



CASE REPORT

Delayed presentation of profunda femoris pseudoaneurysm following an intertrochanteric neck of femur fracture

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Introduction

Fractured neck of femur is a common presentation to the acute services and is a cause of significant morbidity and mortality. Arterial injury is a rare but recognised complication of intertrochanteric femur fractures.

We report a case of delayed presentation of a profunda femoris pseudoaneurysm following an intertrochanteric femur fracture.

Case report

A 79-year-old female was admitted with an oblique, partially displaced four part intertrochanteric fracture of the right femur following a fall. The lesser trochanter fragment was displaced infero-medially as shown in Fig. 1. The fracture was repaired using an intramedullary nail as shown in Fig. 2. Her premorbid mobility was with a zimmer frame and one assistant having had a left fractured neck of femur repaired the previous year.

Post-operatively her recovery was complicated by a progressive anaemia. She received nine units of packed cells over a period of 10 days. There was no overt GI bleeding, but this was thought to be the most likely source. On the eighth post-operative day the patient was noted

to have a swollen right lower limb, not consistent with post-operative changes, raising the suspicion of a DVT. A venous duplex proved difficult, due to the limb swelling and poor patient mobility, but was interpreted as showing a partially occlusive thrombosis of the proximal right superficial femoral vein. She was started on anticoagulation therapy and over the following 2 days there was a further drop in her haemoglobin with increased thigh swelling. At this time a repeat duplex scan showed the proximal right superficial femoral vein to be compressed by a large pseudoaneurysm arising from the right profunda femoris artery, 7 cm distal to its origin. Flow was detected in an area of 3 cm with the rest of the cavity filled with haematoma as shown in Fig. 3. Thrombus was noted in the below knee popliteal vein.

The patient was taken to theatre for repair of the pseudoaneurysm. The operative findings were a lateral tear of the profunda femoris artery, 7 cm from its origin. This fed into a large 25 cm by 20 cm haematoma filled cavity which surrounded the neck and proximal shaft of the femur. The arterial defect was repaired with non-absorbable suture and the haematoma evacuated and large drains were placed in the cavity. She was continued on anticoagulation for the DVT.

Post-pseudoaneurysm repair the patient had no further blood loss. Unfortunately due to associated medical co-morbidities, including cerebrovascular disease, ischaemic cardiac disease and left ventricular failure the patient died 18 days following the pseudoaneurysm repair.

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Figure 1 Right four part, oblique intertrochanteric femur fracture with infero-medially displaced lesser trochanter fragment.



Figure 2 Post-intramedullary nail repair.

Discussion

Arterial injuries accompanying intertrochanteric neck of femur fractures are rare. Iatrogenic injury may occur due to a drill bit or screw passing through the profunda femoris artery.² A more commonly described mechanism of arterial injury is thought to be due to arterial puncture by the displaced ends of the bone at the fracture site.^{4,6} This can occur either at the time of injury, during operative correction or early during post-operative mobilisation.⁴ In the case described, the cause of the pseudoaneurysm is unlikely to have been iatrogenic as the intramedullary nail required no drilling through the bone at the level of the profunda femoris artery. It most likely resulted from puncture of the artery by the displaced lesser trochanter fragment either at the time of injury or during manipulation at the time of surgery.

Traumatic profunda femoris pseudoaneurysms can present in a variety of ways. Those described include progressive anaemia, thigh pain, bruising and swelling⁴ or a pulsatile mass in the groin.^{1,2,6} In our case progressive anaemia was

the only initial sign of ongoing bleeding as the pseudoaneurysm and haematoma remained clinically undetected. The thigh pain and swelling was initially thought to be consistent with post-operative changes. Further swelling was incorrectly attributed to the DVT identified on initial duplex. Anticoagulation therapy led to a further increase in thigh swelling, raising the suspicion of an arterial injury which was diagnosed by the repeat duplex scan.

