

Case Report

Delayed stent migration after stenting for symptomatic intracranial stenosis: A case report

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ABSTRACT

This case report describes a 59-year-old male patient with acute ischemic stroke secondary to intracranial large vessel occlusion. The patient underwent endovascular intervention. During the follow-up period, the patient consistently adhered to the prescribed post-stroke medication regimen, and no recurrent ischemic stroke events were documented. However, at the 11-month follow-up, cerebral angiographic evaluation revealed proximal migration of the previously implanted Enterprise stent within the left middle cerebral artery, accompanied by in-stent restenosis.

Keywords: In-stent restenosis, Intracranial stent, Migration, Symptomatic intracranial stenosis

INTRODUCTION

Endovascular therapy has gained increasing clinical application in patients with symptomatic intracranial arterial stenosis (sICAS). Studies have demonstrated that the placement of Enterprise stents in intracranial atherosclerotic disease is associated with a low complication rate and high technical success in short-to-medium term outcomes.^[1] However, post-operative complications, including intersphincteric resection, thrombosis, and perforating artery occlusion, remain a significant concern. Notably, stent migration – a rare complication following Enterprise stent deployment in sICAS – has been reported in only one documented case to date.^[2] Herein, we report a case of delayed stent migration occurring 11 months post-procedure in a patient with sICAS treated with Enterprise stent implantation. Written informed consent was obtained from the patient.

CASE REPORT

A 59-year-old male with a history of hypertension for 20 years and type 2 diabetes mellitus for 3 years was admitted to the neurology department due to a 3-day history of slurred speech and slowed responsiveness, accompanied by acute-onset limb weakness lasting over 3 h. Initial imaging, including non-contrast head computed tomography (CT) and CT angiography, revealed occlusion of the left

middle cerebral artery (MCA) M1 segment and ischemic penumbra. Intravenous tirofiban was initiated, but the patient's symptoms still progressed (an increase in National Institutes of Health Stroke Scale score (NIHSS) from 0 to 9), 3D digital subtraction angiography (3D-DSA) confirmed left MCA M1 occlusion [Figure 1]. Percutaneous transluminal angioplasty and stenting was performed. A balloon (1.5 mm × 10 mm; SINOMED, China) was used for dilation, followed by successful deployment of an Enterprise stent (4.0 mm × 16 mm; Cerenovus, USA), resulting in residual stenosis of 20% in the left MCA. The patient was discharged with an NIHSS score of 0. Dual antiplatelet therapy (DAPT) with aspirin and clopidogrel was administered for 6 months postoperatively, followed by long-term monotherapy with enteric-coated aspirin tablets. At the 11 months follow-up, 3D-DSA revealed proximal migration of the stent and severe in-stent restenosis (80–90% stenosis) near the distal end [Figure 2]. Given the asymptomatic nature of the in-stent restenosis (ISR), a non-interventional management strategy was implemented. Medical optimization included: extended DAPT, intensified lipid-lowering therapy, and structured imaging surveillance.

DISCUSSION

In a large clinical series of 1000 consecutive patients with acute cerebrovascular disease, no cases of delayed stent

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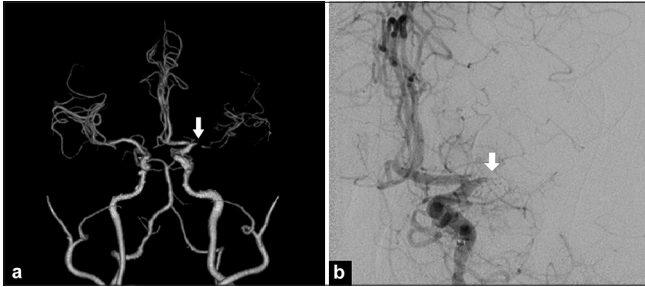


Figure 1: (a) Head and neck computed tomography angiography showing occlusion of the M1 segment of the left middle cerebral artery (MCA) (white arrow). (b) Digital subtraction angiography confirmed the MCA M1 segment occlusion (white arrow) as the culprit vessel.

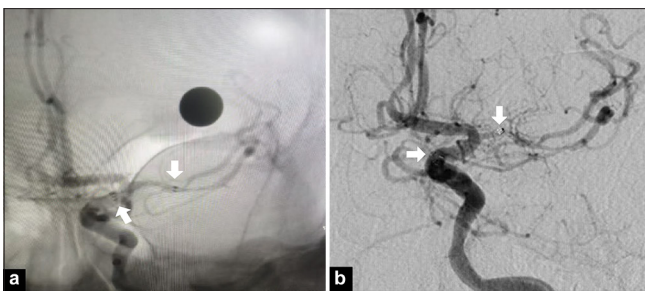


Figure 2: (a) Digital subtraction angiography (DSA) during percutaneous transluminal angioplasty and stenting demonstrates the Enterprise stent positioned at the middle cerebral artery (MCA) bifurcation, with its proximal end in the C7 segment of the internal carotid artery (ICA) (white arrows indicates the stent). (b) Follow-up DSA at 11 months postoperatively reveals approximately 6 mm proximal migration of the Enterprise stent, with its distal end now located in the C6 segment of the ICA (white arrows indicates the stent).

migration were observed following stenting for symptomatic intracranial stenosis.^[3] To date, few cases of stent migration following stenting for sICAS have been documented, with representative examples summarized in Supplementary Table 1.^[2,4,5] This case highlights delayed proximal migration of an Enterprise stent in the left MCA detected 11 months post-implantation, accompanied by severe ISR. Potential mechanisms for migration may include: (1) anatomical mismatch between the narrower MCA and wider proximal internal carotid artery (ICA), leading to insufficient stent anchoring; (2) incomplete stent apposition, reducing friction with the vessel wall; (3) biomechanical stress exacerbated by the relatively short stent length; and (4) hemodynamic forces from distal ISR (80–90% stenosis), potentially displacing the stent proximally. Despite confirmed CYP2C19 rapid metabolism (ruling out clopidogrel resistance), suboptimal glycemic control (HbA1c: 8.2%) and hypertension likely contributed to accelerated atherosclerosis and ISR progression. Although aspirin resistance cannot be excluded

due to unavailable pharmacogenetic testing, chronic vascular inflammation appears central to ISR pathogenesis. This case underscores the need for optimized stent sizing, enhanced endothelialization designs, and long-term surveillance in patients with metabolic risk factors. Future studies should explore bidirectional causality between ISR and stent migration to refine preventive strategies.

This case report has several limitations. First, stent migration remains a rare event with only anecdotal reports in intracranial stenting. The proposed mechanisms are speculative, lacking histopathological or computational fluid dynamics validation. Second, the migration chronology remains undefined. Absence of serial imaging between implantation and 11 months follow-up precludes precise dating of migration onset.

Future research should prioritize investigating the following predictors of ISR and stent migration: (1) Diameter discrepancy between proximal and distal segments of the target stenotic artery; (2) stent landing zone accuracy relative to vascular anatomy; (3) post-procedural residual stenosis rate; and (4) adherence to standardized post-operative pharmacotherapy.

CONCLUSION

This case documents a rare complication of proximal stent migration following stenting for sICAS. Our analysis suggests this phenomenon may be attributed to two interrelated factors: (1) A significant diameter discrepancy between the proximal and distal vasculature (ICA vs. MCA), and (2) excessive stent protrusion into the ICA terminus, resulting in conical stent deformation that predisposes to proximal migration.

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Ethical approval: Institutional Review Board approval is not required for retrospective study.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for 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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Use of artificial intelligence (AI)-assisted technology for manuscript preparation: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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