

## Profunda Femoris Artery Pseudoaneurysm Presenting with Triad of Thigh Swelling, Bleeding and Anaemia

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### Abstract

**Introduction:** We describe an alternative presentation of 2 cases of femur fractures with pseudoaneurysms of the profunda femoris artery. **Clinical Picture:** In both cases, there is a recurrent triad of: (1) thigh swelling, (2) bleeding from the fasciotomy wound, and (3) anaemia with a falling haemoglobin trend. **Treatment:** Surgical exploration is often not diagnostic or therapeutic. Angiography can accurately diagnose the presence of a pseudoaneurysm and intervention with coil embolisation is effective in arresting further bleeding. **Outcome:** Both cases show good outcome following coil embolisation. **Conclusion:** Recognition of this triad is necessary to ensure early accurate diagnosis so that proper treatment is rendered to prevent further recurrent bleeds.

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**Key words:** Angiography, Compartment syndrome, Embolisation, Fasciotomy

### Introduction

Pseudoaneurysms of the profunda femoris artery have been reported following blunt and penetrating trauma to the thigh, and orthopaedic procedures of the proximal femur. These pseudoaneurysms can present in various forms, such as a painful pulsatile mass, or even thigh compartment syndrome. We describe 2 cases of femur fractures with pseudoaneurysms of the profunda femoris artery that presents with the triad of: (1) thigh swelling, (2) bleeding from the fasciotomy wound, and (3) anaemia with a falling haemoglobin trend, following fasciotomy of the thigh.

### Case Report

#### Case 1

A 24-year-old male motorcyclist sustained multiple injuries in a road traffic accident, including open fractures of bilateral femur shafts and left distal radius. In view of his injuries and hypotensive status, the fractures were initially stabilised with external fixators following debridement of the open wounds. Fasciotomy was performed for the left thigh due to a tense swelling and the clinical diagnosis of impending compartment syndrome. Postoperatively, the

left lower limb was pale with faint distal pulses. An angiogram was performed to exclude arterial injury with circulatory compromise in the limb. It showed patent superficial femoral vessels with attenuated distal flow due to generalised vasoconstriction, which was attributed to his hypotensive state. The profunda femoris artery was not visualised in the study. The patient responded well to fluids and blood products resuscitation, with restoration of stable haemodynamics and good circulation in the left leg. Radiographs revealed satisfactory reduction and fixation of the fracture sites (Fig. 1). A few days later, the wound was inspected and found to be clean with some old clots and no active bleeding.

Two weeks later, the patient developed a tense swelling in the thigh, and the dressing over the fasciotomy wound was soaked with fresh blood. At the same time, there was associated tachycardia with a fall in the haemoglobin level from 8.8 g/dL to 7.3 g/dL. The wound was explored and found to be clean except for the blood clots. There were no areas of active bleeding identified. The clotting profile was normal. The patient was transfused with packed cells and the episode of wound bleeding was managed expectantly.

A few days later, a similar episode recurred with swelling

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of the thigh, and bleeding from the fasciotomy wound. The haemoglobin level dropped from 8.3 g/dL to 5.8 g/dL. The patient was hypotensive and tachycardic. However, examination of the wound was again unremarkable. An angiogram was performed and it revealed a pseudoaneurysm from a branch of the profunda femoris artery with active extravasation of contrast. The bleeding vessel was successfully embolised with 2 coil wires and the bleeding arrested (Figs. 2 & 3). The wound was subsequently skin grafted and the patient had good recovery without further bleeding episodes.

### Case 2

A 25-year-old motorcyclist was involved in a road traffic accident, and sustained a closed comminuted fracture of the proximal third of the right femur. He underwent surgery on the same day with closed intramedullary nailing of the right femur. Lateral fasciotomy was performed for tense swelling of the thigh, and clinical suspicion of compartment syndrome. Post-fixation radiographs showed adequate reduction of the fracture with good alignment. The fasciotomy wound was inspected on 2 occasions, and was found to be clean.

The patient's recovery was uneventful until 13 days following the initial surgery, when he developed swelling in the right thigh, associated with bleeding from the fasciotomy wound site. The pulses in the leg distally were normal. The haemoglobin level dropped from 8.4 g/dL to 6.3 g/dL. Exploration of the wound revealed a large haematoma collection with no obvious bleeding spot. The haematoma was evacuated, and the cavity packed. There were no further bleeding episodes and a week later, the fasciotomy was closed with split-thickness skin grafting, and the patient discharged.

Two months after the accident, he presented again with a spontaneous swelling in the right thigh associated with pain and discharge of blood clots from the distal end of the previous fasciotomy wound. During exploration, a large haematoma collection was found but there was no obvious source of bleeding identified. The haemoglobin level had dropped from 8.0 g/dL to 6.3 g/dL.

During his hospitalisation, there were 2 further episodes of thigh swelling and bleeding from the wound in the following 2 weeks. An angiogram showed a 2-cm pseudoaneurysm arising from a branch of the profunda femoris artery (Fig. 4). This was successfully embolised with 2 coil wires (Fig. 5). The patient recovered well subsequently without further incidents.

### Discussion

The close proximity of the profunda femoris artery to the proximal femur makes it susceptible to damage following

fractures and orthopaedic procedures in that region. These damages can occur because of bone spikes, drills, screws, displaced implants and even retraction of surrounding tissue.

Many authors have reported on profunda femoris artery pseudoaneurysms and their various presentations. In the initial stages, it can be subtle with localised pain and swelling in the thigh, resembling a haematoma. The mass can continue to enlarge, and, with continued arterial inflow into the cavity, a pulsatile haematoma with an audible bruit will result.<sup>1,2</sup> With increasing size, it can even cause acute compartment syndrome of the thigh.<sup>3,4</sup> There is usually no compromise in distal perfusion unless there is significant pre-existing occlusive disease in the superficial femoral artery.

