

## Pseudo-Aneurysm After Dynamic Hip Screw Fixation for Intertrochanteric Femoral Fracture: A Case Report

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### Abstract

**Case:** A 79 years old man presented with right intertrochanteric femur fracture following a fall. He underwent surgical fixation complicated by Profunda femoris artery pseudo aneurysm. This rare complication usually present late because of the deep position of the artery.

**Conclusion:** We report a patient who developed Pseudo aneurysm of the profunda femoris artery following a dynamic hip screw fixation for an intertrochanteric femur fracture. Awareness of this complication and a high level of suspicion allows early diagnosis and treatment. Thereby, reducing the morbidity of the condition.

**Keywords:** Pseudo Aneurysm; Profunda Femoris Artery; Intertrochanteric Fracture

### Introduction

Pseudo aneurysm and arterial hemorrhage of the profunda femoris artery is rare after dynamic hip screw fixation for an intertrochanteric femoral fracture with a reported rate of 0.2% [1].

### Case Report

79 years old man with known case of diabetes mellitus, hypertension, chronic obstructive pulmonary disease, ischemic heart disease and iron deficiency anemia presented with right hip pain and inability to walk following a fall. He was unable to bear weight on the affected extremity.

On examination there was no swelling, obvious deformity or skin changes. By palpation there was tenderness in the groin. Range of motion was painful and restricted, pedal pulses were palpable and capillary refill in the feet was normal, neurological examination within normal limits. Plain radiographs showed an intertrochanteric fracture of the right femur.



**Figure 1a:** AP view of the hip, you can notice the thin line in the intertrochanteric area.



**Figure 1b:** Lateral view showing the intertrochanteric fracture.

The patient was operated on the following day for his hip fracture, and after close reduction on the fracture table, fixation with a dynamic hip screw with 4 hole 135\* plate via the lateral approach was done (Figure 2). The operation took 45 minutes; blood loss was about 400 ml and one unit of packed red blood cells was transfused intra-operatively. Post-op the patient was shifted to the ICU for close observation and monitoring for 24hrs.



**Figure 2a:** Ap view.



**Figure 2b:** Lateral view.

40 mg of low molecular weight heparin subcutaneously was started on the day of admission and continued for 7 days postoperatively.

After a week the patient was discharged in good condition with full weight bearing and follow up in OPD after 2 weeks.

In the out-patient the wound was clean, clips were removed and there were no complaints.

After 4 months, the patient was admitted under general surgery as a case of right inguinal hernia for open repair. Examination revealed painless right mid-thigh swelling with good range of motion of right hip and knee. No signs of infection were seen. Blood and radiographic evaluation was done.

Blood investigations were within normal. X- ray showed soft tissue calcification present in a cystic fashion at the medial aspect of proximal shaft of right femur as shown in figure 3.

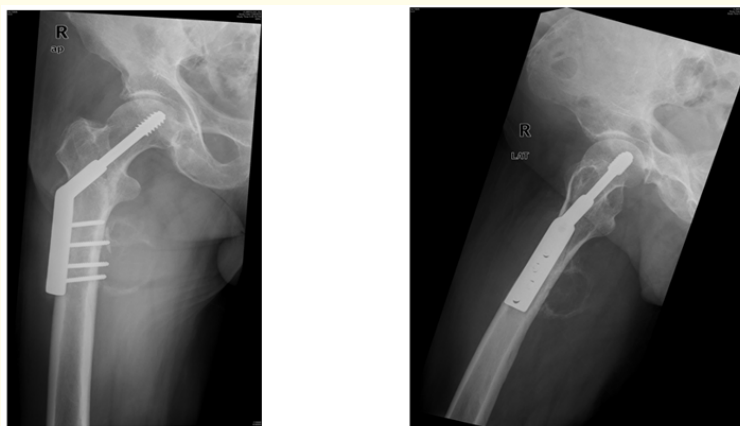


Figure 3: AP and lateral views of the hip. Notice the collection.

Ultrasound scan of the right thigh revealed oval area of collection measuring 11 cm in length and 3.8 cm in width is noted along the anterior compartment of right mid thigh. There were few anechoic areas present within it (Figure 4).



