interventions, highlighting how prompt identification and timely initiation of treatment can minimize brain injury and greatly enhance patient outcomes. Ultimately, it serves as

a compelling reminder of the profound impact that timely intervention can have on the recovery and quality of life for stroke survivors.

Learning points

1. Time is Crucial in Stroke Intervention: Early intervention in stroke cases is critical—"Time is brain," as every moment lost can lead to irreversible damage.
2. Role of Mechanical Thrombectomy: Mechanical thrombectomy should be a primary treatment option for large vessel occlusion, restoring blood flow and improving outcomes.
3. Importance of Follow-Up and Monitoring: Continuous monitoring and follow-up are essential for effective long-term recovery and quality of life.

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Figure/Video

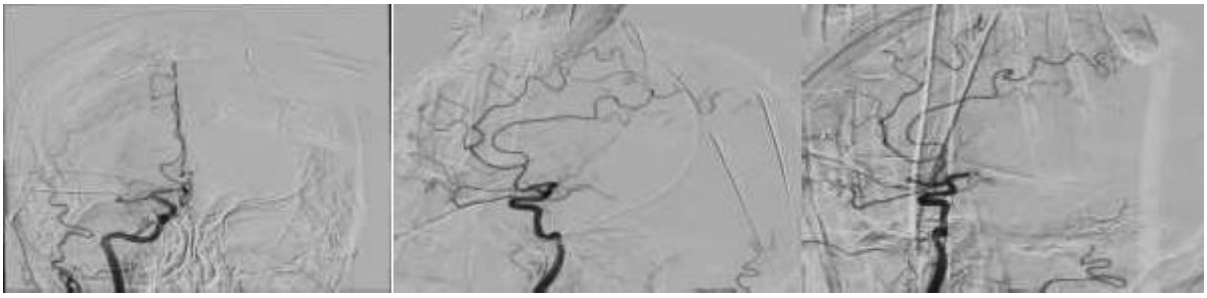

Figure 1: Pre procedure AP Cranial view with occluded MCA
Figure 2: Pre procedure Modified lateral view
Figure 3: Pre procedure modified orbital view

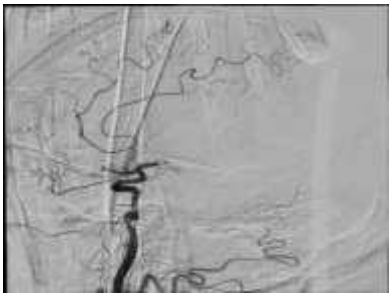

Figure 4: Pre procedure full lateral view

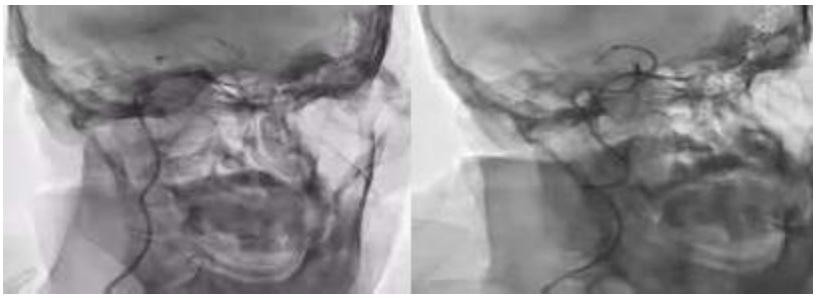

Figure 5: Procedure under way
Figure 6: Procedure under way

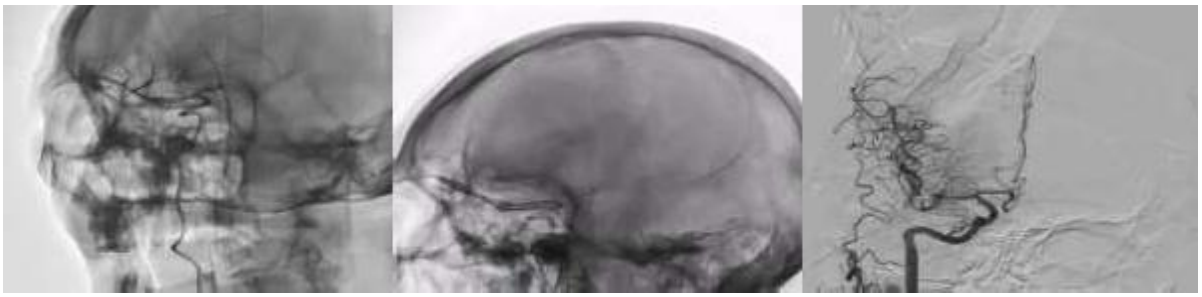

Figure 7: Procedure under way
Figure 8: Procedure under way
Figure 9: Post procedure AP cranial view with open MCA

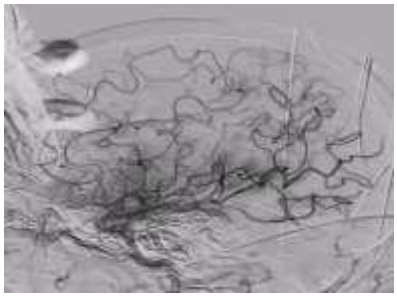

Figure 10: Post procedure lateral view with MCA open