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SHORT REPORT

Management of Femoral Artery Pseudoaneurysm Secondary to Drug Abuse

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Introduction

Arterial pseudoaneurysms due to self-injection of drugs occur most commonly in the groin. This complication of drug abuse is accompanied by systemic sepsis, life-threatening haemorrhage, limb loss or death. In addition, it often presents the vascular surgeon with a major therapeutic problem. We present our experience in treating such patients over a 3-year period. Diagnostic features, physical findings and clinical pitfalls are also described.

Case Reports

Ten patients suffering from pseudoaneurysms of the femoral artery as a result of self-injection of drugs in the groin area are included in this retrospective study. All of them were treated in our unit from January 1999 until December 2001. Tables 1 and 2 illustrate patients' characteristics and clinical findings upon admission.

In all patients a colour duplex ultrasound scan was performed prior to surgery, and an additional angiogram was obtained in two cases (Fig. 1). Some patients underwent CT scans as well (Fig. 2).

Operations were performed on an emergency basis. In all cases, exposure of the distal portion of the external iliac artery was obtained, through an extraperitoneal incision, for proximal control. The involved arterial segment was excised to an anatomically normal-appearing artery. Our criteria for revascularization were, (a) the extent of sepsis in the affected area, (b) the availability of autologous long saphenous vein (LSV) in the contralateral limb and (c) the condition of the distal circulation as assessed by intra-operative Doppler analysis following trial clamping of the external iliac artery.

Arterial reconstruction was accomplished in seven patients (Table 3). By-pass grafting was carried out in six; in one case with concomitant arteriovenous fistula a primary repair of the artery was feasible. In two patients, the presence of a distal arterial Doppler signal at the level of the ankle vessels using a sterile 10 MHz transducer was considered satisfactory for limb salvage and ligation of the femoral artery bifurcation vessels was performed. The mean post-reconstruction Ankle Brachial Pressure Index (ABPI) was 0.82. The mean post-ligation ABPI was 0.68.

Neurological impairment on admission to the hospital was present in three patients. The femoral nerve was involved in two cases. In these cases necrotic nerve tissue was debrided from the wounds. In addition, a lumbosacral plexus injury following pressure necrosis of the psoas muscle throughout its length was found in the third patient. Neurological loss did not improve following treatment of the vascular lesions and contributed to residual disability postoperatively.

The mean duration of hospitalization was 19 days (range 6–28 days). The mean follow-up period was 16 months (range 2–32 months). There were no perioperative deaths. No amputation was performed immediately postoperatively or during the follow-up period. Those patients who were submitted to ligation

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Table 1. Patients' characteristics

		Mean	Range
Males/females	(9/1)		
Age (years)		38	30–54
History of drug abuse (years)		16	8–34
Onset of symptoms (days)		12	1–37

of the arteries at the femoral bifurcation experienced intermittent claudication (Fontaine stage IIa–IIb). One patient who underwent axillary-popliteal artery by-pass grafting returned five months later with infection of his graft, which had to be removed. However, claudication did not necessitate any further arterial intervention for any patient.

Discussion

Intravenous drug abuse constitutes a major cause of pseudoaneurysm formation in the femoral artery, and the groin area is the most frequent site of involvement in drug abusers. This complication is accompanied by systemic sepsis, life-threatening haemorrhage, limb loss or death.[1–4]

Treatment options are controversial. The main concern involves the necessity of revascularization and, if this is the case, the type of graft to be used for restoration of arterial continuity. Autologous vein grafts are preferable in the presence of sepsis but these grafts are not always available.[5,6] The superficial femoral vein as an alternative conduit for arterial reconstruction has been recently proposed by Benjamin *et al*.[7] However, the use of deep veins in this group of patients is not always possible due to commonly co-existing deep venous thrombosis.[8] Indeed, half of the patients in our study (5/10) presented with superficial femoral and popliteal vein thrombosis. Some authors have employed extra-anatomic by-pass procedures

Table 2. Clinical signs and symptoms at presentation

	Number of patients (n)
Lesion location	
CFA	9
PFA	1
Signs and symptoms	
Bruit	6
Oedema (thigh-calf)	5
Fever >38 °C	3
Leukocytosis (WBC $>10{,}000/mm^3$)	10
Haemorrhage	2
DVT	5
Neurologic deficit	3 (femoral nerve injury $n = 2$)

CFA, common femoral artery; PFA, profunda femoris artery; DVT, deep venous thrombosis.