The diagnostic modalities used to diagnose traumatic profunda femoris pseudoaneurysms are angiography^{2,4} and duplex ultrasound.^{1,6} The benefit of duplex studies over arteriography is to allow identification of the size of the pseudoaneurysm, mural thrombus and also presence of blood

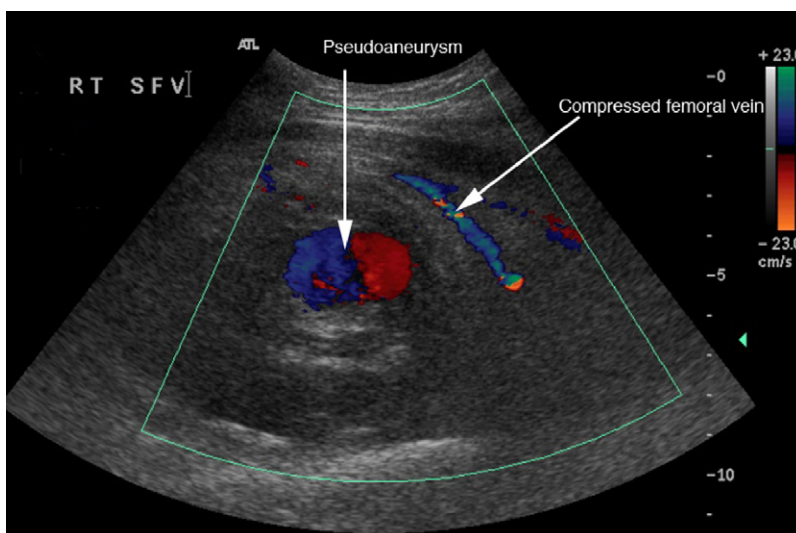


Figure 3 Duplex scan of right profunda femoris pseudoaneurysm and compressed femoral vein.

flow.¹ In this case duplex ultrasound revealed the pseudoaneurysm and surrounding haematoma as well as accurately locating the site of the arterial injury.

Femoral artery pseudoaneurysms can be treated operatively or non-operatively. Non-operative treatment of pseudoaneurysms include ultrasound guided compression, ultrasound guided thrombin injections and vascular radiological interventions such as transcatheter embolisation and covered stents.

Femoral artery pseudoaneurysms, secondary to arterial puncture for diagnostic and therapeutic angiography, can be treated by ultrasound-guided compression over the arterial puncture site which results in thrombosis of the cavity and sealing of the arterial injury. This is not possible in the deeper lying profunda femoris artery as it is not possible to achieve adequate compression, this being compounded if the surrounding haematoma is large. Ultrasound-guided thrombin injection has been successfully used for treatment of iatrogenic femoral artery pseudoaneurysms secondary to femoral artery catheterisation and cardiac and peripheral intervention.³ Similar satisfactory outcomes have been achieved in traumatic pseudoaneurysms.

Transcatheter embolisation with steel coiling has been described by Edwards et al.¹ for treatment of a 7 cm diameter pseudoaneurysm. Placement of a covered stent graft has been used successfully to treat traumatic pseudoaneurysms of the external iliac artery and the popliteal artery, following infection and loosening of a hip prosthesis and a total knee replacement respectively.⁵

Direct operative repair of the arterial injury, as per our case, has been used in patients where active bleeding⁴ or a large haematoma² has been present.

Conclusion

This case highlights the need to maintain a high level of suspicion of associated occult arterial damage in patients with intertrochanteric femur fractures and unidentified progressive anaemia. Diagnosis of pseudoaneurysm of the profunda femoris artery is readily confirmed with duplex scanning or angiography. Operative and the newer radiological techniques may be employed successfully in dealing with these pseudoaneurysms. Early recognition and treatment can prevent further complications and reduce the risk of morbidity and mortality in these patients.

References

1. Edwards RD, Ingram S, McIntyre R. Unstable intertrochanteric fracture complicated by pseudoaneurysm of the deep femoral artery, treatment by transcatheter embolisation. *J Intervent Radiol* 1992;7:21–3.
2. Hanna GB, Holdsworth RJ, McCollum PT. Profunda femoris artery pseudoaneurysm following orthopaedic procedures. *Injury* 1994;25:477–9.
3. Kang SS, Labropoulos N, Mansour MA, et al. Expanded indications for ultrasound-guided thrombin injection of pseudoaneurysms. *J Vasc Surg* 2000;31:289–98.
4. Keel JD, Eyres KS. Vascular injury by an intertrochanteric fracture fragment. *Injury* 1993;24(5):350–2.
5. Kickuth R, Anderson S, Kocovic L, et al. Endovascular treatment of arterial injury as an uncommon complication after orthopaedic surgery. *J Vasc Intervent Radiol* 2006;17:791–9.
6. Murphy PG, Geoghegan JG, Austin O, et al. Pseudoaneurysm of the profunda femoris artery due to intertrochanteric fracture of the hip. *Arch Orthop Trauma Surg* 1999;119:117–8.