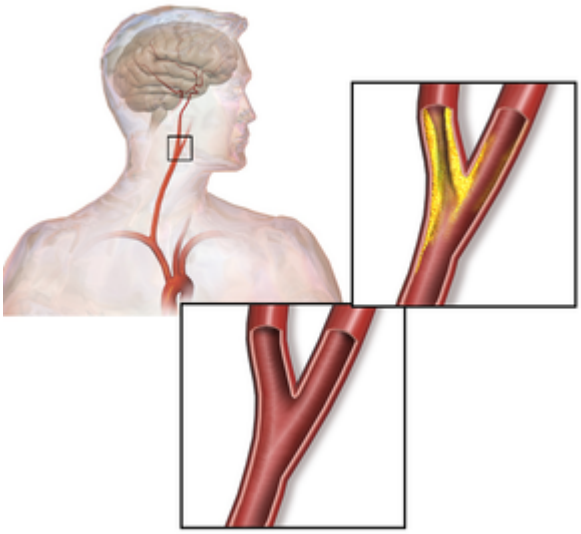
# Common carotid artery occlusion treatment

- Neuroprotective Effects of Anisodine Hydromide in a Rat Model of Vascular Dementia and the Antioxidative Stress Mechanisms Involved
- Total Saponins of Panax notoginseng Leaves Alleviate Vascular Dementia via the Gut-Brain Axis
- Emergent Endovascular Intervention for Acute Neurological Deficits Post-Carotid Endarterectomy: A Single-Institutional Analysis and Systematic Review of the Literature
- Arterial and Venous Thromboembolism Associated With Whippet-Induced Vitamin B12 Deficiency
- A case of POEMS syndrome presenting craniocervical vascular stenosis
- Outcome of Detachable Balloon Embolization in Traumatic Carotid Cavernous Fistula
- The vasodilatory effect of acupuncture and medicine-cake-separated moxibustion on a 28-year course of Takayasu arteritis: a case report
- The effect of N-acetylcysteine on apoptosis and NGF-Akt/Bad pathway in the hippocampus tissue of cerebral ischemia-reperfusion in male rats



---

Management depends on symptom severity, distal vessel patency (Riles classification), collateral flow, and comorbid conditions.

## 1. Medical Management

- Antiplatelet therapy (aspirin, clopidogrel)
- Statins
- Blood pressure and diabetes control
- Smoking cessation and lifestyle changes
- Indicated for asymptomatic patients or those with adequate collaterals

## 2. Endovascular Treatment

- Carotid stenting via:
  - Retrograde ECA or subclavian access
  - Reentry catheter techniques for subintimal dissection
- Best for Riles type I or II (distal outflow patent)

## 3. Surgical Revascularization

- Bypass options:
  - Subclavian–ICA bypass
  - Axillary–ICA bypass
  - CEA with interposition graft
- Consider in symptomatic patients with poor collaterals and good surgical profile

## 4. Conservative Monitoring

- For Riles type IV (no distal runoff)
- High-risk surgical patients
- Includes duplex/CTA follow-up

## Goal of Treatment

- Prevent stroke and improve perfusion
- Minimize embolic risk
- Personalize approach based on anatomy and clinical status

---

No consensus exists for treatment of asymptomatic patients, and decisions for treatment of symptomatic patients are controversial and made according to each case [1]. The 2011 American Heart Association guidelines recommend open surgery or endovascular intervention to treat symptomatic ischemic lesions affecting the anterior cerebral circulation caused by Common carotid artery occlusion [2] In contrast, the 2009 European Society of Cardiology Protocol has no specific recommendations on this matter, [3] which emphasizes the need for further studies.

## Literature review

A review of English-language medical literature from 1965 to 2012 was conducted using the PubMed and EMBASE databases to find all studies involving management of common carotid artery occlusion (CCAO). The search identified 21 articles encompassing 146 patients/arteries (73.2% men; mean age 65 ± 6.9 years).

The majority of the patients (93.8%) were symptomatic. Most of the patients (61.5%) had ipsilateral internal carotid artery (ICA) and external carotid artery (ECA) patent, while an occluded ICA and a patent ECA were found in 26.6% of the patients. Eighty per cent of the patients treated underwent a surgical bypass procedure, with the subclavian artery as the most common inflow vessel (64.1%). During the first 30 days of the procedure two strokes (1.5%) were reported. During a follow-up period spanning an average of 25.6 ± 11.2 months nine patients (6.6%) experienced a clinical cerebrovascular event. Seven restenoses (5.1%) and two reocclusions (1.5%) also occurred-eight after open surgical and one after endovascular repair.

