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Pseudoaneurysm of the deep femoral artery caused by a guide wire following femur intertrochanteric fracture with a hip nail: A case report

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ABSTRACT

An 85-year-old woman developed severe swelling and pain in the proximal thigh after internal fixation of an intertrochanteric fracture of the femur with a hip nail. In order to identify the causes and determine the effective treatment, angiography was performed. The results of the angiography revealed a pseudoaneurysm of a branch of deep femoral artery. Endovascular embolization was used to treat the pseudoaneurysm. After reviewing all possible causes, we found a mistake in insertion of a guide wire for hip nail. Using intraoperative fluoroscopic images, we found the mal-positioned guide wire located posterior to trochanter on lateral view of hip. This case study reminds us that pseudoaneurysm can occur in a guide wire during hip nailing. Surgeons can avoid this complication with confirmation of lateral and anteroposterior view of hip.

Introduction

Hip fractures are one of the most common osteoporotic fractures, and the incidence of proximal femur fractures is expected to increase in the future.[1] Internal fixation using sliding hip screw or intramedullary nails is the standard procedure in the treatment of the proximal femur. A percutaneous insertion of intramedullary nails has become more common.[2,3] There have been reports about pseudoaneurysm during hip fracture surgeries,[4–9] and most of the reports noticed that the deep femoral artery (DFA) injury might occur in insertion of screws of dynamic hip screw (DHS).[4,5,7,9] With an intramedullary nail, there is a similar risk of insertion of distal locking screw of hip nail.[6] We present a case of a patient with pseudoaneurysm of the DFA caused by a guide wire, not drill bit or screws following internal fixation of trochanteric fracture using a hip nail. We also have reviewed the literature on the subject.

Case report

An 85-year-old female suffered pain in her left hip after a mechanical fall at home. She had a medical history of hypertension and angina pectoris, and she had a total knee arthroplasty revision performed one year ago. Plain radiographs revealed intertrochanteric fracture of the left femur (AO/OTA 31-A2, Fig. 1). Surgery was done on the 2nd day after injury. Routine preoperative evaluation was done prior to the surgery. Closed reduction was achieved under fluoroscopy, and internal fixation of her left proximal femur was performed with proximal femoral nail antirotation-II (PFNA2; Synthes, Oberdorf, Switzerland, Fig. 1B). Preoperative hemoglobin (Hg) was 11.6 g/mL with 33.2% of hematocrit (Hct) and immediate postoperative Hg was 8.9 g/mL (Hct 26.3%). Intraoperative blood loss was minimal due to percutaneous procedure and transfusion was not applied. However, she complained severe pain in the proximal thigh and severe swelling of left thigh was revealed. Postoperative Hg at 12 h after surgery was 6.3 g/mL (Hct 18.3%), but the vital sign was stable. Four units of packed red blood cells were transfused. In general, a small hematoma can be treated conservative methods including rest, ice, compression and elevation. However, potential injury to the deep femoral artery should be considered and a percutaneous endovascular procedure should be

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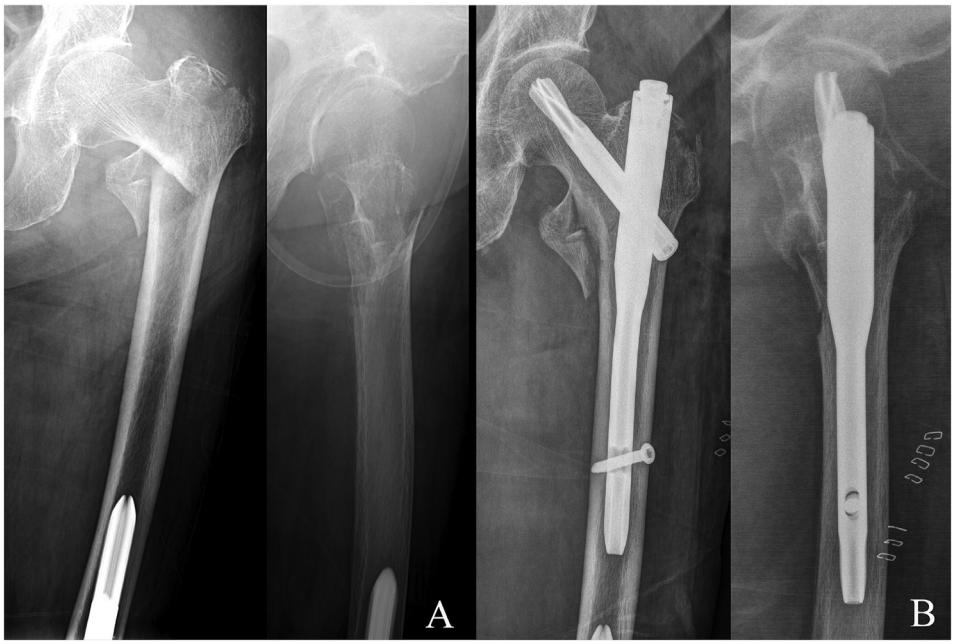

