



Microsurgical Management of a Complex MCA Bifurcation Aneurysm Using M2–M2 Bypass and Clip Reconstruction

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Case Overview

A 75-year-old woman presented with an incidentally discovered, unruptured right MCA bifurcation aneurysm. Imaging demonstrated a highly irregular, dysplastic aneurysm involving the inferior division M2 and partially incorporating the superior division.

Given the complex morphology and branch vessel involvement, definitive treatment required a strategy that preserved distal flow while enabling complete aneurysm exclusion.

Intraoperative Assessment

Bypass patency and distal flow were confirmed intraoperatively using indocyanine green angiography and Doppler ultrasonography.

Both modalities demonstrated robust bypass filling with appropriate timing relative to native circulation, supporting safe progression to aneurysm obliteration.

Surgical Challenge

The aneurysm demonstrated fusiform and calcified features at the MCA bifurcation, limiting the feasibility of primary clip reconstruction without compromising one or both M2 branches.

Intraoperative exposure confirmed broad incorporation of branch vessels, necessitating an alternative strategy to secure distal perfusion prior to definitive aneurysm obliteration.

Postoperative Outcome

Postoperative digital subtraction angiography confirmed durable M2–M2 bypass patency and complete aneurysm exclusion.

The patient remained neurologically intact and was discharged home on postoperative day three.

Operative Strategy

A frontotemporal craniotomy with wide Sylvian fissure dissection was performed to expose distal M2 branches prior to addressing the aneurysm.

After an initial attempt at primary clipping proved unsafe, an intracranial–intracranial bypass was selected.

The superior and inferior division M2 segments were mobilized and aligned, allowing for a side-to-side M2–M2 anastomosis to preserve distal flow before clip reconstruction.

Teaching Points

- Complex MCA bifurcation aneurysms may require bypass-assisted strategies when clip reconstruction alone is unsafe
- M2–M2 side-to-side bypass preserves physiologic flow while avoiding extracranial donor morbidity
- Early identification of distal recipient vessels expands intraoperative options
- Multimodal flow assessment is essential before and after clip reconstruction

Key Technical Points

- Wide distal-to-proximal Sylvian fissure dissection to identify suitable recipient vessels
- Selection of parallel M2 segments to minimize tension on the anastomosis
- Side-to-side anastomosis with back-wall-first suturing using 9-0 Prolene
- Use of temporary clips and systemic heparinization prior to anastomosis
- Fenestrated “picket fence” clip construct for definitive aneurysm exclusion

Surgical Video

Operative Video Demonstration:

<https://player.vimeo.com/video/1122700509>

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