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CASE REPORT

Delayed presentation of superficial femoral artery pseudoaneurysm 45 years following gunshot injury

Pradeep Ramakrishnan[1] · Prateek Vaswani[1] · Milind Padmakar Hote[1] · Shiv Kumar Choudhary[1]

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Abstract

This case report is a description of an uncommon delayed presentation of penetrating trauma of lower limb with history of inciting event being 45 years ago, as there are only 4 such reported cases in the literature. A 65-year-old male presented with progressive enlargement of swelling over the anterior aspect of the right thigh with difficulty in walking due to mechanical effects and paraesthesia in the affected limb. Clinical signs of a large lump in the right anteromedial thigh with no pulsations were present. Computerised tomographic angiography revealed the presence of a superficial femoral artery pseudoaneurysm. The open surgical management involved resection of the pseudoaneurysm and autologous vein patch angioplasty. The rarity of incidence and paucity of physical signs suggest that a high index of suspicion, careful clinical review and radiological investigation is indispensable to diagnose and treat this condition.

Keywords Pseudoaneurysm · Delayed · Femoral artery · Gunshot injury

Introduction

Delayed presentation of the post-traumatic pseudoaneurysm of lower limb arteries is rare with only 13 cases published in literature among them only four were due to the post-traumatic superficial femoral artery (SFA) pseudoaneurysm. Literature search was done under the following MeSH terms, 'delayed presentation, pseudoaneurysm, penetrating', in Pubmed database [1–7]. Here, we present one such successfully managed case.

Case report

This is the case of a 65-year-old gentleman who is a chronic smoker with a 45-year history of a progressively enlarging mass over his right anteromedial thigh, after sustaining a bullet injury. The bullet was extracted with a longitudinal surgical incision over the proximal right thigh. Over the past 3 years, he noticed swelling in the right thigh and difficulty in walking or moving the right lower limb due to mechanical effect of the mass and paraesthesia in the right lower limb. On physical examination, a large 18 × 15-cm swelling was observed over the anteromedial part of the middle one-third of the right thigh. The skin overlying the mass was intact with no signs suggestive of inflammation. The affected limb had evidence of varicose veins, healed ulcer over the medial aspect of the ankle, warm limb with feeble peripheral pulsations and no motor weakness. His haemogram, coagulation profile and renal function tests were normal. Computerised tomographic angiogram (CTA) revealed bilobed pseudoaneurysm of the right mid-SFA measuring 15.5 × 14.5 × 5.9 cm in size with peripheral calcification and thrombosis, with the neck of the sac being 2.2 × 1.5 cm in size and located in the anteromedial relation of the mid-SFA, compressing it but with a good distal flow (Fig. 1). He was planned for surgical intervention. Intraoperatively, proximal and distal control were established after exposure of the right SFA in the proximal thigh and right supragenicular artery in the medial thigh. Pseudoaneurysm was opened; thrombus and debris were evacuated. The neck of the pseudoaneurysm was excised and the segment was closed with a patch of saphenous vein harvested from the contralateral limb, since there was venous congestion due to pressure effect by pseudoaneurysm (Fig. 2). The thrombus

✉ Pradeep Ramakrishnan
pradeep.r.reddy85@gmail.com

[1] Cardio Thoracic Centre, Department of Cardiothoracic Surgery, All India Institute of Medical Sciences, CTVS Office, 7th Floor, New Delhi, India

