

CASE REPORT

Bilateral external carotid artery stenting in symptomatic patient with complete occlusion of both internal carotid arteries

Mohamed Elsharkawi¹  | Baker Ghoneim¹ | Mohamed Elsherif¹ | Sherif Sultan^{1,2}

¹Department of Vascular & Endovascular Surgery, Galway University Hospital, National University of Ireland, Galway, Ireland

²Department of Vascular and Endovascular Surgery, Galway Clinic, Galway, Ireland

Correspondence

Mohamed Elsharkawi, Galway University Hospital, Galway, Ireland.
Email: dr_easterny@hotmail.com

Abstract

Completely occluded ICA should not always turn a symptomatic patient down for surgical intervention especially if medical treatment fails. Where bilateral ECA intervention is required, endovascular approach should be considered if feasible.

KEYWORDS

external carotid, internal carotid artery occlusion, stent, trans-cervical

1 | CASE REPORT

We report 2-year follow-up of our first simultaneous bilateral external carotid artery (ECA) stenting for a patient with bilateral internal carotid artery (ICA) occlusion and symptomatic ECA stenosis.

Through cervical approach, bilateral ECA stenting with An X.ACT stent was performed followed by balloon angioplasty. At 24 months, the patient remained completely asymptomatic and follow-up duplex showed patent stents. This case illustrates the durability of endovascular intervention in symptomatic ECA disease and the benefits of using cervical approach as a safe alternative option to femoral access.

An informed consent was obtained from the patient prior to writing this work.

72 years old male presented with daily transient episodes of vision loss affecting both eyes and lasting between 10 seconds and 5 minutes. Symptoms were persistent for 7 weeks prior to presentation, worse in the left eye. Patient's medical background history consisted of hypertension, paroxysmal atrial fibrillation, ischemic heart disease, and hyperlipidemia. He was an ex-smoker with a 20 pack-year history. He was on oral anticoagulation and statins at the time of presentation.

Neurological examination was normal with no detected focal limb weakness. Ophthalmological examination was unremarkable as well with no obvious ocular pathology could be detected. Initial investigations with carotid duplex ultrasound showed bilateral internal carotid artery (ICA) complete occlusion with increased velocities in both ECA. Normal antegrade flow was detected in both vertebral arteries. Non-contrast computed tomogram (CT) of the brain showed no evidence of hemorrhage or infarction. Patient was reviewed by stroke service, and conservative management was recommended with increasing statins dose and adding Aspirin to his medications.

Despite optimized medical treatment, patient's symptoms got worse occurring four to five times daily. Patient had urgent magnetic resonance imaging (MRI) of the brain which came back to show chronic microvascular changes with no evidence of acute infarction. Further assessment by computed tomography angiogram (CTA) showed bilateral ICA occlusion with normal appearance of intracerebral circulation; however, there was an evidence of high-grade stenosis in the origin of both ECAs with concomitant 30% stenosis of the left common carotid artery (CCA) (Figure 1).

Following discussion of patient's case in the neurovascular multidisciplinary meeting, recommendation was to proceed

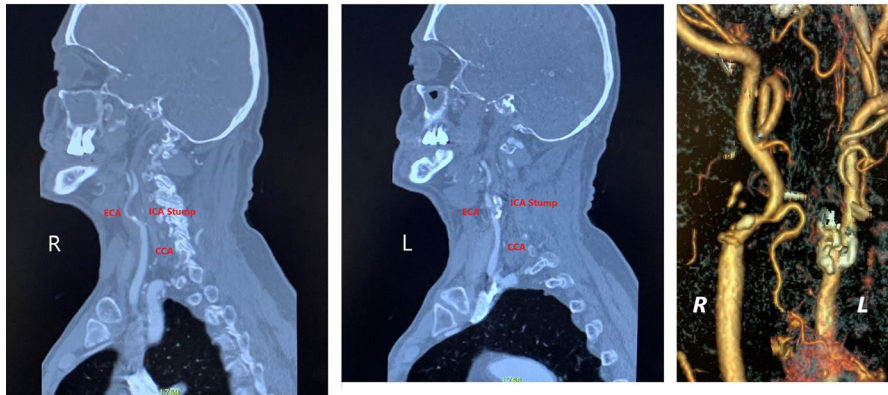


FIGURE 1 CTA showing occluded ICA bilaterally with ECA high-grade stenosis. CCA, Common carotid artery, ECA, External carotid artery, ICA, Internal carotid artery

