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Case Report

Cervical carotid pseudoaneurysm eroding the skin with impending blowout

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1. Introduction

Carotid endarterectomy is the most performed vascular surgical procedure in the western world today. Pseudoaneurysms (PA) complicate about 0.3% of all carotid endarterectomy (CEA) [1]. Due to its life-threatening nature, post-CEA PA requires prompt recognition and management. The traditional open surgery repair remains the gold standard treatment, although it is associated with relatively high morbidity and mortality [2]. Over recent decades, endovascular techniques have offered a less invasive approach with high efficacy and safety [3]. Herein, we present a case of an eroding PA presenting eight years after CEA, successfully occluded by the placement of 2 overlapping Wallstents (Boston Scientific, Marlborough, MA, USA).

2. Case report

An 88-year-old right-handed male with a past medical history of atrial fibrillation, hypertension, dyslipidemia and diabetes mellitus presenting eight years after a right CEA. During that time the patient remained asymptomatic until six months prior to his admission, when a nonhealing wound with intermittent sentinel bleeding developed on the right side of his neck. He did not seek medical attention until he experienced a sudden vision loss in his left eye. At admission, the patient was neurologically intact, and physical examination revealed a loud carotid bruit with blood oozing from a skin breakdown on the right side of the neck with a pulsating mass underneath (Fig. 1A). However, his vital signs were stable, no signs of nerve compression were present, no fever or purulent discharge and a complete workup ruled out infection. A CTA was performed, revealing an 18 mm PA arising from the right common carotid artery(CCA) bifurcation (Fig. 1B). An angiogram confirmed the presence of 20·15 mm PA originating in the right CCA bifurcation and extending to the skin surface, with no evidence of extravasation (Fig. 1C).

Given the size of the PA and its potential complications, follow up with watchful waiting was not an option. Open surgical reconstruction was unfavored due to the patient's surgical history, age, and comorbidities. The decision was made to proceed with an endovascular reconstruction using two overlapping Wallstents, and dual antiplatelet therapy was started. The trans-radial approach was used to deploy 2 Wallstents measuring 8.0 x 29 mm, and 8.0 x 36 mm in a telescoping fashion across the neck of the PA (Fig. 1D). Completion angiogram showed adequate flow through the intracranial vessels with significant stasis within the PA.

Recovery was uneventful and postoperative neurologic examination remained intact. Follow-up computed tomography angiography (CTA) performed after five days revealed 95% obliteration of the PA (Fig. 2A). At that time, wound debridement and skin closure was performed (Fig. 2B). After that, the patient was subsequently discharged home with dual antiplatelet therapy for six months and then Aspirin monotherapy after that. A telemedicine consultation was performed with the patient showing that the wound healed nicely and the patient's modified Rankin score is 0. Doppler ultrasound was performed instead of an

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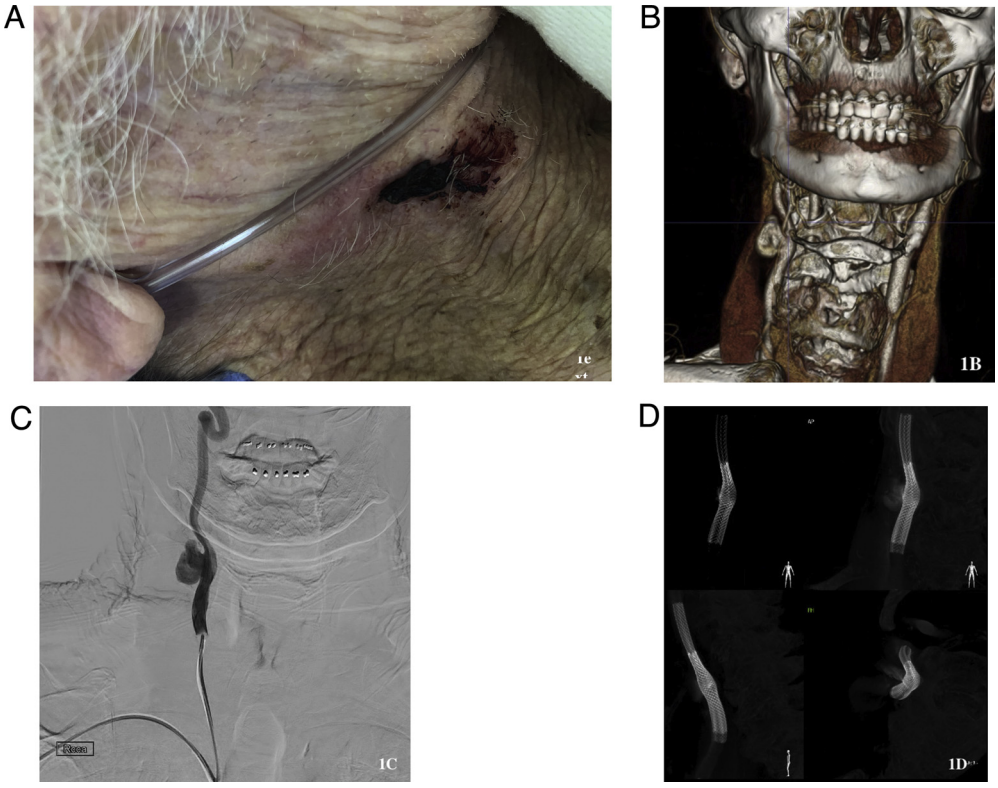

Fig. 1. (A) Photograph of the patient's right neck eight years after carotid endarterectomy. (B) Preoperative CT showing the PA from the right CCA.(C) Digital subtraction angiography, antero-posterior view, showing a 20 × 15 mm PA originating in the right CCA bifurcation.(D) Completion angiography after stent deployment, with significant stasis within the pseudoaneurysm.

