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Surgical Management of a Pulsatile Mass in the Distal Thigh: A Case Report of Post-Traumatic Pseudoaneurysm

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ABSTRACT

Pseudoaneurysms are uncommon vascular complications arising after arterial wall disruption, most commonly following blunt or penetrating trauma. Delayed presentation several years after injury is rare, particularly in association with high-velocity blast fragments. A 20-year-old woman presented with a progressively enlarging pulsatile mass in the left distal thigh over four months. She also reported worsening pain, numbness, and difficulty walking. Her history included a blast-fragment injury to the same limb eight years earlier. Doppler ultrasonography demonstrated a large pseudoaneurysm of the distal superficial femoral artery (SFA), which was confirmed on CT angiography. The patient underwent open surgical repair with pseudoaneurysm resection and revascularization using a reversed saphenous vein interposition graft. Recovery was uneventful, and follow-up Doppler studies demonstrated normal limb perfusion. Traumatic pseudoaneurysms of the SFA typically present early after injury; however, delayed manifestation years after trauma is uncommon. In this case, chronic vessel-wall contusion from a retained or high-velocity fragment likely contributed to late pseudoaneurysm development. Large or symptomatic pseudoaneurysms are best managed surgically due to the risk of rupture, thrombosis, and neurovascular compression. Open repair with autologous vein grafting remains an effective option for restoring arterial continuity in young patients.

Keywords: Femoral artery, Pseudoaneurysm, Post-traumatic, Bomb blast, Vascular surgery, Case report.

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Introduction

Pseudoaneurysm (PSA) refers to a contained arterial-wall rupture in which blood leaks into surrounding tissues and forms a hematoma that communicates with the arterial lumen. Traumatic pseudoaneurysms are relatively uncommon and can arise following blunt trauma, penetrating injuries, iatrogenic procedures, or high-energy blast events. Although most traumatic

pseudoaneurysms appear within hours to weeks after the inciting injury, delayed presentations occurring years later have been reported but remain rare.

Their clinical presentation varies depending on size, location, and the degree of compression of adjacent structures (1). Undiagnosed pseudoaneurysms can lead to significant complications, including rupture, thrombosis, distal embolization, neuropathy, and limb ischemia. Potential complications of PSA include rupture and thromboembolic events, which can lead to significant limb dysfunction or even amputation if not diagnosed and treated promptly (2). Timely diagnosis using imaging techniques such as Doppler ultrasonography and Computed Tomography Angiography (CTA) is essential for improving patient outcomes (1). Management usually involves either surgical intervention or endovascular techniques, tailored to the individual case and any associated complications (3). The prolonged delay and unusual mechanism of injury make this case clinically and academically significant.

This report highlights the clinical presentation, diagnostic workup, surgical intervention, and outcomes in a young female patient with a post-traumatic pseudoaneurysm.

Case Presentation

A 20-year-old female presented to the Emergency Department with a pulsatile mass in her left distal thigh, which she had been aware of for the past four months. The mass had gradually enlarged and was associated with increasing pain, numbness over the anterior thigh, and weakness during ambulation. The patient's medical history included a significant bomb blast fragment injury to the same area eight years earlier, which necessitated wound debridement; however, she reported no knowledge of any arterial injury at that time. A healed scar was present near the swelling, corresponding to the previous exit wound. Upon physical examination, a pulsatile swelling measuring 11 × 9 cm was palpated in the left distal thigh, with distal pulses being mildly weak. Sensation over the anterior thigh was mildly reduced, but motor function remained intact.

To assess the vascular status, a Doppler ultrasound was performed, revealing a large pseudoaneurysm measuring 10 × 8 cm in the distal superficial femoral artery (SFA), with a characteristic 'to-and-fro' waveform at the neck, suggestive of turbulent blood flow associated with an aneurysmal structure. CTA further confirmed the presence of a saccular aneurysm in the distal SFA, measuring approximately 9 × 7 cm, with notable mural thrombosis and calcified plaques observed within the sac (Fig. 1).

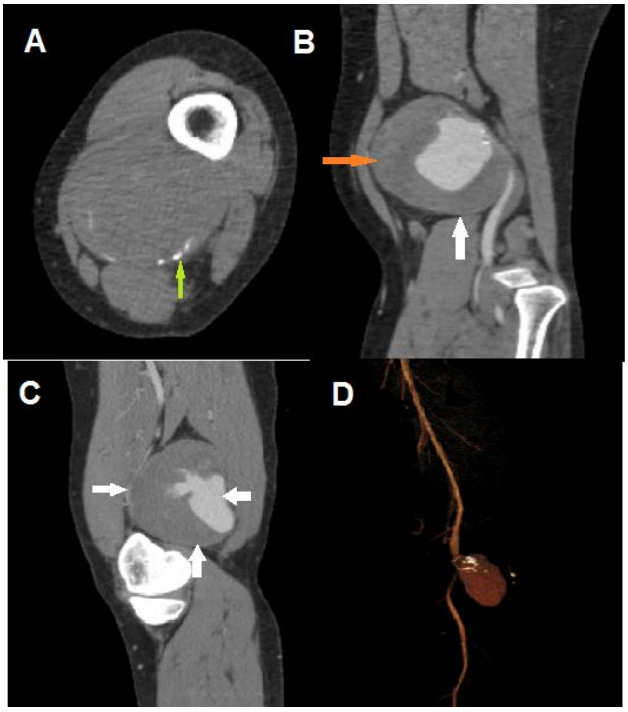

Fig. 1: Computed tomography angiography showing: (A) Large saccular pseudoaneurysm with calcified plaque (green arrow). (B) Aneurysmal sac with mural thrombosis (white arrow). (C) Sagittal reconstruction showing the extent of the pseudoaneurysm. (D) Three-dimensional volume-rendered image demonstrating the pseudoaneurysm and adjacent femoral–popliteal arterial anatomy

