

Introduction

Moyamoya disease (MMD) is a cerebrovascular disorder marked by progressive vessel narrowing and compensatory collateral formation. When standard STA-MCA bypass fails, a salvage OA-MCA bypass may restore cerebral perfusion.

Methods and Materials

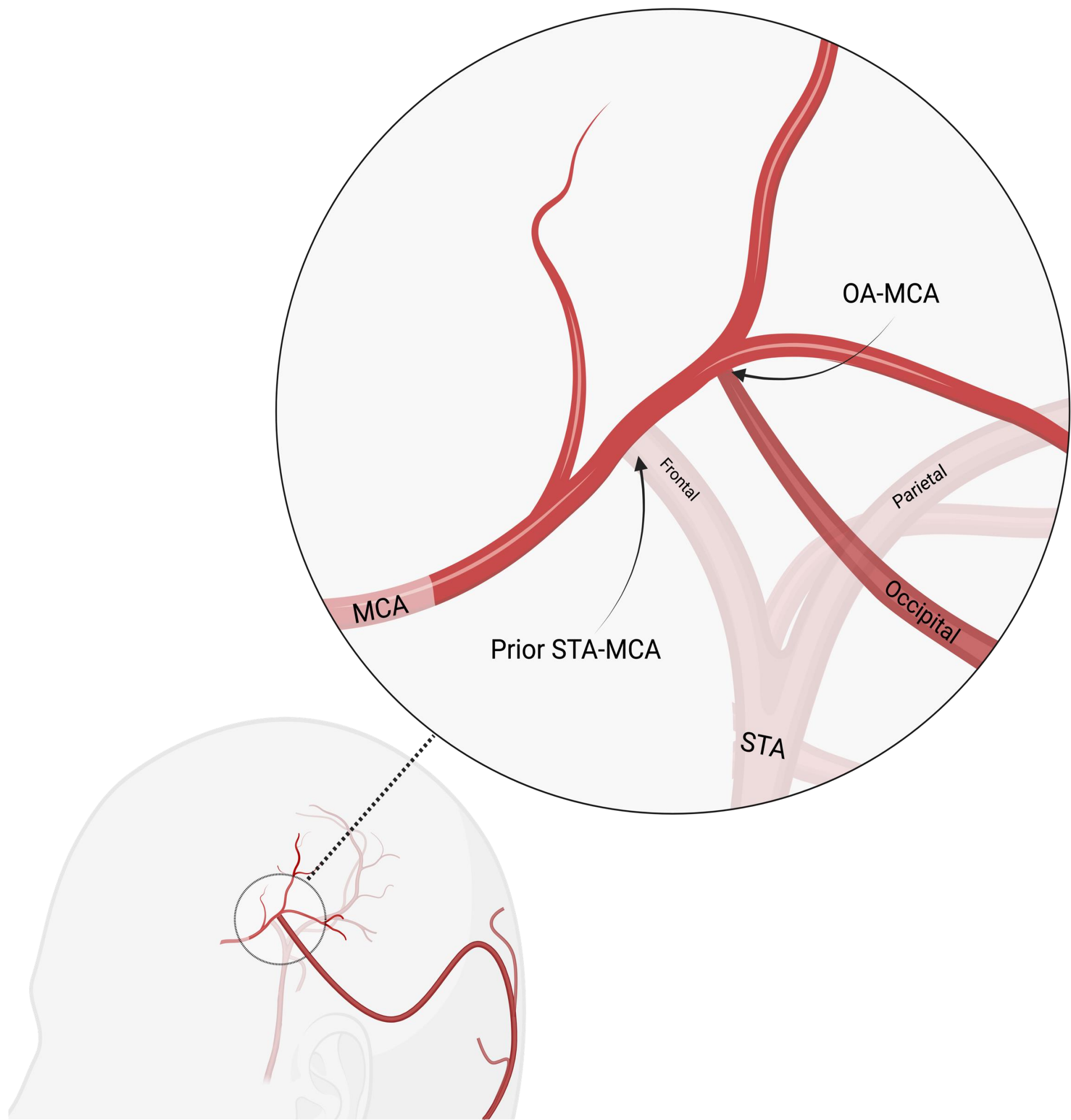
Illustrative Case

A 55-year-old female with rapidly progressive MMD and a history of bilateral STA-MCA bypass presented with syncope and later developed ataxia, apraxia, headache, and aphasia. Both STA-MCA bypasses were occluded on angiography.

Systematic Review

MEDLINE and Embase were searched up to 12/2024 with keywords, “cerebral revascularization”, “occipital artery”, “MCA”, and “bypass”. Out of 87 articles, 20 underwent full text review, and 5 met criteria.

Illustration of OA-MCA Bypass



Results

Illustrative Case

Patient initially underwent L STA-MCA but continued having symptoms. A subsequent R OA-MCA was performed but occluded. Therefore, L OA-MCA bypass was performed and remained patent postoperatively. Repeat DSA displayed patency of the L OA-MCA bypass and improved perfusion from the L STA-MCA bypass but residual hypoperfusion in the left anterior frontal MCA circulation. Aphasia remains a concern and has not returned to baseline.

Systematic Review

100% patency in 19 patients over mean 24.2 months; no ischemic recurrence. 12/19 (63.2%) had full symptom resolution; 7/19 (36.8%) improved symptoms 2/19 (10.5%) had wound infections. 1/19 (5.3%) had symptomatic treatment failure.

Discussion

Summary of Main Findings

OA-MCA bypass is a reliable salvage option for patients with failed STA-MCA bypass or unsuitable STA anatomy, demonstrating high patency and symptomatic improvement rates.

Comparison to STA-MCA and High-Flow Grafts

While STA-MCA bypass remains the gold standard for adult MMD, OA-MCA bypass offers comparable patency with fewer complications and may uniquely address posterior circulation involvement in salvage cases.

High-flow grafts, such as radial artery or saphenous vein, carry higher risks like hyperperfusion and occlusion. OA-MCA bypass provides similar outcomes with less invasiveness and a safer profile.

Future Directions

Prospective multi-center studies are needed to standardize protocols. Comparative research on combined bypass strategies and exploration of genetic predictors (e.g., RNF213 mutations) could refine patient selection and optimize outcomes.

Conclusion

The OA-MCA bypass is a safe and robust intervention for flow augmentation in patients with MMD after failed STA-MCA bypass.



Scan for details

Author & Year	# Pts	Mean Age (Years)	Sex (M/F)	Mean F/U (Months)	Previous Operation	Clinical Symptoms		Cerebral Perfusion		
						Complete	Improved	Complete	Improved	Unobtained
Baranoski et al., 2023	7	34	2/5	34	Direct, Indirect, and Combined	5	2	5	1	1
Hong et al., 2023	2	61.5	1/1	12	N/A**	2	0	0	2	0
Hirano et al., 2018	3	24	1/2	27.3	Direct	3	0	0	3	0
Nakamura et al., 2021	6	10.2	3/3	13.8	Direct, Combined*	1	5	5	0	1
Pandey et al., 2011	1	8	1/0	34	Indirect	1	0	1	0	0

Table 1. Systematic Review of Salvage OA-MCA Bypass in Moyamoya Disease
Direct = STA-MCA; Combined = STA-MCA + Indirect
R = retrospective; CR = case report
* = double-barrel; **= OA-MCA as initial therapy

References

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