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CASE REPORT

Ruptured Aneurysms of Superficial Femoral Artery

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Introduction

Superficial femoral artery aneurysms (SFAAs) are rare.¹ Atherosclerotic SFAAs usually remain undetected until rupture takes place,² in contrast with aneurysms of the common femoral and popliteal artery whose rupture is distinctly uncommon.^{3–5} Infected SFAAs have a high tendency to rupture. The physician must be aware of their development in patients with bacteraemia, keeping in mind that their clinical presentation may sometimes be obscure.⁶

During the period 1990 to February 1999, 153 patients were operated on for aneurysmal disease in our institution, including two patients with SFAA, giving an incidence of 1.5%. The first patient presented with rupture of an atherosclerotic aneurysm and the second one with simultaneous rupture of bilateral SFAAs. We report our experience in the management of SFAAs and the use of prosthetic grafts in infected aneurysms, where the traditional practice demands avoidance of such a material. A review of the literature regarding SFAAs is also presented.

Case 1

An 81-year-old male with a known abdominal aortic aneurysm was admitted with a pulsatile haematoma in his left thigh that had progressively expanded during the previous 4 days. He was haemodynamically stable. On physical examination a pulsatile haematoma with visible bruising was present in the posterior and medial aspect of his left thigh up to the buttock.

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Ultrasound evaluation and angiography revealed a 6 cm SFAA. In the theatre a ruptured aneurysm of the distal superficial femoral artery (SFA) was confirmed. Total resection of the SFAA was performed and a 10-cm-long 6-mm polytetrafluoroethylene (PTFE) graft was interposed. Ligation of the popliteal vein was also necessary. He was discharged 5 days later in good condition.

Case 2

A 66-year-old male was admitted with a suspected deep venous thrombosis. Thirty days before admission he had a urinary tract infection, due to *Escherichia coli*. Twenty days later he developed pain and swelling in both lower limbs with persistent fever, despite the antibiotic therapy.

On physical examination, the patient was pale and had a low-grade fever. Tender, erythematous, pulsatile masses were detected on the anteromedial aspect of both lower thighs. The calves were normal, distal pulses were present and the rest of the physical examination was unremarkable. Ultrasound evaluation revealed bilateral SFAAs with a small area of peri-aneurysmal leakage. Deep venous thrombosis was not present. Laboratory tests revealed a white blood cell count of 17 800/mm³ and a haemoglobin concentration of 7.5 g/dl. A few hours after admission the right-sided aneurysm ruptured, causing an expanding haematoma in the posterior thigh. Emergency exploration through a medial approach confirmed the presence of a 6-cm ruptured aneurysm in the lower segment of SFA. The aneurysm had a wide neck and a fusiform appearance. Following resection of the aneurysm, repair was performed using a 6-mm PTFE

bypass graft between the common femoral and popliteal artery at its origin. The proximal anastomosis was end-to-side and the distal one end-to-end at the adductor canal–popliteal fossa transition. While waiting for a second operation scheduled to be performed electively 3 days later, a slowly expanding haematoma appeared in the contralateral thigh. On operation, a 5-cm ruptured aneurysm was found. Surgical repair consisted of a 6-mm PTFE interposition graft between SFA and popliteal artery. Postoperatively, urine cultures were sterile. One blood culture yielded a group C beta-haemolytic *Streptococcus*, while the other ones were negative. The fever and leukocytosis subsided and the patient was discharged on the 15th post-operative day. Six months later he had a coronary artery bypass graft operation, and 1 year later he remains in good condition.

Discussion

Atherosclerotic SFAAs are rare.¹ They are bilateral in 18% and are often associated with aneurysms at other sites in 27–69%.^{2,7} Review of the English literature since 1965, using the MEDLINE database, revealed 26 cases of atherosclerotic SFAA in 21 patients.^{2,7–10} The rupture rate is estimated to be 12/26 (46%), and is always tamponaded by the surrounding muscle and fascial compartment.⁵ Therefore, rupture in our patient was well tolerated for 4 days before operation. True atherosclerotic common femoral aneurysms rupture rarely (2–14%).^{3–5} Embolisation and thrombosis occur less frequently in SFAA (12% and 18%, respectively) than in popliteal aneurysms.¹