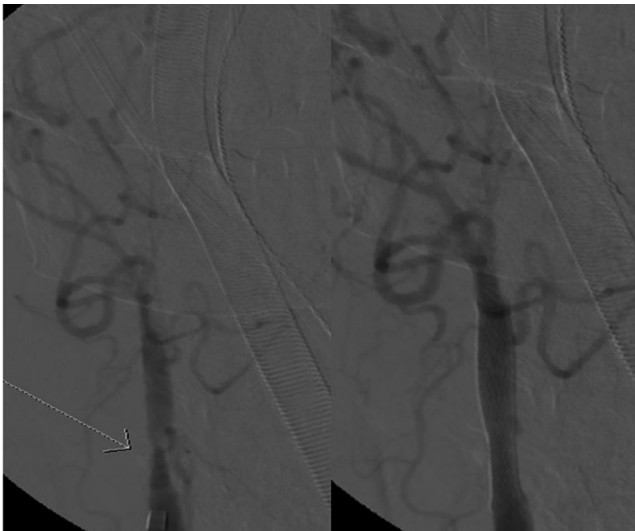


FIGURE 2 Intraoperative angiogram comparing right ECA before and after stenting

with revascularization of both ECAs using either open or endovascular approach.

Patient was planned for endovascular repair. Femoral approach was thought to carry many challenges in such vasculopathic patient due to tortuous and heavily calcified aortoiliac segment with near total occlusion of the left common iliac artery. As a result, bilateral cervical access was adopted. Under general anesthesia, bilateral open trans-cervical approach to both CCAs was established. Seldinger technique was used to access both CCAs using 7-french sheath. Cerebral protection with reversal of flow was achieved by clamping CCA and applying negative pressure by connecting a VacLok syringe (Merit Medical) to the sheath's side port. Primary stenting was performed using 10–8 mm × 40 mm X.ACT stent (Abbott) followed by angioplasty using 5 mm balloon. Completion angiogram showed the stents to be in a good place with restoration of the flow (Figures 2 and 3).

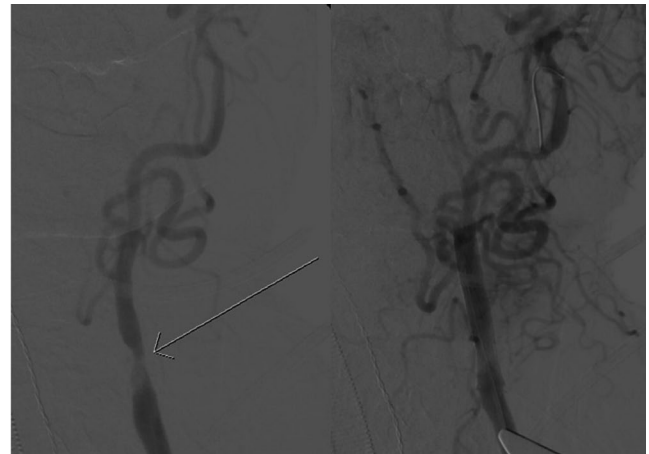


FIGURE 3 Intraoperative angiogram comparing left ECA before and after stenting

Postoperatively, patient's recovery was unremarkable with no procedure-related complications. He was discharged home on the first day following procedure with completely symptoms free.

Patient was reviewed in the outpatient clinic at 6 weeks following discharge from the hospital and then six-monthly thereafter. At 2-year follow-up, the patient remained completely asymptomatic with no evidence of stenosis in both stents on duplex ultrasound.