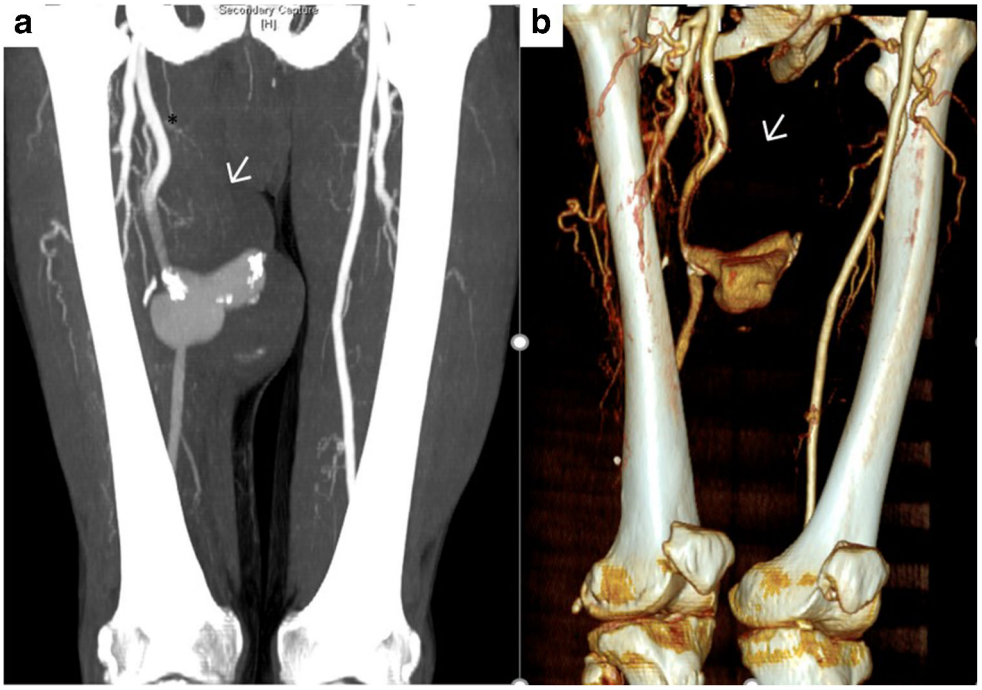

Fig. 1 **a**, **b** Coronal and volume-rendered computed tomography image showing a large peripherally thrombosed and calcified pseudoaneurysm (arrow) arising from the right mid superficial femoral artery (*)

revealed no growth of micro-organisms on culture. The histopathological examination exhibited proteinaceous debris and degenerated leucocytes consistent with organised thrombus. The wound was left open and the unhealthy thinned out skin was excised, and later, secondary suture closure was done. He recovered well and was discharged. A follow-up Doppler ultrasound showed patent flow in the right superficial femoral artery and distally.

The patient has given consent for publication and no disclosures are present in the manuscript.

Discussion

The literature review showed a delayed presentation of femoral artery pseudoaneurysms from 2 weeks to 54 years. Femoral pseudoaneurysms may present with pain, lower limb pitting oedema, pulsating lump, bruit/palpable thrill or compressive femoral neuropathy. Progressive enlargement may lead to ischemic skin necrosis. Serious complications of rupture and distal ischemia have also been reported [8]. History of trauma or instrumentation is usually present. The deep

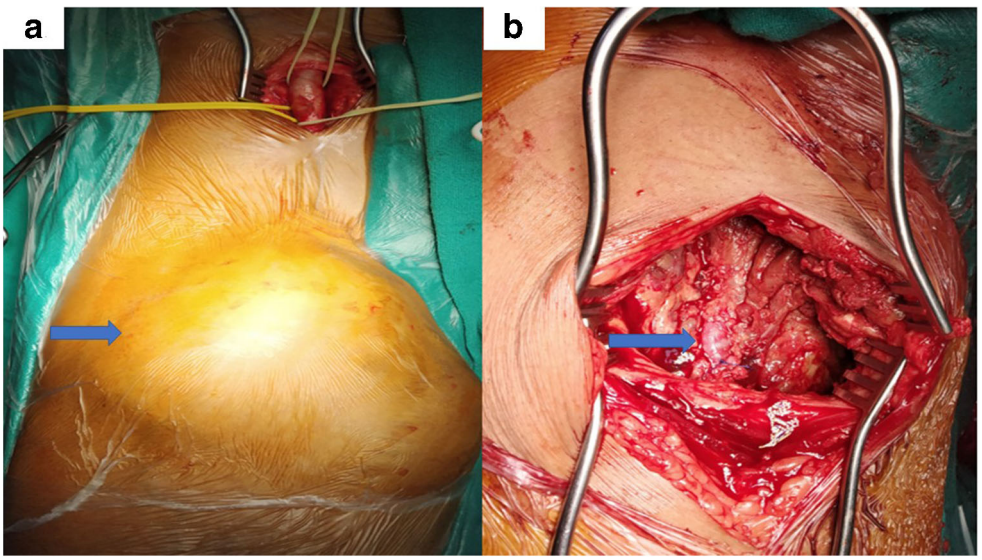

Fig. 2 **a** Preoperative image showing the large SFA pseudoaneurysm right thigh (arrow). **b** Intraoperative image showing the vein patch repair (arrow) of the neck of pseudoaneurysm

