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SHORT REPORT

**Dacron Patch Infection After Carotid Angioplasty.
A Report of 6 Cases**

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Objective. We describe our experience with Dacron patch infections after carotid endarterectomy (CEA).

Report. From 633 patients undergoing carotid endarterectomy with Dacron patching, six re-presented with prosthetic infections. In 3 of the 6 cases a neck haematoma had necessitated surgical revision after the original carotid surgery. Five patients underwent interposition vein grafting and 1 vein patch angioplasty. Postoperatively, 2 patients developed a repeat infection including the 1 patient with patch angioplasty. All patients were free of infection and neurological symptoms after a maximum follow-up of 56.5 months.

Conclusion. Following the development of haemorrhage or wound complications careful clinical surveillance should be carried out after carotid reconstruction.

Keywords: Carotid endarterectomy (CEA); Patch infection; Neck haemorrhage; Postoperative management.

Introduction

Prosthetic patch infection is a rare but well recognised complication following carotid endarterectomy (CEA).^{1–3} The management of this complication must assure the total eradication of the septic focus, while maintaining adequate brain perfusion. We report our experience with the treatment of this clinical entity over a 7-year period.

Report

From January 1999 through December 2005 633 patients underwent primary carotid endarterectomy (CEA) with knitted polyester patch angioplasty. Six (5 from our own series, incidence 0.9%) patients underwent surgery during the same period to treat prosthetic patch infection after CEA.

The study group included four men and two women (ranging in age from 48 to 81 years) originally

treated due to a stenosis at the origin of the internal carotid artery (ICA). Perioperative antibiotics were not routinely administered at the time of the original CEA. We choose to use antibiotic prophylaxis only in cases of reoperation, recent respiratory tract infection, when C-reactive protein levels were >30 mg/dl and/or white cell blood count was >15.000/mm³. Cephazoline was our antibiotic of choice. Details of patient's demographics are presented in Table 1. All 6 patients recovered from the original CEA without neurological deficit. However, 3 patients (50%) had a significant haematoma necessitating operative revision.

Infected patches were discovered from 10 to 700 days (mean: 134.3 days) after surgery. All patients presented with a neck swelling at the site of CEA. One patient had evidence of pseudoaneurysm formation on duplex and computed tomography (CT)-studies (see Fig. 1). Preoperative duplex scans revealed a fluid collection around the patch or stable haematoma in two cases respectively. Details of the operative procedures, as well as bacteriologic findings and early and late outcomes are presented in Table 2.

The principles of surgical treatment included complete excision of the infected patch, extensive soft

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Table 1. Patients demographics

Pat.	Age/sex	Diabetes	Postoperative complications ^a	Time to diagnosis (d)	Presenting symptoms
1.	76 M	Yes	—	27	Patch disruption
2.	81 W	No	—	700	Pseudoaneurysm
3.	48 W	No	Wound haemorrhage	21	Pain, draining sinus
4.	79 M	Yes	Wound haemorrhage	24	Draining sinus, fever
5.	72 M	No	Wound haemorrhage	24	Pain, abscess, fever
6.	60 M	Yes	—	10	Abscess

^a After originary CEA.

tissue and arterial wall debridement under orotracheal intubation. The arterial defect was repaired with a saphenous vein patch in one case and a venous interposition graft between the common and the internal carotid artery in the remaining five patients with extensive arterial wall involvement. Systemic broad-spectrum antibiotics were started immediately and continued during the in-hospital stay. All patients received appropriate oral antibiotics for 4 to 6 weeks after discharge depending on clinical findings.

There were neither peri- nor postoperative deaths or cranial nerve dysfunctions. Two patients experienced a re-infection during the early post-treatment period. Patient 1 bled from the interposition vein graft, which was treated with repeat grafting after wound debridement. A second recurrence necessitated graft excision and ICA ligation ten days later. No perioperative neurological deficits developed.

The only patient who underwent a vein patch closure of the arterial defect (Patient 5) also developed an infection recurrence, which was treated with an autologous vein interposition graft. On the first postoperative day he developed a major stroke with complete contralateral hemiparesis and had to be transferred to the Stroke Unit receiving temporary anticoagulation and physiotherapy.