Figure 4: Oval area of collection measuring 11 cm in length and 3.8 cm in height is noted along the anterior compartment of right mid-thigh.

Ultrasound scan was repeated after 2 days, showed pseudo aneurysm in right proximal thigh in relation to profunda femoris artery.

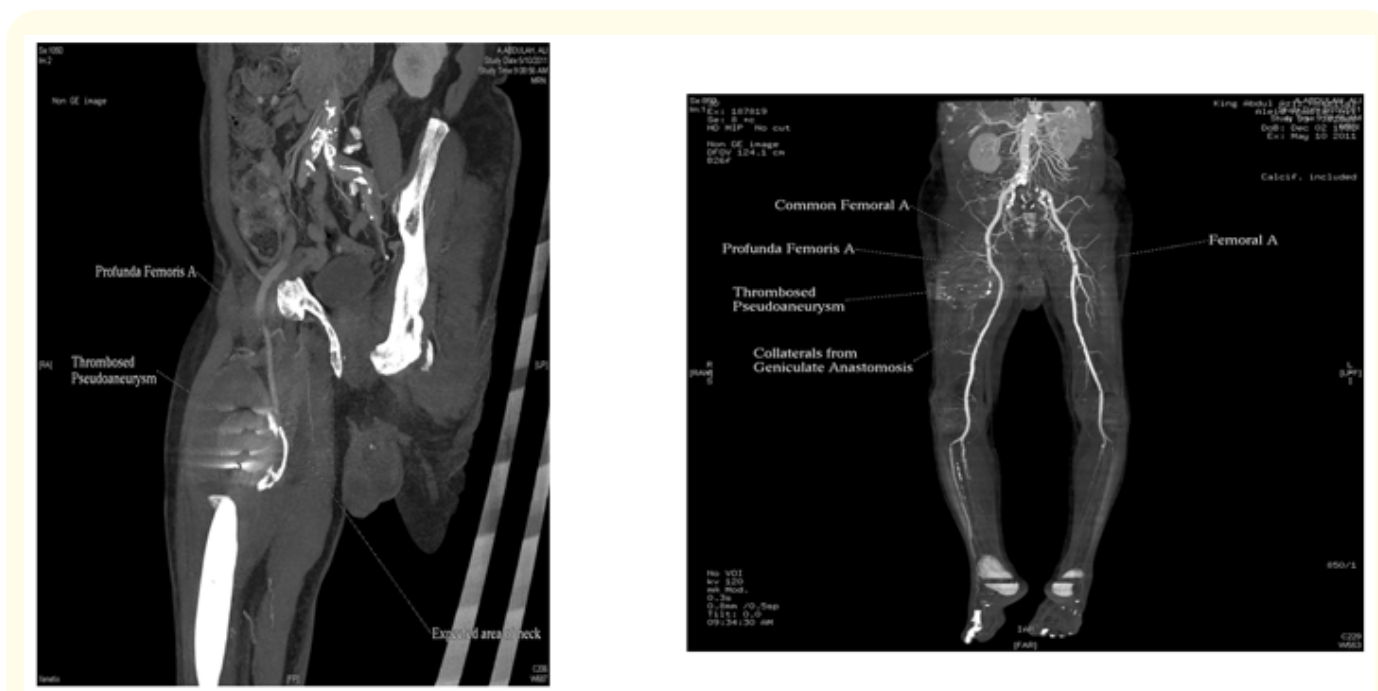


Figure 5: CT angio showing the pseudo-aneurysm.

Vascular consultation was done and computed tomographic angiography requested, which revealed right profunda femoris artery pseudo aneurysm completely thrombosed.

The patient was taken to the operating room by the vascular surgeon, the aneurysm was opened and a 400-ml-haematoma was evacuated.

One of the distal screws was seen projecting toward the profunda femoris artery which caused a tear in the lateral wall of the artery, this was repaired.

Post-operative patient had uneventful recovery and was discharged home.

After 2 months, the patient presented to the vascular surgery clinic, and a swelling was noticed at the site of the vascular repair. It was diagnosed as a hematoma. The next day he was taken to the operating room, and under local anesthesia, a small incision was made and the hematoma was evacuated, the vascular repair was examined and it was sound.

