SHORT REPORT

Endovascular Treatment of an Infected Carotid Prosthetic Patch and Pseudo-aneurysm

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Abstract
Prosthetic patch infection following carotid endarterectomy (CEA) is rare and usually requires surgical excision of the patch and carotid ligation or reconstruction. We present a case of carotid patch infection with pseudoaneurysms successfully treated with a covered stent. Follow-up to 31 months demonstrated no clinical, biochemical or microbiological evidence of local or systemic infection and surveillance duplex confirmed continued exclusion of the pseudoaneurysm. At fourteen months, symptomatic proximal and distal restenoses were successfully restented. The patient then remained asymptomatic, but the distal stenosis recurred. Endovascular treatment may be an alternative to surgery, particularly in those who are high risk.

Introduction
Prosthetic patch infection following carotid endarterectomy (CEA) has a prevalence of 0.5–1%. It can manifest itself through systemic and local sepsis, haemorrhage, neurological symptoms and pseudoaneurysm formation. Treatment usually involves surgical excision of the patch with carotid ligation or arterial reconstruction using autologous vein patch or bypass. Complications of this complex procedure include re-infection, neurological injury, stroke and death. Endovascular treatment of infected pseudoaneurysms in other locations is controversial with variable results. We report a case of carotid patch infection with pseudoaneurysm formation successfully treated with a covered stent.

Case report
A 62-year-old hypertensive lady underwent left CEA with Dacron patch insertion for symptomatic stenosis. Two years later a swelling developed over the wound site; undefined by duplex and MRI. A sinus developed in 2005, which MRI suggested was due to chronic infection of the patch. Surgical exploration was undertaken by an otolaryngologist,
within another institution, confirming the tract arose from the patch. The tract was excised but the patch was left in situ. The sinus subsequently reappeared, but microbiology remained negative throughout.

In 2007 the patient complained of neck discomfort. Duplex identified a characteristic “corrugated patch” (Fig. 1) and pseudoaneurysms, confirmed by MR angiogram and digital subtraction angiography (Fig. 2). White cell scan showed increased uptake around the patch. Surgical intervention was considered but discounted due to the patient’s preference, obesity and significant neck scarring.

Exclusion of the pseudoaneurysm involved embolisation of the left external carotid artery using two 4-mm coils (William Cook Europe, DK-4632 Bjaeverskov) and an 8 mm × 50 mm covered stent (Wallgraft™ Endoprosthesis, Boston Scientific, Natick, MA, USA) placed from the common to the internal carotid artery with balloon angioplasty to 7 mm and 4 mm respectively. She made an uneventful recovery and was discharged on a six-week course of clindamycin and long-term aspirin, clopidogrel and a statin.

At 6 months, duplex identified high grade left internal carotid artery stenosis, immediately distal to the stent graft (peak systolic velocity, PSV 371 cm/sec), with subsequent imaging also indicating a proximal stent stenosis. The patient presented at 14 months with crescendo TIAs and both stenoses were successfully stented with two uncovered Carotid Wallstents (Boston Scientific Natick, MA, USA). The distal restenosis recurred by 4 months (PSV 559 cm/sec), but remained asymptomatic.

At 31 months follow-up there was no clinical, biochemical or microbiological evidence of local or systemic infection and surveillance duplex confirmed continued exclusion of the pseudoaneurysm. Thirty-two months following successful treatment of the infected pseudoaneurysm, the patient died of unrelated ischaemic heart disease and bronchopneumonia.

Discussion

In a recent review, 91% of prosthetic patch infections cultured Staphylococci or Streptococci. The late presentation in this case may represent infection with a less virulent strain such as Staphylococcus epidermidis which could account for the absence of positive cultures and a 6-year interlude between operation and pseudoaneurysm formation. Patch corrugation on duplex, as in this case, was found in four of ten cases of prosthetic patch infection in a further series, no causative organism was reported. Successful endovascular treatment may be as a result of low-grade infection. This form of intervention would need further consideration before being used in a more acute setting.

Surgical intervention for pseudoaneurysms includes patch excision with carotid ligation or arterial reconstruction incorporating autologous vein patch or interposition vein graft. These are recognised as complex procedures with potentially high morbidity and mortality, but remain
standard care. Cumulative freedom from preoperative stroke/death or re-infection was 65% at 2 years. Endovascular treatment of carotid pseudoaneurysms, involving covered stent insertion, has been used as a measure of controlling the pseudoaneurysm in order to enable delayed and more controlled surgical intervention. Various types of stent have been used including nitinol or stainless steel covered with Dacron or PTFE. In the only other reported case of endovascular treatment of an infected carotid prosthetic patch, a covered stent was positioned in the carotid bifurcation as a long-term measure for a post-CEA infected pseudoaneurysm, without complication. As in the case presented, the patch infection became evident many years after initial surgery.

Limitations of this endovascular treatment include restenosis and recurrent infection. Restenosis has been reported following covered stent insertion, including a trial stopped early due to the incidence of restenosis.

Conclusion

A second case of successful endovascular treatment of an infected carotid patch with pseudoaneurysm is presented. This case highlights the potential problem of restenosis associated with carotid covered stents. However endovascular treatment may be an alternative to surgery, particularly in high risk surgical candidates.

References