Infected SFAA may present with fever of unknown origin or mimic other conditions like deep-venous thrombosis, arthritis or an abscess, especially if thrombosed and no pulsatile mass is found on clinical examination.⁶ We consider that simultaneous bilateral rupture could be explained only in the terms of simultaneous arterial infection at the site of existing atherosclerosis or aneurysm, after systemic bacteraemia.¹² Although cultures of the sac and luminal thrombus were negative, these could be due to long-term pre-operative antibiotic treatment.¹³ The positive blood culture for beta-haemolytic *Streptococcus* group C suggests that this was the most likely culprit. This organism has been reported to be the cause of embolic mycotic aneurysms.¹⁴ The urinary tract infection due to *E. coli* was probably not the cause, although urinary tract infection has been associated with mycotic aneurysm formation.^{14,15}

Debridement of all infected tissue and remote bypass

grafting with autologous vein along with long-term antibiotic medication remains the conventional treatment for mycotic SFAAs. Synthetic bypass grafting is also appropriate in certain cases where a quick operation with minimal bleeding is required to save the patient's life.² Vein interposition has also been proposed¹⁶ and currently an endovascular stent-graft approach at management with an autologous saphenous-vein-covered stent has been reported.¹⁷ PTFE graft interposition has been avoided because of the fear of graft infection. Restoration of vascular continuity after common femoral aneurysm excision can also be achieved by internal iliac-artery graft interposition.¹⁸ Occlusion of vessels just proximal and distal to a mycotic aneurysm is reported to be safely accomplished via percutaneous embolisation with coils. Afterwards, surgery can be performed electively in a non-infected field.¹⁹ Sometimes simple ligation or occlusion of the feeding artery may be all that is required for control.⁶ Antibiotic therapy alone, without surgical intervention, might be sufficient treatment for mycotic aneurysms, especially for the highly selected circumstances of an exquisitely sensitive organism, the absence of periarterial abscess and readily observable anatomic lesion.^{17,20} A 6-week course of parenteral antibiotics is generally recommended.^{21–23}

We chose a PTFE graft in the first operation in order to save time and restrict bleeding,² since significant anaemia was present (Hct = 23%) and blood was not available. However, there was no evidence of gross infection and long-term antibiotic treatment had been commenced. Because of the negative cultures of the sac and thrombus of the right aneurysm, we performed the same procedure on the other leg. It has been recommended that in cases of infected abdominal aortic aneurysms *in situ* placement of prosthetic grafts may be justified in the absence of gross infection.^{7,19,24,25}

Reviewing the English literature since 1965, using the MEDLINE database, we found five reported cases of infected SFAA. The first case was a thrombosed SFAA during pneumococcus septicaemia.⁶ Pus from the aneurysmal sac was sterile. Treatment consisted of debridement and ligation of entry and exit arterial orifices without reconstruction.^{6,26} The second case was a SFAA due to *Salmonella oranienburg*.²⁷ Blood cultures were negative. Diagnosis was established 10 months after the onset of symptoms. Aneurysm excision and reversed saphenous vein bypass were performed. The third case was a thrombosed SFAA in a patient with staphylococcal endocarditis.¹⁴ Gram stain and culture of the specimen showed no organisms, probably because of the long-term antibiotic medication. Reconstruction consisted of a right common femoral

to anterior tibial *in situ* saphenous-vein bypass-graft procedure. The fourth was a contained rupture of SFAA due to *E. coli* bacteraemia five days after appendicectomy.²⁸ The aneurysm was resected and the patient had a reversed vein femoropopliteal bypass graft. Use of prophylactic antibiotic therapy was recommended. The fifth was a SFAA occurring 1 week after haemorrhagic colitis.¹⁷⁻²⁰ Blood cultures were negative. Stent-graft repair with a saphenous-vein covered stent was used to exclude an expanding infected aneurysm in this critically ill patient. Eradication of infection was achieved without arterial wall excision.

In conclusion, infected SFAA aneurysms may be sterilised after long-term antibiotic therapy and surgical reconstruction using synthetic materials is permissible under specific circumstances.

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