Post-op the patient was doing well. There was no re-collection, after 8 days from the admission, discharge was planned for him. One-hour-later, he was found cyanosed and unresponsive. CPR was initiated but unfortunately the patient could not be recovered and was pronounced dead.

## Discussion

The profunda femoris artery arises at the posterolateral aspect of the femoral artery, 2 to 5 cm below the inguinal ligament. The artery typically starts laterally and then posteriorly to the femoral artery, being medial to the proximal femoral shaft, it ends at the lower third of the thigh in a small branch, which pierces the adductor magnus, and is distributed on the back of the thigh to the hamstring muscles. The profunda femoris artery generally gives rise to 3 perforating arteries, which pierce the tendon of the adductor magnus to reach posteriorly and are close to the linea aspera of the femur. The first perforating artery is given off above the adductor brevis and the third one is given off below the muscle. Therefore, the profunda femoris artery at the level of the proximal femoral shaft is vulnerable to iatrogenic injury during dynamic hip screw fixation, owing to its proximity to the femur [1] at the craniocaudal level nearly equivalent to the third and fourth plate holes in the dynamic hip screw plate. During fixation over drilling can lead to injury of the profunda femoris artery and its first or second perforating arteries. Internal rotation of the hip causes the profunda femoris artery to lie closer to the femur cortex and increases the risk of arterial injury.

Different mechanisms of arterial injury account for differing timing of symptoms onset, which can be acute or chronic, from days to years after dynamic hip screw fixation [2]. Onset of symptoms is more acute when the arterial injury is caused by spikes of fractured bone during injury and manipulation, or by over-penetration by a drill bit, retractor, or screw [3,4]. Delayed onset is usually secondary to prolonged impingement or erosion of the artery by a protruding fixation screw, particularly seen in arteries with atherosclerotic plaques.

In our patient, the pseudo aneurysm was close to the screw tip of the fourth hole. The cause of injury to the profunda femoris artery was likely to relate to over drilling or impingement by the screw tips. Diagnosing arterial injury after dynamic hip screw fixation is difficult because it is usually masked by other complications, such as deep venous thrombosis or a hernia as our case.

A pseudo aneurysm may present as a local swelling, simulating a wound hematoma. Pulsatility and bruit detection may be difficult because of the deep location. It may be useful to detect the integrity of the distal vasculature of the lower limb. However, these findings may be normal when the injury only involves a minor vessel. Therefore, a high index of suspicion and radiological imaging (particularly noninvasive imaging by CT angiography and duplex ultrasonography) play a major role in making the diagnosis [5-9].

CT angiography enables 3-D reformatting of the lower limb vasculature. Although the image quality can be impaired by metallic implants, it is a quick and noninvasive method, with high sensitivity (90 - 95%) and specificity (98 - 100%) for detecting arterial injury after trauma [6].

Interventional procedures offer both diagnosis and treatment of a femoral artery pseudo aneurysm. Femoral artery angiography and percutaneous transarterial embolisation with coils have been reported in the treatment of a truncated muscular branch of the profunda femoris [5,10,11]. A percutaneous approach with thrombin injection for obliterating the pseudo-aneurysm has also been reported [12]. Interventional radiological procedures are the treatment of choice because most patients with intertrochanteric fractures are elderly with multiple co-morbidities and are poor candidates for a second operation. Percutaneous transarterial embolisation can avoid the need for another major operation and general anesthesia [13]. CT angiography is particularly useful in studying the vascular anatomy in planning for transarterial embolisation. Real-time ultrasound guidance is useful in guiding the needle for percutaneous thrombin injection.

## Conclusion

Intertrochanteric fractures of the hip are common in our daily activity, especially in elderly patients. The treatment of these injuries is almost easy, fast and well understood.

Vascular complications are rare, in comparison to other general and mechanical complications. Rare cases of pseudo-aneurysm of the profunda femoris artery have been described in the medical literature.

This case highlights the importance of being vigilant and careful during drilling and screw fixation in the proximal holes of implant and also having a high index of clinical suspicion for diagnosing profunda femoris pseudo aneurysm early with history of progressive swelling following proximal femur fracture fixation.

### **Conflict of Interest Statement**

No funds were received in the support of this study. No benefits in any form have been or will be received from a commercial party related directly or indirectly to the subject of this manuscript.

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