



Case Report

Thrombectomy and stenting of pseudoaneurysm from transcarotid artery revascularization

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ABSTRACT

Background: Transcarotid artery revascularization (TCAR) is becoming an increasingly popular treatment of carotid stenosis. Despite this rapid adoption, little in the literature describes the associated complications of this procedure.

Case Description: We report a case of a left M1 large-vessel occlusion following treatment of symptomatic, high-grade carotid stenosis with a TCAR procedure approximately three weeks earlier. The initial angiography demonstrated a pseudoaneurysm in the left common carotid artery at the site of TCAR access with a distal clot in the carotid stent. The clot within the stent was aspirated, and a mechanical thrombectomy was performed with a combination of a stent-retriever and aspiration catheter for thrombolysis in cerebral infarction 2B revascularization.

Conclusion: The TCAR procedure offers a novel method for revascularization of carotid lesions; it does include its complications. While generally safe, access site complications such as pseudoaneurysms can always occur. Knowledge of this risk allows for appropriate surveillance and management should it occur.

Keywords: Ischemic stroke, Large-vessel occlusion, Thrombectomy, Transcarotid artery revascularization

INTRODUCTION

The trans carotid artery revascularization (TCAR) procedure is becoming increasingly popular as an alternative to carotid endarterectomy (CEA) or transfemoral carotid artery stenting (TFCAS) with recent data supporting the TCAR procedure as being as safe (CEA) or safer (TFCAS) in the appropriately selected patient.^[4,5] Despite the increasing popularity of this procedure, little has been published about complications from TCAR. Here, we report a case of a large-vessel occlusion (LVO) in the setting of a common carotid pseudoaneurysm following a TCAR procedure. Angiography at the time of presentation from the left M1 occlusion demonstrated a thrombus within the carotid stent and a common carotid artery pseudoaneurysm proximal to the stent.

CASE REPORT

A 64-year-old man with a medical history notable for laryngeal cancer treated by resection, chemotherapy, and radiation underwent a left-sided TCAR procedure for symptomatic,

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severe carotid stenosis on July 21, 2023. He was discharged on 81 mg aspirin and clopidogrel after an uncomplicated stay but discontinued the aspirin due to reflux. On August 16, 2023, the patient awoke with aphasia, right arm weakness, and altered mental status with a last known normal time of 2230 the evening before. A computed tomography angiography was performed, demonstrating distal left M1 occlusion, and the patient was subsequently taken to the endovascular suite for mechanical thrombectomy.

A diagnostic cerebral angiogram was performed through an 8F arterial sheath in the right common femoral artery. The left common carotid was selected with the guide catheter, and an injection demonstrated thrombus within the previously placed carotid stent and a distal common carotid pseudoaneurysm [Figure 1]. An Esperance aspiration catheter was then navigated over a Trax microcatheter with a Synchro Support microwire. The clot, as mentioned above, was aspirated from the stent and the system was advanced into the left middle cerebral artery to the face of the thrombus [Figure 2].

Once the microcatheter and microwire were advanced distal to the occlusion, the aspiration catheter was advanced to the face of the occlusive thrombus and the stent-retriever was deployed. After 3 min, the stent-retriever was recaptured and removed from the patient under continuous aspiration through the aspiration catheter. A final angiograph demonstrated a thrombolysis in cerebral infarction 2B revascularization [Figure 3].

Three days later, when the patient was more stable, he was taken back to the endovascular suite for placement of a covered stent in the left common carotid [Figure 4]. He was ultimately discharged to a rehab center approximately two weeks after the presentation.