The femoral and popliteal arteries proximal and distal to the lesion were patent. The decision was made for surgical intervention to address the distal SFA pseudoaneurysm. During the operation,

significant clot formation was noted within the aneurysm sac (Fig. 2). The affected arterial segment was resected, and revascularization was achieved with an autologous reversed saphenous vein interposition graft. The postoperative course was uneventful, and the patient was treated with antibiotics, analgesics, and a heparin infusion to prevent thromboembolic complications.

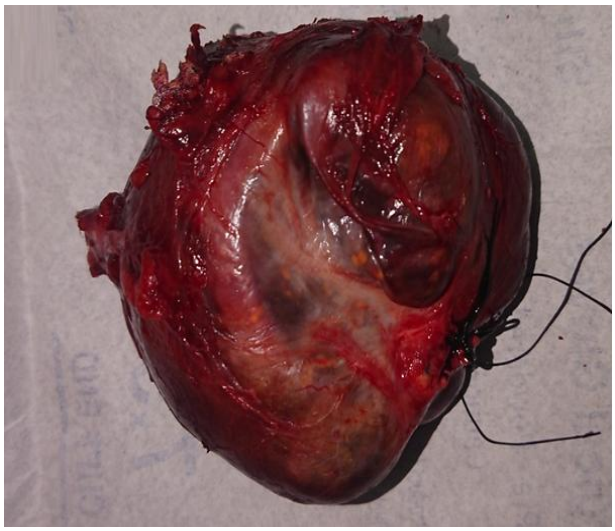

Fig. 2: Intraoperative image showing the excised pseudoaneurysm sac filled with organized thrombus She was discharged on postoperative day eight, and subsequent follow-up examinations, including both physical assessment and Doppler studies, confirmed intact graft flow and no residual pseudoaneurysm, revealing normal findings in the affected limb and indicating successful surgical management.

Discussion

SFA-PSA is a cystic structure that develops at the junction of the femoral artery and its branches, often resulting from trauma, drug injections, medical procedures, rheumatism, or immune disorders. It typically presents as a pulsating mass that progressively enlarges in the lower limbs (4).

Blunt trauma remains the most prevalent cause of traumatic pseudoaneurysms, accounting for approximately 9% of all post-traumatic cases arising from the SFA (3). The interval between the initial trauma and the presentation of a pseudoaneurysm can vary significantly, ranging from hours to years (5), with our case demonstrating an unusual delay of eight years. The most striking feature of this case is the delayed presentation eight years after the initial blast injury, which is highly unusual yet documented in a few similar cases in the literature. This prolonged presentation may be attributed to lateral contusion of the vessel wall caused by high-velocity fragments striking the artery, leading to pseudoaneurysm formation as the contused vessel wall undergoes healing (6). Delayed pseudoaneurysm formation may result from partial arterial wall contusion, intimal damage, or microscopic disruption caused by high-velocity projectiles. Physical examination is often the initial diagnostic approach, with a painful, pulsatile mass being the most common clinical manifestation (7).

Differential diagnosis for a thigh pulsatile mass includes arteriovenous fistula, soft-tissue sarcoma with arterial involvement, and true aneurysm. Doppler ultrasound is considered the gold standard for diagnosing pseudoaneurysms, boasting a sensitivity of 94–99% and specificity of 94–97%. In more complex cases, CT and MRI may also be employed (8). PSA larger than 2.5 cm or those that are symptomatic pose risks of compressive effects on adjacent structures, which can lead to pain, thrombosis, distal embolization, rupture, hemorrhage, and skin necrosis. As such, timely treatment is essential to prevent complications (9). Large, symptomatic, thrombosed, or anatomically complex pseudoaneurysms are best treated surgically. Surgical intervention remains the primary treatment modality for pseudoaneurysms; however, alternative options include conservative management, ultrasound-guided compression (USGC), ultrasound-guided thrombin injection (USTI), endovascular stent graft insertion, and coil embolization (7).

Surgery has demonstrated a 100% success rate with a complication rate of approximately 21%. Operative management is particularly indicated in cases of infection, rapidly enlarging masses, rupture, ischemia of the distal limb, or neurological deficits due to compressive effects (8). Open surgical repair techniques may involve primary suture repair, end-to-end anastomosis, bypass grafting,

and distal embolization of the pseudoaneurysm content, potentially necessitating thrombectomy and thrombolysis (10). In the present case, open surgical repair with reverse saphenous vein interposition graft was chosen to release the compressive effect and alleviate pain.

Conclusion

This case exemplifies the importance of recognizing the potential for late-onset vascular complications following trauma. It also illustrates the effectiveness of timely diagnosis and appropriate surgical intervention in managing large pseudoaneurysms, resulting in favorable outcomes for the patient. Future cases should emphasize the importance of vigilant follow-up in patients with significant traumatic injuries to detect and manage such complications proactively.

Ethics approval

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Competing Interests

None.

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