The necessity to intervene to a CCAO remains controversial. Open surgical management of symptomatic CCA occlusive disease is a safe, durable, and effective therapeutic strategy with low perioperative cerebrovascular morbidity [4].

## Case series

In the endovascular treatment of acute cerebral large-vessel occlusion, cervical magnetic resonance angiography (MRA) is a useful modality for assessing the access route. However, we sometimes encounter cases in which not only the internal carotid artery (ICA), but also the common carotid artery (CCA) is poorly visualized, leading to hesitation over which devices and techniques to choose for revascularization. We retrospectively evaluated such cases, focusing on image findings and treatment results.

Data from 96 patients who underwent acute endovascular revascularization from January 2016 to December 2019 were analyzed. We extracted patients with poor CCA visualization on cervical MRA from 35 cases with ICA occlusion and examined angiographic findings, treatment methods, and outcomes.

Results: Poor visualization of the CCA in cervical MRA was observed in 8 cases. All cases displayed atrial fibrillation or sick sinus syndrome. Angiographic findings showed true CCA occlusion in 2 patients and ICA occlusion in 6 patients. Reasons for the inability to visualize the CCA on cervical MRA were speculated to be stenosis of the external carotid artery (ECA), presence of embolism in the ECA, or severe heart failure. In cases of true CCA occlusion, thrombus was aspirated using the balloon guide catheter and good recanalization was obtained. Seven of 8 patients displayed favorable recanalization, with a good prognosis after 90 days in 5 patients.

Poor CCA visualization on cervical MRA does not necessarily represent true CCA occlusion. Aspiration of thrombus from a balloon guide catheter is effective for true CCA occlusion [5].

---

Hecht et al. from the Department of Neurosurgery and Center for Stroke Research Berlin (CSB), Charité and Department of Neurology, Aarhus, analyzed the experience with surgical revascularization of CCA-occlusion to develop an algorithm for selection of the most suitable bypass strategy according to the Riles classification.

During a 10-year period, 16 out of 288 patients with cerebrovascular disease and compromised hemodynamic reserve underwent revascularization for unilateral CCA-occlusion. The utilized bypass strategies included (1) a saphenous vein graft from the subclavian artery (SA) to the internal carotid artery (ICA), (2) a radial artery graft from the V3 segment of the vertebral artery (VA) to a superficial branch of the middle cerebral artery (MCA), or (3) a saphenous vein graft from the SA to a deep

branch of the MCA.

In CCA-occlusion with maintained external carotid artery (ECA)/ICA patency (Riles type 1A), an SA-ICA bypass was performed (25%). In cases without ECA/ICA patency (Riles type 1B or 2) but suitable VA, a VA-MCA bypass was grafted (31%). In cases with unsuitable VA, a long SA-MCA interposition bypass was performed (38%). Transient postoperative neurological deficits occurred in 5 patients (31%) with 1 patient (6%) suffering permanent neurological worsening and 1 mortality (6%). Overall, no difference was found between the median preoperative mRS (2; range, 1-4) and the mRS at the time point of the last follow-up (2; range, 1-6; p = 0.75). The long-term graft patency was 94%.

Although surgical revascularization for CCA-occlusion is feasible, it is associated with a higher risk than standard bypass grafting. Considering the poor natural history of CCA-occlusion, however, this risk may be justified in carefully selected patients [6].

---

Eight patients with common carotid artery (CCA) occlusion underwent bypass with saphenous vein to either the carotid bifurcation (five), the internal carotid artery (two), or the external carotid artery (one). Indications included ipsilateral transient ischemic attack (two), recent nondisabling hemispheric stroke (two), and transient nonhemispheric cerebral symptoms (two). Two asymptomatic patients with CCA occlusion and contralateral internal Carotid artery stenosis underwent prophylactic revascularization prior to planned aortic surgery. There were no perioperative strokes, occlusions, or deaths. Late ipsilateral stroke occurred in two patients, and one patient had a single transient ischemic attack after 2 years. The four patients with preoperative transient cerebral ischemia experienced relief of their symptoms. Duplex ultrasound is an accurate screening modality for distal patency. Collateral filling of the internal or external carotid artery can usually be demonstrated after aortic arch or retrograde brachial contrast injection. End-to-end distal anastomosis after endarterectomy eliminates the original occlusive plaque as a potential source of emboli. The subclavian artery is preferred for inflow on the left. The CCA origin is easily accessible for inflow on the right. Bypass of the occluded CCA is safe and may be effective in relieving transient cerebral ischemic symptoms, although long-term ipsilateral neurologic sequelae may still occur [7].