DISCUSSION

Many practitioners have readily adopted direct carotid access with flow reversal through TCAR for its decreased risk of intraprocedural embolic injury and the ease of direct access rather than navigation through tortuous and often diseased vessels. Indeed, in the past eight years, since the Food and Drug Administration approved TCAR, the number of centers performing the procedure has increased from 29 to 606, and TCAR is utilized in approximately 1/4th of carotid stenosis cases in those institutions.^[3]

Despite this widespread adoption, little has been reported on the complications associated with TCAR. In fact, multiple studies have demonstrated the comparable safety of TCAR to transfemoral carotid stenting or CEA in both patient outcomes and access site complications.^[1,2,4] Of the few complications that have been reported to the Food and

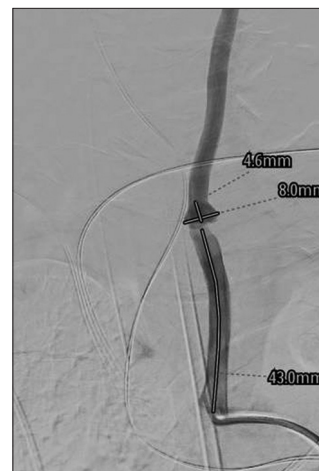


Figure 1: Left carotid artery with a 4.6 × 8.0 mm pseudoaneurysm.

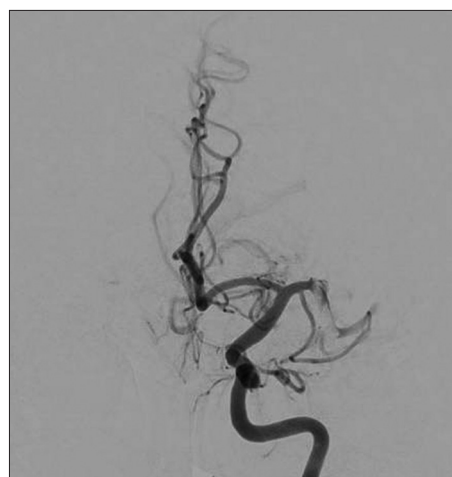


Figure 2: Initial angiogram demonstrating left M1 occlusion.

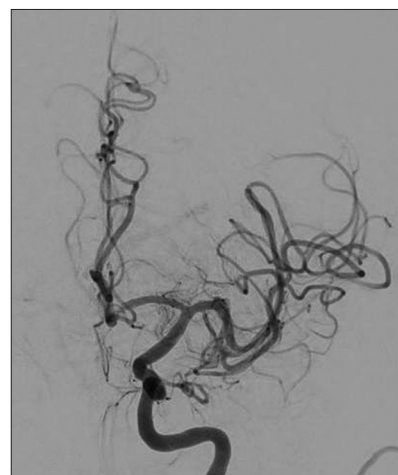


Figure 3: Post-thrombectomy with thrombolysis in cerebral infarction 2B revascularization.



Figure 4: Left carotid artery status post-covered stent deployment leading to closure.

Drug Administration Manufacturer and User Facility Device Experience (MAUDE) database; however, the majority are carotid dissections from access (58 of 115).^[8] Approximately 90% of those were identified and repaired intraprocedurally.

Unfortunately, for those patients who experience an arterial injury that is either not recognized intraoperatively or occurs in a delayed fashion, the implications can be quite serious. Here, we present a case of TCAR-access site injury and a subsequent distal embolic LVO. While the risk of distal embolism was elevated in this patient after discontinuing the aspirin, this case emphasizes that direct carotid access carries its risks, particularly in the setting of previously irradiated vasculature with abnormal media and endothelium structure and function.^[7] This point is underscored by a recent publication in which a carotid pseudoaneurysm caused by a TCAR procedure ruptured.^[6] Obviously, in these patients, the benefit of stroke reduction through aortic arch navigation avoidance and flow reversal was undermined by these significant complications necessitating further treatments.

Nevertheless, the development of and rapid increase in TCAR utilization offers an opportunity for improved patient outcomes given the previously demonstrated benefits of TCAR in properly selected patients.^[4,5] As this procedure becomes increasingly popular, however, case reports such as this help serve as warnings of how serious the morbidity can be when TCAR does not go as expected.

CONCLUSION

The benefits of TCAR have been demonstrated in both literature and practice as more practitioners move towards

incorporating TCAR into the treatment of carotid stenosis. Despite this, there remains little data regarding the risk profile of TCAR. Here we present an LVO as a complication following a pseudoaneurysm at the carotid access site. Providers must take into consideration the risk with direct carotid access when utilizing TCAR.

Ethical approval

The research/study was approved by the Institutional Review Board at Piedmont Health, number 1953404-3, dated January 7, 2023.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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