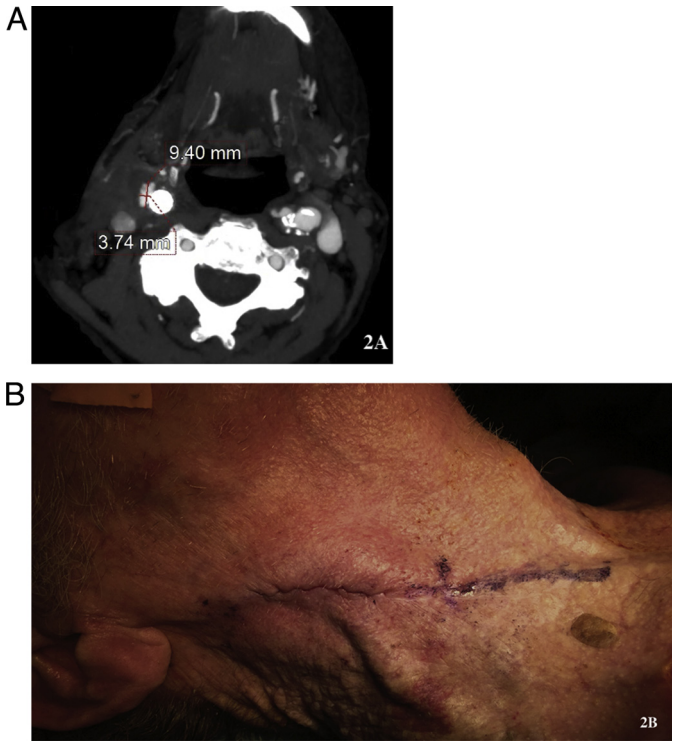

Fig. 2. Patient's Follow up (A). CTA scan five days post-procedure revealing a significant obliteration of the pseudoaneurysm. (B) Photograph of the patient's right neck after the wound debridement and closure.

angiogram, due to patient's preference, showing complete thrombosis of the PA.

3. Discussion

Pseudoaneurysms complicates around 0.3% of all CEA [1]. PA is defined as an arterial dilatation where the aneurysm is not walled by the 3 layers, but by a blood clot or fibrous wall, which makes it prone to enlargement [1]. Post-CEA PA may develop as soon as 2 days or as long as 22 years after surgery. It may present as an enlarging pulsatile neck mass, lower cranial nerve palsy, ischemic stroke, or infection. However, the majority of PAs are asymptomatic [3]. Carotid PA is a life-threatening emergency as it may rupture or cause thrombo-embolic stroke [3]. Left untreated mortality rates may reach up to 77%; however, timely intervention may drop mortality rate by half [3].

Until a few years ago, open surgery was the only approach for treating carotid PA. The resection of the PA followed by patch angioplasty, interposition venous grafting or direct anastomosis, remains the gold standard especially in the setting of infection. Although open surgery is an effective treatment option, it is technically challenging and associated with a 9% risk of mortality/major stroke and 6% risk of cranial nerve injury [2]. Also, the PA's mass effect and scar tissue distorts the planes for dissection. The need for clavicular resection sternotomy, or mandibular dislocation adds complexity to the surgical approach.

The ongoing advancements in the endovascular field have offered new minimally invasive techniques for treating PAs, which is extremely helpful in redo surgeries were scar tissue complicates the procedure. The use of endovascular approach, either standalone stents or with coils, has been reported previously with satisfactory results in the setting of post-CEA, post-traumatic, and infected PAs.

In the present case, the flow diversion concept used for intracranial aneurysms has been used for treating a PA originating from the ECA by using telescoping Wallstents. The placement of a closed cell design telescoping stents across the PA neck is a relatively simple technique to divert intra-aneurysmal flow leading to aneurysm exclusion.

Some authors advocate the use of covered or open-cell stents, however, aside from the risk of infection and their limited flexibility, a randomized controlled trial of covered versus bare stents for carotid stenosis was halted early due to a statistically significant higher incidence of restenosis in the covered stent group [4]. We opted for close-cell stent for greater flow diversion propriety. A retrospective study suggest that the use of close-cell stents is associated with lower stroke/death rate after carotid stenting compared with open-cell stents. Double stenting may be an effective alternative treatment for Post-CEA pseudoaneurysms. However, it is indeed not without limitations, such as the risk of periprocedural rupture. Additionally, multiple stents implantation is associated with a higher risk of stent fracture, and the risk of thromboembolism should certainly not be underestimated. Another caveat for stenting a PA is delayed occlusion time compared to coils, although stent-assisted coil embolization can increase the immediate occlusion rate, placement of a coil into the PA cavity carries a higher risk of rupture. Double stenting undoubtedly increases the foreign body material in the arterial wall, yet overlapping stenting have a higher flow diversion effect and induces quicker occlusion [5].

4. Conclusion

Post-CEA pseudoaneurysm with an open wound is a life-threatening complication that requires prompt recognition and management. Symptomatic post-CEA PAs can be successfully and effectively managed with the use of 2 overlapping Wallstents alone, without adjunctive coils. We believe that this approach may be a reasonable alternative to open surgery for treating pseudoaneurysms especially in high risk patients.

Disclosure

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Conflict of interest

None.

Patient consent was taken prior to the inscription of this case report.

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