CASE REPORT

Femoral artery rupture during total hip arthroplasty

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rajeshkakwani@gmail.com**SUMMARY**

Vascular injuries are an uncommon but significant complication of total hip arthroplasty. We present a case of femoral artery rupture through an atherosclerotic plaque during primary total hip arthroplasty and a review of the published literature. The early recognition and prompt treatment of this complication can reduce the mortality and morbidity associated with this injury.

BACKGROUND

Vascular injuries during total hip arthroplasty are uncommon. The overall reported incidence in the literature is 0.1–0.3%.^{1–3} They are more common during revision than primary arthroplasty. The more common iatrogenic causes reported are acetabular penetration, reaming and screw fixation, extraction of the acetabular component, femoral cerclage wires and inappropriate placement of anterior acetabular retractors.^{2–4} Spontaneous rupture of the femoral artery through atherosclerotic plaques, presenting as an insidious onset, pulsating swelling in the thigh, has also been reported.⁵ We report an unusual complication of the femoral artery rupture through the atherosclerotic plaque during primary total hip arthroplasty.

CASE PRESENTATION

An 85-year-old woman with a history of hypercholesterolaemia, ischaemic heart disease and aortic valve replacement was scheduled for a routine total hip arthroplasty. Her regular warfarin medication was stopped 3 days preoperatively and the international normalised ratio (INR) on the day of the surgery was 0.9. The patient was positioned in the lateral position. The modified Hardinge approach was utilised to expose the hip joint. The exposure of the acetabulum is achieved through very careful placement of a blunt Hohmann retractor over the anterior rim of the acetabulum. A routine cemented Exeter hip arthroplasty was performed. All the vital parameters remained stable during the procedure. The patient was then transferred to the recovery. In the recovery room, the patient became hypotensive and responded transiently to two fluid challenge boluses. There was no swelling of the thigh or the leg and both the legs were equally cool. Peripheral pulses were not palpable in either lower extremity due to the hypotension.

Careful observation revealed a gradually enlarging swelling in the right lower quadrant of the abdomen. A suspicion of femoral artery injury was raised.

Figure 1 Femoral artery angiogram showing the site of rupture.

INVESTIGATIONS

An urgent CT angiography of the femoral artery was performed. This revealed bleeding from the femoral artery at the level of the lesser trochanter immediately proximal to the femoral artery/proximal femoris bifurcation (figure 1). A large retroperitoneal haematoma explained the swelling of the abdomen (figure 2).

DIFFERENTIAL DIAGNOSIS

- Femoral artery rupture due to iatrogenic trauma during total hip arthroplasty
- Spontaneous rupture of the femoral artery

Figure 2 CT scan of the abdomen showing the retroperitoneal haematoma.

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Figure 3 Femoral artery rupture through an atherosclerotic plaque.

TREATMENT

The patient was managed with controlled hypotension to minimise further blood loss. Urgent vascular exploration was undertaken by a vascular surgeon. A transverse rupture of the anterior aspect of the femoral artery was noted through an atherosclerotic plaque (figure 3). This was repaired primarily. The fragility of the femoral artery was further evidenced when the superficial femoral artery avulsed from the bifurcation when the clamps were removed. This was also repaired primarily. The retroperitoneal haematoma was partially evacuated through the same approach and retroperitoneal drain inserted. After haemostasis had been achieved, resuscitation was accelerated to restore circulating volume. She required 10 units of packed cells plus additional fresh frozen plasma and platelet transfusions.

The patient was then monitored closely in the intensive care unit for haemodynamic stability as well for any development of compartment syndrome or systemic consequences of massive transfusion. The retroperitoneal drain was removed at 48 h and a colostomy bag attached to the drain site with further drainage collected for 5 days.

OUTCOME AND FOLLOW-UP

The patient was discharged home on day 10, having had her warfarin restarted and her INR was within target range. She remains in good health.

DISCUSSION

Vascular injury during total hip arthroplasty is associated with significant morbidity including loss of limb (15%), as well as mortality (7%).⁶⁻⁷ The common presenting features of vascular injury are either excessive bleeding or ischaemia. The bleeding generally is associated with thigh swelling and hypotension. Vascular injuries are more common in revision arthroplasty surgery and around 43% needed emergent surgery.⁶

Figure 4 Pelvic radiograph.

The anterior acetabular retractors especially the sharp Hohmann type retractors have been implicated in penetrating injury to the femoral artery,⁸⁻⁹ but these injuries are generally expected along the posterior or lateral wall of the femoral artery and occur at the level of the acetabulum. These injuries are often immediately apparent or, on the contrary, can be diagnosed late due to significant hidden retroperitoneal haematoma developing in the recovery ward area.

Our arterial fracture occurred more distally and the rupture occurred on the anterior surface of the vessel. We postulate that extreme flexion, adduction and external rotation of the limb while preparing the femoral canal in lateral approach combined with fragility of the femoral vessel with extensive calcified atherosclerotic plaques lead to fracture of the flexion surface of the femoral artery.

The fracture occurred approximately 5 cm distal to the inguinal ligament and through the anterior surface of the vessel in a thin patient (therefore approximately 2 cm deep into the skin). Despite this no evidence of groin haematoma or thigh swelling was visible. The massive retroperitoneal haematoma was clear on CT scan and was detectable clinically by significant right lower quadrant swelling, which became less apparent in more than 60 min as the haematoma dissipated.

Early and prompt recognition of a vascular injury following total hip arthroplasty is important to avoid potentially disastrous complications.⁷ We are indebted to the vigilance of the recovery room staff who were alert and identified our patient in danger.

Learning points

- ▶ The calcified atherosclerotic femoral artery commonly seen on radiographs (figure 4) poses a risk of spontaneous rupture during the manipulation of the leg during total hip arthroplasty.
- ▶ The assessment of a patient with unexplained hypotension after a hip replacement should include a careful examination of the abdomen.
- ▶ In the present day practice, where the vascular expertise is not always available onsite, as was in our case, a high degree of suspicion and careful monitoring to elicit the earliest signs of vascular injury are essential to avoid a catastrophic outcome.

Contributors All authors were involved in the management of the patient and in the preparation of the manuscript.

Competing interests None.

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