Cervical Carotid Artery Dissection Endovascular treatment

Endovascular treatment (EVT) has emerged as an alternative to anticoagulation or antiplatelet therapy in select cases, particularly when medical management fails or when there is hemodynamic compromise.

Indications

Endovascular intervention is considered in patients with:

Progressive stroke symptoms despite medical therapy. Hemodynamic compromise due to significant luminal narrowing. Recurrent embolic events despite optimal anticoagulation or antiplatelet therapy. Pseudoaneurysm formation with risk of rupture or thromboembolism. Total occlusion with inadequate collateral circulation. Endovascular Approaches Stenting

The most common technique, aimed at revascularization and stabilization of the dissected segment. Types of stents used: Bare-metal stents (BMS): Effective in stabilizing the vessel but require dual antiplatelet therapy. Flow-diverting stents: Can be used in selected cases, particularly when pseudoaneurysms are present. Angioplasty with Stenting

Balloon angioplasty is performed before or after stenting to restore vessel patency. Care must be taken to avoid excessive manipulation, which could worsen dissection. Flow-Diverting Devices

Used for large pseudoaneurysms to promote remodeling and thrombosis within the aneurysm while maintaining vessel patency. Thrombectomy

In cases of acute ischemic stroke due to thromboembolism from the dissection, mechanical thrombectomy (MT) can be performed with or without stenting. Technical Considerations Access Route: Typically, a transfemoral approach is used; however, a radial approach may be considered in select cases. Imaging Guidance: Digital subtraction angiography (DSA) is used for real-time visualization. Antithrombotic Management: Dual antiplatelet therapy (aspirin + clopidogrel) is initiated peri-procedurally and continued post-stenting. Complications and Risks In-Stent Thrombosis – Requires careful post-procedural management with antiplatelets. Stent Migration or Malposition – Can lead to recurrent symptoms or occlusion. Distal Embolization – Potential for embolic stroke, requiring embolic protection devices in some cases. Perforation or Rupture – A rare but serious complication requiring immediate intervention. Outcomes and Prognosis Studies indicate that endovascular treatment results in high recanalization rates and low procedural complication rates. Stroke recurrence is lower compared to patients managed medically in select high-risk cases. Long-term patency of stents remains favorable, with low rates of restenosis. Conclusion Endovascular treatment is an effective and safe option for selected patients with cervical carotid artery dissection, particularly those with progressive symptoms, hemodynamic compromise, or recurrent embolic events. Stenting is the most commonly used technique, with favorable outcomes in well-selected cases. However, proper patient selection and post-procedural management are crucial to optimizing results.

Retrospective observational cohort studies

Sousa et al. investigated the impact of emergent carotid artery stenting during endovascular treatment for acute ischemic stroke in patients with tandem occlusion secondary to cervical carotid artery dissection. This was a secondary analysis of patients treated with EVT for AIS due to occlusive carotid artery dissection and tandem occlusion included in the retrospective international Antithrombotic Treatment for Stroke Prevention in Cervical Artery Dissection STOP-CAD Study. They compared patients with and without emergent stenting. The primary efficacy and safety outcomes were 90-day functional independence (modified Rankin Scale 0-2) and symptomatic intracranial hemorrhage (sICH) within 24h after EVT. The procedural outcome was successful intracranial recanalization (mTICI 2b/3). They used mixed-effect logistic regression adjusting for site, age, and NIHSS. In additional analyses, they used inverse probability of treatment weighting and adjusted for ASPECTS. Of the 4023 patients enrolled in STOP-CAD, 328 presented with anterior circulation AIS due to tandem occlusion and underwent EVT. The median age was 51 years (interquartile range 44-58), and 96 patients (29.3%) were female. One hundred fifty patients (45.7%) underwent emergent stenting. There was no significant association between stenting and 90-day functional independence (62.0% vs 59.7%; aOR 1.23, 95% CI 0.82-1.86, p=0.315) or sICH (7.3% vs 7.9%; aOR OR 0.95, 95% CI 0.41-2.2, p=0.913). Emergent carotid stenting was associated with successful intracranial recanalization (81.8% vs 76.6% aOR 2.62, 95% CI 1.52-4.5, p<0.001). Results did not meaningfully change in additional analyses. In patients presenting with an acute anterior circulation tandem occlusion secondary to cervical carotid artery dissection, emergent stenting was associated with a higher likelihood of successful intracranial recanalization but not improved functional outcomes or increased sICH. It remains unclear whether emergent stenting led to successful intracranial recanalization or whether patients with successful intracranial recanalization were more likely to be stented. Randomized trials are warranted [1)]

1)
Sousa JA, Rodrigo-Gisbert M, Shu L, Luo A, Xiao H, Mahmoud NA, Shah A, Oliveira Santos AL, Moore M, Mandel DM, Heldner MR, Barata V, Bernardo-Castro S, Henninger N, Muppa J, Arnold M, Nehme A, Rothstein A, Khazaal O, Kaufmann JE, Engelter ST, Traenka C, Metanis I, Leker RR, Nolte CH, Ghannam M, Samaniego EA, AlMajali M, Poppe AY, Romoli M, Frontera JA, Zedde M, Kam W, Mac Grory B, Saleh Velez FG, Ranasinghe T, Siegler JE, Zubair AS, Marto JP, Klein P, Nguyen TN, Abdalkader M, Mantovani GP, Simpkins AN, Sen S, Elnazeir M, Yaghi S, Sargento-Freitas J, Requena M. Emergent Carotid Stenting During Thrombectomy in Tandem Occlusions Secondary to Dissection: A STOP-CAD Secondary Study. Stroke. 2025 Jan 30. doi: 10.1161/STROKEAHA.124.048295. Epub ahead of print. PMID: 39882629.