All patients were followed up with periodic clinical examination and duplex scanning at 1, 3, 6, 12 months and then yearly. At the time of this report, there had been no recurrent infections during a follow-up of 44–75 months in 4 of the 6 patients. Two of the patients died 36 and 45 months after infection treatment of causes not related to a re-infection or a neurological event.

Discussion

The exact incidence of prosthetic patch infection is uncertain, but it is probably extremely low. In our experience the incidence of infection was 0.9%, which is well within the range reported in the literature. However, if infection occurs, the mortality and/or permanent stroke morbidity rate can be extremely high (29%).⁴ We found post-operative neck haematoma to be associated with subsequent patch infection in 3 of 6 cases.

The diagnosis of carotid patch infection may be difficult at times. Lazaris⁵ has also recently suggested the value of Duplex imaging in diagnosing patch sepsis.

In our daily practice, we employ duplex scanning in haemodynamic stable patients with a suspected diagnosis of carotid patch infection. In cases of uncertain distal vascular status, we perform a CT scan. The rationale for treating patch infection is the same as for anywhere else in the vascular system. Traditional surgical treatment consists of wide debridement of infected and necrotic tissue and removal of all patch material followed by vascular reconstruction with autogenous vein. The choice between vein patch

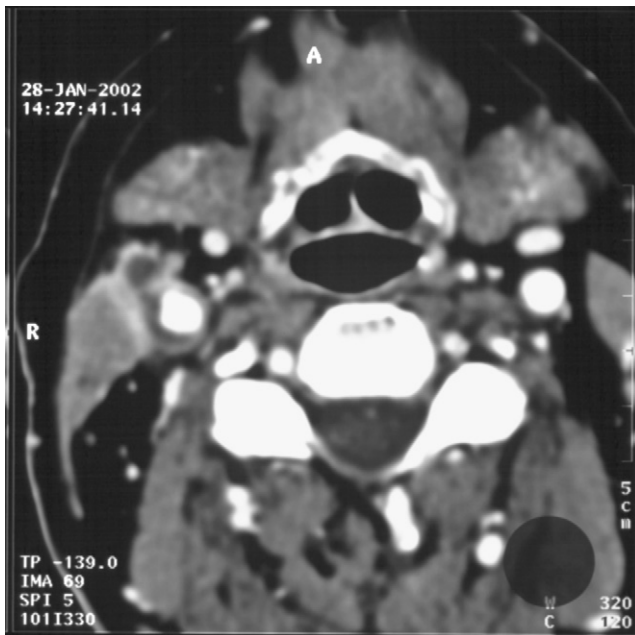


Fig. 1. Pat. 2. Pseudoaneurysm of the left internal carotid artery detected on computed tomography (CT)-scan in a late sterile patch infection.

Table 2. Operative management, bacteriology and outcome

Pat.	Patch/graft	Material	Perioperative complications	Bacteriology	Outcome	
					Time interval (months)	Symptoms
1.	Graft	Vein	Re-infection, haemorrhage	St. aureus	50	Death
2.	Graft	Vein	—	Sterile	62	Free
3.	Graft	Vein	—	Sterile	56	Death
4.	Graft	Vein	—	Coagulase-negative Staphylococci	44	Free
5.	Patch	Vein	Re-infection	St. aureus	75	Free
6.	Graft	Vein	—	Sterile	45	Free

or vein bypass is probably arbitrary. We used a vein patch in only one patient who seems to have maintained an adequate arterial wall. However, this patient required secondary vein grafting. Based on the findings of this study, we would be more reluctant to use this technique and would prefer vein interposition grafting.

In conclusion, the critical point that emerges from our experience is that wound haematomas seems to be a risk factor in promoting the development of early patch infections after carotid angioplasty. This emphasises the need for meticulous respect of surgical sepsis and intraoperative hemostasis, surveillance of early wound complications and their aggressive management, particularly in patients who are at high risk, such as diabetics.

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