Fig. 1. Preoperative and postoperative radiologic findings. (A) Left hip anteroposterior (AP) and lateral x-ray showing intertrochanteric fracture of the left femur (AO/OTA 31-A2). (B) Postoperative AP and lateral view demonstrating good reduction of fracture.

performed when unexpected large thigh swelling is encountered after hip fractures.[8] Therefore computed tomography (CT) angiography was immediately performed with a suspicion of vessel injury because this procedure usually does not result in massive bleeding and unexplained anemia might be caused by vessel injury such as pseudoaneurysm. CT angiography demonstrated a large hematoma in the left thigh (Fig. 2) and a large pseudoaneurysm originated from the DFA (Fig. 3A). CT angiography also detected atherosclerotic aortoiliac calcifications without significant stenosis. Angiography result revealed a 3 cm-sized pseudoaneurysm arising from a muscular branch of the DFA corresponding to the abnormality seen on the CT angiography (Fig. 3B). The pseudoaneurysm was embolized with coils including afferent and efferent segment, and there was no further active hemorrhage (Fig. 3C). Without any other complications, she was discharged 2 weeks after the operation (Fig. 3D). Informed consent was obtained from the patient for the publication of this study.

Discussion

Iatrogenic pseudoaneurysms of femoral artery after fracture of femur are rare. This report describes the cause of iatrogenic injury, anatomical consideration of the proximal femur, risk factors of pseudoaneurysm, and prevention tips against pseudoaneurysm.

There are several other causes of iatrogenic pseudoaneurysm following surgery of proximal femur fracture. Pseudoaneurysm of the DFA is caused primarily by overpenetration of the drill bit or screws.[7–10] Pseudoaneurysm of the superficial femoral artery can

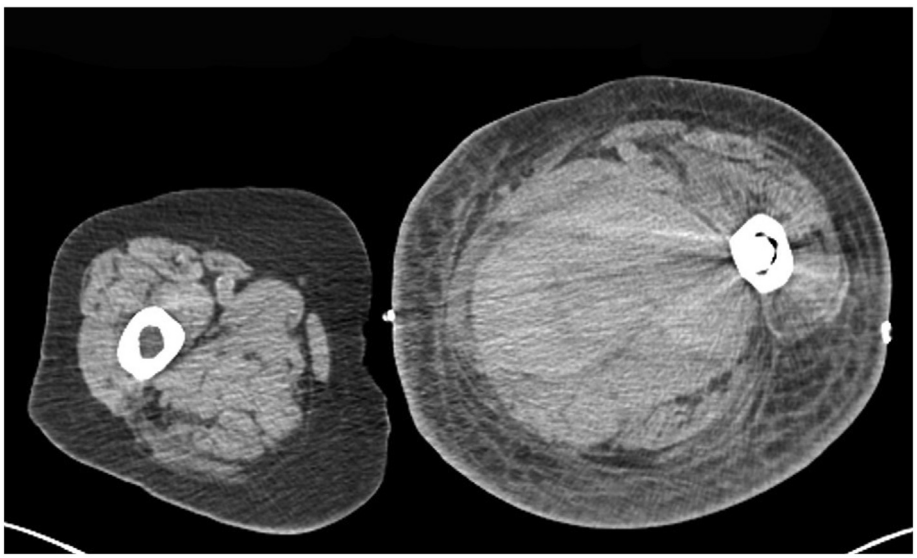

Fig. 2. Computed tomographic image of the upper thigh demonstrating the dramatic difference between the size of left (66 cm) and right thigh (51 cm).

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