2 | DISCUSSION

External carotid artery is an important part of extensive collateral system in the neck which plays an important role in providing blood supply to the brain in case of ICA disease.¹ This becomes more evident in the setting of high-grade stenosis or occlusion of the ICA where ECA can contribute up to 80% of cerebral blood flow.²

In patients with occluded ICA, diseased ECA can result in ophthalmologic and neurologic symptom. Transient ischemic attacks (TIA) in case of bilateral ICA occlusion may result from either hemodynamic change caused by cerebral hypoperfusion³ or emboli originating from thrombus in the stump of ICA or plaque in CCA and ECA.^{4,5} As a result, treatment of symptomatic patients with ECA stenosis proved to be beneficial with several studies reporting improvement or resolution of ischemic symptoms following ECA endarterectomy⁵⁻⁸ and durable with reported 1.6% rate of perioperative stroke and 0% mortality rate.⁹

Endovascular solution proved to be an effective and safe alternative in patients with bilateral disease; moreover, it might be preferred in patients with significant comorbidities or patients with hostile neck. We decided to do ECA stenting as the patient had significant comorbidities. Additionally, both sides were urgent due to crescendo TIA. At 2-year follow-up, the patient remained completely asymptomatic without recurrence of ocular symptoms.

Owing to its reported safety and lower stroke risk compared to femoral approach,¹⁰ trans-cervical approach was favored in this case to avoid the problem with the arch and possible embolization. Using a VacLok syringe, cerebral protection with reversal of flow during stent deployment was simply achieved.

3 | CONCLUSION

External carotid artery stenting is a safe and durable alternative to surgical endarterectomy in patients with symptomatic ECA disease and ICA occlusion.

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTION

ME: involved in case analysis, literature review, consenting the patient, and writing the paper. BG, ME, and SS: involved in case analysis and writing the paper.


ETHICAL APPROVAL

Ethical approval was granted, and an informed consent was obtained from the patient prior to writing this work.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Mohamed Elsharkawi  <https://orcid.org/0000-0001-6771-0291>

REFERENCES

1. van Laar PJ, van der Grond J, Bremmer JP, Klijn CJ, Hendrikse J. Assessment of the contribution of the external carotid artery to brain perfusion in patients with internal carotid artery occlusion. *Stroke*. 2008;39(11):3003-3008.
2. Brown K, Itum DS, Preiss J, et al. Carotid artery stenting has increased risk of external carotid artery occlusion compared with carotid endarterectomy. *J Vasc Surg*. 2015;61(1):119-124.
3. Bryan DS, Carson J, Hall H, et al. Natural history of carotid artery occlusion. *Ann Vasc Surg*. 2013;27(2):186-193.
4. Gertler JP, Cambria RP. The role of external carotid endarterectomy in the treatment of ipsilateral internal carotid occlusion: collective review. *J Vasc Surg*. 1987;6(2):158-167.
5. Nicolosi A, Klinger D, Bandyk D, Towne J. External carotid endarterectomy in the treatment of symptomatic patients with internal carotid artery occlusion. *Ann Vasc Surg*. 1988;2(4):336-339.
6. Klijn CJ, Kappelle LJ. Haemodynamic stroke: clinical features, prognosis, and management. *Lancet Neurol*. 2010;9(10):1008-1017.
7. Street DL, Ricotta JJ, Green RM, DeWeese JA. The role of external carotid revascularization in the treatment of ocular ischemia. *J Vasc Surg*. 1987;6(3):280-282.
8. O'Hara PJ, Hertzner NR, Beven EG. External carotid revascularization: review of a ten-year experience. *J Vasc Surg*. 1985;2(5):709-714.
9. Sterpetti AV, Schultz RD, Feldhaus RJ. External carotid endarterectomy: indications, technique, and late results. *J Vasc Surg*. 1988;7(1):31-39.
10. Sfyroeras GS, Moulakakis KG, Markatis F, et al. Results of carotid artery stenting with transcervical access. *J Vasc Surg*. 2013;58(5):1402-1407.

How to cite this article: Elsharkawi M, Ghoneim B, Elsherif M, Sultan S. Bilateral external carotid artery stenting in symptomatic patient with complete occlusion of both internal carotid arteries. *Clin Case Rep*. 2021;9:540–542. <https://doi.org/10.1002/ccr3.3577>