Synchronous Endobypass of Bilateral Superficial Femoral Artery Aneurysms (After Bilateral Popliteal Aneurysm Bypass Surgery) Using Heparin-Bonded Stent-Grafts

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Introduction: Bilateral superficial femoral artery aneurysms are a rare entity, managed here via a synchronous endovascular approach.

Report: An 84-year-old male presented with bilateral peri-anastomotic superficial femoral artery aneurysms 3 years after femoropopliteal bypass for bilateral popliteal aneurysms. He underwent successful synchronous bilateral endobypass using overlapping 13 × 100 mm (proximal) and 11 × 100 mm (distal) heparin-bonded endoprostheses.

Discussion: Calibre mismatch between ectatic vessel and narrower vein graft may be related to peri-anastomotic aneurysm formation in a patient who has a predilection for aneurysm formation. Bilateral superficial femoral artery aneurysms can be managed by synchronous endobypass with the attendant benefits of avoiding repeat admission/anaesthetic episodes.

INTRODUCTION

We present an endovascular solution towards treating bilateral superficial femoral artery aneurysms synchronously.

CASE REPORT

An 84-year-old male underwent sequential bilateral below-knee femoropopliteal bypass for popliteal artery aneurysm (PAA), using great saphenous vein (GSV). He complained of pulsatile masses in the upper medial aspect of both thighs 3 years later.

Computed tomographic angiography (CTA) confirmed the presence of peri-anastomotic superficial femoral artery aneurysms (SFAAs), measuring 34 mm (right) and 32 mm (left) in maximum orthogonal diameter (Fig. 1A). Bar an incidental thrombosed right internal iliac artery aneurysm, he had no other intra-abdominal aneurysms. Both PAAs remained thrombosed with intact run-off. As a result of knee prosthetic artefact on CTA, magnetic resonance angiography (MRA) was also used for a more accurate/planning roadmap of the vascular anatomy (Fig. 1B).

Both common femoral arteries were exposed under general anaesthesia (converted from epidural anaesthesia because of patient restlessness) with antibiotic prophylaxis. The SFAAs were negotiated using a Bentson wire (Cook Peripheral Intervention, Bloomington, IN, USA) and a supporting van Schie 2 catheter (Cook Peripheral Intervention, Bloomington, IN, USA) via a 12F Super Sheath (Boston Scientific, Breakspear Park, UK). Two Viabahn endoprostheses (WL Gore & Associates, Inc., Medical Products Division, Flagstaff, AZ, USA) measuring 11 × 100 mm distally and 13 × 100 mm proximally were deployed on each side with 35 mm overlap over an Amplatz Superstiff wire with post-dilatation as per the instructions for use, resulting in successful SFAA exclusion. The overlap was pre-planned to achieve appropriate vessel coverage with the lengths of endoprosthesis selected. Heparin 4500 IU IV was administered for intraprocedural anticoagulation. In total, 45 mL of contrast was used (Visipaque, GE Healthcare, Chalfont St Giles, UK). The patient was maintained on dual antiplatelet therapy (aspirin 75 mg + clopidogrel 75 mg OD lifelong) and discharged on day 2 with palpable foot pulses. He remains well at 6 months on a graft/endograft surveillance programme (biplanar knee x-rays and duplex ultrasonography), with one baseline CTA (Fig. 2).

DISCUSSION

SFAAs can present as pulsatile thigh masses and can rupture. This presentation of simultaneous bilateral SFAAs may be caused by patients with PAA often having severe ectasia and aneurysmal change/predilection throughout the femoropopliteal segment; however, whether the pressure gradients at the transition zone from a higher calibre SFA to a narrower vein graft, resulting in a bottleneck phenomenon and increased wall stress noted with stenoses elsewhere contributed to aneurysm formation at this specific location.
Figure 1. (A) CTA showing bilateral SFAA (underlined by double-headed arrows as a parallel diameter indicator), axial view. (B) MRA demonstrating the lower limb vascular anatomy; transition area from SFA to the saphenous vein graft is indicated (arrows).

Figure 2. Reconstructed post-procedure CTA showing Viabahn endoprostheses in place. Arrow indicates visible calcification of the left PAA.
point remains a speculatory consideration, as does the role of clamp damage from the previous operations. Over 50% of SFAA are associated with popliteal aneurysms, as typified here.  

Substantial saphenous vein graft aneurysms (SVGAs) after lower limb bypass grafts — initially considered in this scenario — are a recognised, though rare, entity. MRA/CTA confirmed normal vein grafts and that the aneurysmal portion was the SFA immediately proximal to the anastomosis. These were clearly absent on this patient’s CTA 3 years previously, so therefore represent new post-bypass peri-anastomotic SFAA.

Synchronous endobypass has the advantages of avoiding repeat anaesthetic and a second hospital admission, with attendant implications for cost, length of stay, and patient/operator satisfaction with both pathologies being treated. To the authors’ knowledge, use of heparin-bonded covered stents has not been previously described in this scenario, and seems an effective elective option that may avoid the potential for limb loss associated with emergency presentations, and complications from surgical bypass.

CONFLICT OF INTEREST
AC is a consultant for Gore.

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REFERENCES