

SURGICAL VIDEO

Surgical Treatment of Post-Carotid Endarterectomy Carotid Pseudoaneurysm

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Post-endarterectomy pseudoaneurysms (PEPA) are a rare complication of carotid endarterectomy (CEA), but are associated with high morbidity risk. Therefore, once they are diagnosed, treatment is urgent to prevent possible complications such as rupture, embolisation, thrombosis, or airway and cranial nerve compression. In this video, the surgical procedure is shown in a case of PEPA 10 years after CEA with patch angioplasty, which was successfully managed by surgical excision and interposition of great saphenous vein graft. Follow up duplex examination at six months was normal, with patency of the vein graft. This case reiterates the importance of open surgery as the treatment of choice for this difficult clinical setting.

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INTRODUCTION

Carotid endarterectomy (CEA) is one of the most common vascular procedures performed.^{1,2} Post-endarterectomy pseudoaneurysms (PEPA) are a rare complication of CEA that occur in about 0.3–0.6% of the procedures.³ The aetiology includes suture line failure and degeneration of the arterial wall or of the patch. Additionally, some authors report this rare complication to be twice as common after patch angioplasty compared with primary closure.^{1,3,4}

This video shows the surgical procedure in a case of PEPA 10 years after CEA with patch closure, which was successfully managed by surgical excision and interposition of great saphenous vein graft.

CASE REPORT

In 2008, a 74 year old man with a past medical history of hypertension, hyperlipidaemia, chronic kidney disease, and ischaemic cardiomyopathy underwent CEA for symptomatic left carotid stenosis with Dacron patch angioplasty sutured with 5-0 non-absorbable, synthetic polypropylene (Prolene). The procedure was uneventful. Routine duplex follow up at one, six, and 12 months and yearly thereafter was normal.

Ten years after the CEA, the patient presented with a non-painful pulsatile mass in the left lateral aspect of the mid neck. He was neurologically asymptomatic. There were no clinical signs of infection and his white blood cell count and C reactive protein level were normal and all blood cultures were negative. The duplex scan examination showed a 40 mm diameter pseudoaneurysm at the left carotid bifurcation extending into the internal carotid artery (ICA) with mobile thrombus inside the lumen.

The surgical procedure consisted of resection of the PEPA and interposition vein graft of the ipsilateral great saphenous vein between the common carotid artery and the ICA. The external carotid artery was ligated from inside. Intra-operatively there was no evidence of infection and the most likely aetiology was suture line failure. Carotid wall and Dacron patch samples were collected and sent for microbiological analysis, and all were negative. Standard antibiotic prophylaxis for CEA, intravenous cefazolin 2 g, was administered during surgery, and continued for 24 hours. Recovery was uneventful and the patient was discharged on post-operative day five on a single antiplatelet regimen.

Duplex examinations at one and six months after surgery were normal, with a patent vein graft.

DISCUSSION

Carotid artery PEPA is a rare complication of CEA, reported to occur in about 0.3–0.6% of the procedures.³ Although this complication can arise both after patch angioplasty and direct suture closure, some authors found it to be twice as common after patch angioplasty.¹

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The factors that can lead to PEPA include suture line disruption, degeneration of the arterial wall or patch, infection, or even clamp/shunt induced damage.^{1–5} The natural history of these pseudoaneurysms is not well known and they can occur over a long period, from days to several years after CEA. However, once they are diagnosed their treatment is urgent to prevent possible complications such as rupture, embolisation, thrombosis, or airway and cranial nerve compression.

Patients usually present with an asymptomatic pulsatile mass in the lateral aspect of the neck with or without associated neurological deficits. Duplex ultrasound is the gold standard diagnostic tool but additional methods such as computed tomography angiography, magnetic resonance imaging, or angiography are also mandatory.^{1,2}

Nowadays, both surgical and endovascular techniques are used to treat carotid pseudoaneurysm. Open surgery is currently the treatment of choice, regardless of it being technically more demanding in a previously operated neck and being associated with a significant risk of embolic events, cranial nerve injury (6–44% of the cases), and a 6% mortality rate.^{1,3,4,6} On the other hand, and despite being increasingly used in this setting, endovascular treatments are also certainly not free of complications such as transient ischaemic attacks, stroke, and stent occlusion.¹ According to Seward et al., the peri-operative incidence of ischaemic events after an endovascular approach can be as high as 7%.^{4,7}

In this case, the pseudoaneurysm was resected and successfully replaced with a vein graft. Other surgical options include reconstruction of the artery with a prosthetic graft or even by primary closure or patch angioplasty.^{1,4}

In conclusion, this case reiterates the importance of open surgery as the treatment of choice for this difficult clinical

setting, notwithstanding the possibility of associated morbidity, even in experienced hands.

APPENDIX A. SUPPLEMENTARY DATA

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ejvsr.2019.06.002>.

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