

EC-IC Bypass for Inflammatory Intracranial Stenosis: Institutional Series and Review of the Literature

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Introduction

Clinical Background

Inflammatory intracranial stenoses are rare and heterogeneous cerebrovascular disorders that may progress to cerebral hypoperfusion and recurrent ischemic symptoms. While medical and immunosuppressive therapy is first-line, a subset of patients remains symptomatic despite optimized treatment.^{1,2}

Rationale for EC-IC Bypass

In this setting, ischemia is often driven by hemodynamic failure rather than embolic mechanisms. EC-IC bypass may therefore serve as a territory-specific hemodynamic rescue, rather than treatment of the underlying inflammatory disease.

Methods

Focused Literature Review

A focused, non-systematic literature review was performed to contextualize our experience. Only isolated case reports and very small series describing EC-IC bypass for inflammatory intracranial stenosis were identified.^{2,3} Across these reports, bypass was used as a rescue strategy for refractory ischemic symptoms, with no standardized indications, imaging criteria, or long-term outcome data reported, highlighting the scarcity of available evidence.

Institutional Case Series

Three patients underwent EC-IC bypass for inflammatory intracranial stenosis with persistent ischemic symptoms despite medical therapy. Analysis focused on imaging-based decision-making, revascularization strategy, and follow-up observations.

Imaging-Based Decision Making

Surgical indication was driven by multimodal imaging, including serial angiography, vessel wall MRI, and functional perfusion studies. Revascularization targeted hypoperfused cortical territories while avoiding visibly inflamed donor or recipient vessels (see Table 1).

RESULTS

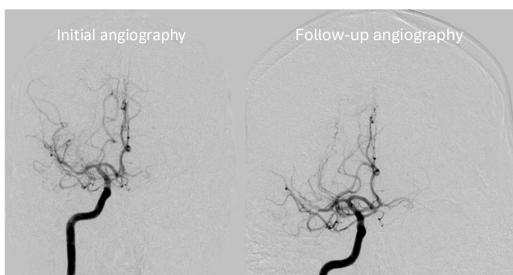
Institutional Experience

The three cases represent distinct patterns of inflammatory arteriopathy, including long-term disease stabilization, active inflammatory disease with hemodynamic compromise, and progressive bilateral involvement requiring multistage revascularization. Key clinical, imaging, and surgical features are summarized in **Table**. Representative imaging from **Case 2** demonstrates angiographic progression, impaired cerebrovascular reserve, and postoperative bypass patency.

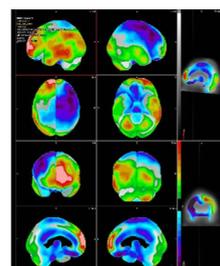
Perioperative and Follow-Up Observations

No perioperative complications or early graft failures occurred. During follow-up, ischemic events were observed outside bypass-dependent territories, while revascularized cortical regions remained protected (see **Table**).

Case	Disease State	Hemodynamic Evidence	Imaging That Drove Surgery	Revascularization Strategy	What This Case Proves
1	Presumed CNS vasculitis	Recurrent TIAs	Angiographic progression	R STA-MCA bypass	Extreme long-term durability (18-year patency)
2*	Active inflammatory arteriopathy	CVR exhaustion	SPECT + Diamox Vessel wall MRI (donor/recipient spared)	R STA-MCA bypass	Bypass is feasible and safe despite active inflammation
3	Progressive bilateral inflammatory disease	Territory-specific hypoperfusion	Serial angiography + CVR failure	Multistage bilateral EC-IC	Territory protection despite disease progression



Progressive intracranial stenosis on serial angiography despite immunosuppressive therapy.



Impaired cerebrovascular reserve in the affected territory despite medical therapy



Patent STA-MCA bypass supplying the previously hypoperfused cortical territory.

Conclusions

In the context of extremely limited published evidence, our experience demonstrates that EC-IC bypass can be safely performed in carefully selected patients with inflammatory intracranial stenosis. When guided by functional perfusion and vessel wall imaging, surgical revascularization may provide durable **territory-specific hemodynamic support**, even in the setting of active or progressive disease.

Take-home points

- Inflammatory intracranial arteriopathy is not an absolute contraindication to EC-IC bypass.
- Ischemic symptoms are frequently driven by **hemodynamic failure**.
- Multimodal imaging is critical for patient selection (see **Table 1**).
- EC-IC bypass should be viewed as a **hemodynamic rescue strategy**, integrated with medical therapy.

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