# Case Reports

Common carotid artery occlusion treatment Case reports.

1)
Takagi T, Yoshimura S, Yamada K, Enomoto Y, Iwama T. Angioplasty and stenting of totally occluded common carotid artery at the chronic stage. Neurol Med Chir (Tokyo). 2010;50(11):998-1000. PubMed PMID: 21123985.
2)
Brott TG, Halperin JL, Abbara S, Bacharach JM, Barr JD, Bush RL, Cates CU, Creager MA, Fowler SB, Friday G, Hertzberg VS, McIff EB, Moore WS, Panagos PD, Riles TS, Rosenwasser RH, Taylor AJ, Jacobs AK, Smith SC Jr, Anderson JL, Adams CD, Albert N, Buller CE, Creager MA, Ettinger SM, Guyton RA, Halperin JL, Hochman JS, Hunt SA, Krumholz HM, Kushner FG, Lytle BW, Nishimura RA, Ohman EM, Page RL, Riegel B, Stevenson WG, Tarkington LG, Yancy CW. 2011 ASA/ACCF/AHA/AANN/AANS/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM/SVS guideline on the management of patients with extracranial carotid and vertebral artery disease: executive summary: a

report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American Stroke Association, American Association of Neuroscience Nurses, American Association of Neurological Surgeons, American College of Radiology, American Society of Neuroradiology, Congress of Neurological Surgeons, Society of Atherosclerosis Imaging and Prevention, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of NeuroInterventional Surgery, Society for Vascular Medicine, and Society for Vascular Surgery. Developed in collaboration with the American Academy of Neurology and Society of Cardiovascular Computed Tomography. Catheter Cardiovasc Interv. 2013 Jan 1;81(1):E76-123. doi: 10.1002/ccd.22983. Epub 2011 Feb 3. Review. PubMed PMID: 23281092.

3) Liapis CD, Bell PR, Mikhailidis D, Sivenius J, Nicolaides A, Fernandes e Fernandes J, Biasi G, Norgren L; ESVS Guidelines Collaborators. ESVS guidelines. Invasive treatment for Carotid artery stenosis: indications, techniques. Eur J Vasc Endovasc Surg. 2009 Apr;37(4 Suppl):1-19. doi: 10.1016/j.ejvs.2008.11.006. Review. PubMed PMID: 19286127.

4) Klonaris C, Kouvelos GN, Kafeza M, Koutsoumpelis A, Katsargyris A, Tsigris C. Common carotid artery occlusion treatment: revealing a gap in the current guidelines. Eur J Vasc Endovasc Surg. 2013 Sep;46(3):291-8. doi: 10.1016/j.ejvs.2013.06.006. Epub 2013 Jul 17. Review. PubMed PMID: 23870716.

5) Asano H, Shimizu T, Aihara M, Yamaguchi R, Aishima K, Yoshimoto Y. Acute Endovascular Revascularization for Patients with Common Carotid Artery Occlusion Apparent on Cervical Magnetic Resonance Angiography. J Stroke Cerebrovasc Dis. 2021 Jan 27;30(4):105626. doi: 10.1016/j.jstrokecerebrovasdis.2021.105626. Epub ahead of print. PMID: 33516069.

6) Hecht N, Wessels L, Fekonja L, von Weitzel-Mudersbach P, Vajkoczy P. Bypass strategies for common carotid artery occlusion. Acta Neurochir (Wien). 2019 Aug 3. doi: 10.1007/s00701-019-04001-4. [Epub ahead of print] PubMed PMID: 31377956.

7) Martin RS 3rd, Edwards WH, Mulherin JL Jr, Edwards WH Jr. Surgical treatment of common carotid artery occlusion. Am J Surg. 1993 Mar;165(3):302-6. PubMed PMID: 8447533.