These 2 cases of pseudoaneurysms of the profunda femoris artery presented in a similar manner. In both instances, fasciotomies were performed and they presented with a delayed triad of: (1) thigh swelling, (2) bleeding from the fasciotomy wound, and (3) anaemia with a falling haemoglobin trend.

The initial bleeding episodes were delayed at about 2 weeks following the fracture. This delay in presentation can occur since the initial injury merely weakens the vessel wall, predisposing to pseudoaneurysm formation. In fact, the damage to the artery may become manifest many months or even years after the initial trauma.

During bleeding episodes, the patient will show signs of blood loss and hypovolaemia, with a rising pulse rate trend and hypotension. In the context of a multi-trauma patient, all efforts must be made to exclude blood loss from other occult sources that can be potentially life threatening. By the time the bleeding from the wound declares itself, the pseudoaneurysm is likely to have bled some time ago, and substantial blood has accumulated in the thigh, resulting in a painful swelling. These bleeding episodes can stop spontaneously and recur later, leading to a falling haemoglobin trend. It is often difficult to identify the pseudoaneurysm during surgical exploration due to its deep-seated location in the thigh. Investigative tools using ultrasonography and angiography are more useful.

Ultrasonography can be used to diagnose profunda femoris artery pseudoaneurysms presenting as a mass.<sup>5</sup> It is useful to define the size and extent of the cavity, and the presence of thrombus formation. For cases that present with bleeding, angiography is an excellent diagnostic and therapeutic tool. It can accurately delineate the site and size of the pseudoaneurysm, the feeding vessels, and patency and adequacy of distal flow. However, for patients with haemodynamic compromise following hypovolaemia, the generalised state of vasoconstriction may render the study sub-optimal, as was the situation in Case 1.



Fig. 1. Reduction and fixation of left femur open fracture with external fixator.

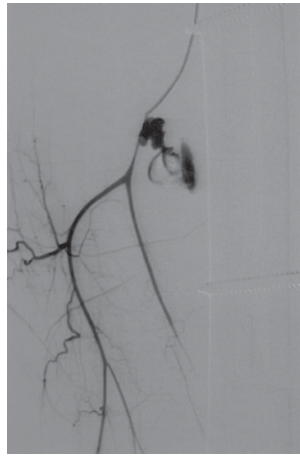


Fig. 2. Angiogram showing pseudoaneurysm from a branch of the profunda femoris artery with active extravasation of contrast.

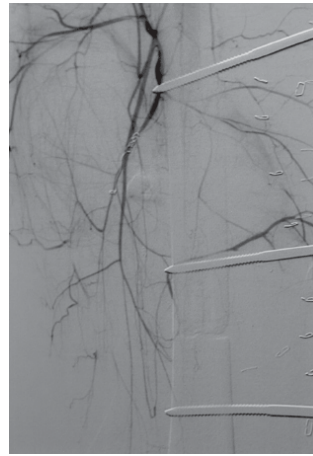


Fig. 3. Pseudoaneurysm successfully embolised with coil wires and bleeding arrested.

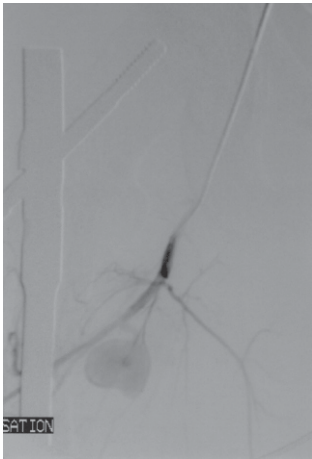


Fig. 4. 2-cm pseudoaneurysm from a branch of the profunda femoris artery.

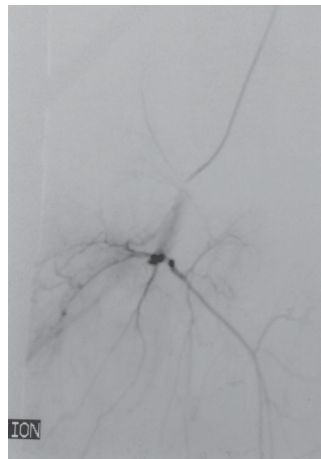


Fig. 5. Successful embolisation of the pseudoaneurysm.

In these cases, Cook® embolisation coils were used for selective embolisation of distal feeding vessels. These stainless steel coils have attached synthetic fibres to promote maximum thrombogenicity. Initial angiography is performed to determine the optimal position for deployment. The coils are delivered to the target vessel using a soft straight wire guide through standard angiographic catheters. Once deployed, a final angiogram is performed to confirm coil position in the target vessel, and to ensure bleeding is arrested. This method of treatment will not be suitable if the origin of the pseudoaneurysm is from a proximal location of a major vessel, since occlusion will invariably cause distal ischaemia. In such circumstances, surgical excision and repair of the damaged artery will be more appropriate.

Both cases were well following angiographic embolisation, with no evidence of clinical recurrence. The duration of follow-up was 1 year 9 months and 6 years 5 months respectively.

The diagnosis of pseudoaneurysm formation of the profunda femoris artery following trauma and orthopaedic procedures requires awareness and a high index of suspicion. The initial presentation can be delayed, subtle and varied. Following fasciotomy of the thigh, the recurrent triad of painful thigh swelling, bleeding from the fasciotomy wound, and anaemia with a falling haemoglobin trend should alert the clinician to the presence of a bleeding pseudoaneurysm of the profunda femoris artery. These cases highlight an alternative mode of presentation of this uncommon condition. Recognition of this triad is necessary to ensure early accurate diagnosis so that proper treatment is rendered to prevent further recurrent bleeds.

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