anatomic location precludes early presentation [9]. Weaver et al. proposed hard or soft signs to identify the vascular injuries after an episode of trauma [10]. Hard signs include active haemorrhage, absence of pulse, bruit, thrill or multiple injuries. Soft signs include hematoma, nearby nerve injury or an ankle-brachial index less than 0.9. These hard or soft signs can be used to stratify the patients with history of trauma as high or intermediate risk for associated vascular injury. If these signs are absent, then there is less chance of vascular injury and no active diagnostic or therapeutic intervention is needed. The possible pathogenesis of the pseudoaneurysm could be due to concussion by the high-velocity projectile injury, injury by bullet fragments or slow migration of bullet fragments causing vascular injury. In this case, no foreign body or bullet fragments were obtained, as the anatomical plane was grossly distorted. Duplex ultrasound is the initial diagnostic modality for imaging with sensitivity and specificity greater than 90% and provides morphological details. CTA is the preferred modality to evaluate the morphology of pseudoaneurysm, the neck of the aneurysm and the relationship of surrounding structures. However, 45 years ago, conventional angiography and ultrasound (USG) were the only imaging modalities clinically available but were not performed in this patient.

Traumatic femoral artery pseudoaneurysms usually involve the superficial femoral artery because of the vulnerable location to trauma, while iatrogenic femoral pseudoaneurysms involve the common femoral artery (CFA), because of the elective puncture of CFA. But there is not much difference in the treatment strategy. Symptomatic pseudoaneurysms with debilitating pain and asymptomatic with size greater than 2–3 cm need to be addressed. Smaller ones (< 2 cm) usually resolve by spontaneous thrombosis and can be subjected to expectant management with duplex USG assessment at periodic intervals. If the size is more than 3 cm, the chance of rupture increases so it needs to be intervened. The treatment approaches include endovascular, open surgical or a combination of the two. Endovascular methods include ultrasound-guided compression, percutaneous thrombin injection in the neck of pseudoaneurysm and use of stent grafts to seal the neck. In this patient endovascular intervention, including stenting, is not advisable because of the large-sized pseudoaneurysm with pressure effects. By surgery, all the thrombus and debris were debrided, thereby relieving the symptoms of mass effect. Also, in chronic pseudoaneurysm, there can be additional feeder arteries from the neovascularised aneurysmal sac and from the surrounding muscular arteries, which may lead to failure following stent grafting. Open surgical management in such large pseudoaneurysms includes resection and closure of the neck either directly or using patch, end-end anastomosis or using interposition graft for reconstruction. Patch angioplasty is preferred with autologous saphenous vein as the risk of latent infection is less compared with prosthetic material. When a long segment of the involved artery is unhealthy, calcified or infected, then one may need to do resection and a direct end-to-end anastomosis or using autologous reversed saphenous vein graft. Both the endovascular and surgical approaches are associated with good limb salvage rates when carefully selected for respected modality as per the indication. Because of the rarity of incidence and relative paucity of studies with long-term follow-up, it is difficult to conclude the superiority of endovascular over the surgical intervention. Periodic follow-up imaging with duplex ultrasound or CTA must be done to assess the patency of the artery, especially if the prosthetic conduit is used, and to rule out recurrence.

Conclusion

Delayed presentation of lower limb pseudoaneurysm is a rare, but grave, sequela of penetrating trauma and should be diligently detected. In order to optimise patient outcomes, comprehensive clinical assessment and radiological evaluation are required, followed by endovascular or open surgical management.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval Not required since this is a case report.

Human and animal rights statement No animals were involved in this study.

Informed consent Informed consent was obtained from the patient for this research publication.

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