Fig. 1. Preoperative angiogram of a 38-year-old male presenting with a pulsatile mass in the left groin. There is a false aneurysm of the left common femoral artery just above the femoral bifurcation.

through clean operative fields but this option usually requires prosthetic materials. The obturator by-pass procedure is sometimes quite useful, but in the case of an enormous pseudoaneurysm that extends into the retroperitoneum, ipsilateral iliac-based grafts may be contra-indicated.[9,10]

The concern of many surgeons regarding ligation of

Fig. 2. Same patient as above. CT scan at the level of the pubis. A huge mass representing the false femoral artery aneurysm with a contained rupture. The patient was subjected to an external iliac-femoral by-pass graft with autologous vein.

Table 3. Procedures performed and outcome

Patient No.	Lesion location	Treatment				30-days morbidity	Follow-up (months)
		By-pass procedures			Other procedures		
		Graft type	Input vessel	Output vessel			
1	CFA	R LSV	CFA	FB	–	–	18
2	CFA	R LSV	CFA	FB	–	Nerve injury	16
3	CFA	R LSV	EIA	CFA	–	–	28
4	CFA	–	–	–	Ligation of FB	Claudication, nerve injury	15
5	CFA	R LSV	CFA	FB	–	–	8
6	CFA	–	–	–	Ligation of FB	Claudication	2
7	CFA	R LSV	EIA	CFA	–	–	32
8	PFA	–	–	–	Ligation of PFA	–	14
9	CFA	Composite (PTFE + LSV)	Axillary artery	Popliteal artery (above knee)	–	Nerve injury	5
10	CFA + A–V fistula	–	–	–	Primary repair	–	20

CFA, common femoral artery; R LSV, reversed long saphenous vein; FB, femoral bifurcation; EIA, external iliac arterty; PFA, profunda femoris artery; A–V fistuala, Arterio–Venous fistula.

the common femoral artery without any attempt at arterial reconstruction dates back more than half a century. In the report by DeBakey *et al*. in 1946, ligation of the SFA and CFA following military injuries resulted in an amputation rate of 54 and 86%, respectively.[11] In a more recent study, Reddy *et al*.[12] reported a 33% amputation rate in patients who underwent CFA ligation without revascularization. They did not check for the presence of pedal Doppler signals following trial clamping of the CFA/EIA intraoperatively. Moreover, this series of patients cannot be compared to those who have developed infected femoral artery pseudoaneurysms due to self-injection of illicit drugs. Since the latter patients are long-term users of toxic substances, they may have developed a good collateral network following previous arterial injuries.

Over the last few years, we have routinely used the trial clamping test of the external iliac artery when decisions have to be made regarding the necessity of restoration of arterial continuity following femoral artery pseudoaneurysm ablation. Following Padberg's experience,[5] we have used ligation of the CFA without arterial reconstruction in patients who had a Doppler signal over a pedal artery following trial clamping of the distal external iliac artery. In contrast to Arora *et al*.,[13] who proposed the very same test and performed ligation of the CFA in all patients (six) in their study, we have found it feasible in only 20% (two out of 10 patients) and neither of these patients has gone on to amputation.

Our small series of patients underscores the fact that treatment of common femoral artery pseudoaneurysms in drug abusers should be tailored to individual requirements. The main goals are to eliminate the source of sepsis and to maintain limb viability with the lowest morbidity. A by-pass procedure is not always required.

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