CASE REPORT

Foot drop following closed reduction of a total hip replacement

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SUMMARY

Sciatic nerve palsy has been well documented and reported, following primary and revision hip replacement. It can also occur following dislocation of hip replacement. The incidence of sciatic nerve palsy in dislocated hip replacement is <0.1%. However, new onset sciatic nerve palsy following a closed reduction of dislocated hip replacement is even rarer. We describe a case of sciatic nerve palsy from traction injury following closed reduction of a total hip replacement.

BACKGROUND

The sciatic nerve is one of the structures most at risk during hip arthroplasty. The nerve exits from the greater sciatic foramen and lies posterior to the hip, superficial to the superior and inferior gemelli, obturator internus and quadratus femoris muscles. The nerve conducts sensation to most of the foot and provides motor fibres for the lower leg. If the nerve is injured, the most apparent deficit is a foot drop, where the ankle cannot be dorsiflexed.

Foot drop from a sciatic nerve injury is a recognised complication of primary and revision total hip replacements (THRs). The incidence of sciatic nerve palsy is around 1% in primary surgery and 3% in revision surgery.^{1–3} In a dislocated hip replacement, its incidence is <0.1% before reduction. This is thought to be due to the femoral head resting on the nerve or causing oedema.^{4–6} Sciatic nerve palsy following closed reduction of a THR is extremely rare, with only five cases described in the literature.^{4–8} These previous cases have been due to mechanical entrapment or twisting of the nerve around the prosthesis that has been identified at revision surgery.

In this case, sciatic nerve palsy developed after a difficult closed reduction of a primary THR. This is the first case where the nerve was macroscopically normal when identified during revision surgery. This case highlights a rare complication following manipulation under anaesthesia, and demonstrates the importance of documentation of neurovascular status prior to and following any orthopaedic intervention.

CASE PRESENTATION

A 76-year-old woman presented to her local hospital following a simple fall. On examination, her leg was shortened with normal neurovascular status. Plain film of the pelvis was performed and showed a dislocated right THR (figure 1).

The patient had medical history of type 2 diabetes mellitus and chronic kidney disease. She was of average build and also had bilateral THRs in

situ. The right hip was a Charnley THR with a metal on polyethylene articulation. It had been inserted via a direct lateral approach and had been functioning well for 12 years with the exception that the hip had dislocated once 12 months prior to this admission. She lived alone and was independent in mobility.

She was taken to theatre promptly for closed reduction under general anaesthesia and muscle relaxant. The procedure was performed by a staff grade registrar. The patient was placed in supine position, and the hip reduced with prolonged and forceful traction. It was a difficult reduction and took more than 30 min. Postreduction pelvis X-ray showed that the hip was reduced (figure 2). Postoperatively, the patient developed foot drop and loss of sensation in the lower leg. This was thought to be a traction injury to the sciatic nerve due to the prolonged and forceful traction applied. She was managed with a foot drop splint and allowed to fully weight bear without the use of an abduction brace.

Unfortunately, 2 days later, she sustained a second dislocation while she was putting on the foot drop splint. This was managed with a second manipulation under anaesthesia in theatre.

INVESTIGATIONS

The patient's postoperative X-rays showed that the hip prosthesis was reduced and congruent. Her

Figure 1 Dislocated total hip replacement.

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Figure 2 Radiograph showing congruent total hip replacement postreduction.

primary THR was undertaken 12 years prior through a direct lateral approach with no complications. The position of the acetabular and femoral components was satisfactory with no signs of wear or loosening.

DIFFERENTIAL DIAGNOSIS

The sciatic nerve palsy was likely a result of traction injury from the closed reduction. The closed reduction was difficult and required prolonged and forceful traction. The patient also had a total of three dislocations of the right hip since the primary operation. This was a challenging case to manage, with sciatic nerve palsy and recurrent dislocations.

TREATMENT

Given the new onset sciatic nerve palsy following the closed reduction and recurrent dislocations, the decision was made to undertake a revision THR and exploration of the sciatic nerve. A Hardinge (direct lateral) approach was used through the old incision. The sciatic nerve was neither entrapped nor compressed around the hip prosthesis. There was no evidence of swelling or haematoma. The old prosthesis was removed and this was revised to a hybrid THR—trilogy IT cup (Zimmer, Indiana) and CPT (Zimmer, Indiana) primary stem using metal with polyethylene articulation (figure 3).

Figure 3 Radiograph showing revision total hip replacement.

OUTCOME AND FOLLOW-UP

The patient had improved sensation over the dorsum of her foot with no return of motor function preoperatively prior to the revision. Postoperatively, her neurovascular status remained the same. During the most recent review 4 months following revision surgery, she continued to have foot drop but had improved sensation of 4/10 compared with her contralateral side.

DISCUSSION

Dislocation rate following primary THR was around 3% and higher in revision THRs.^{9 10} Sciatic nerve palsy was a recognised complication following dislocation of THR. Its incidence varied and was reported to be up to 3.7%.¹¹

Sciatic nerve palsy following closed reduction of a dislocated THR was rare. To our knowledge, there were only five of such cases described in the literature.^{4–8} Chan *et al*,⁴ Haque *et al*,⁵ Leversedge *et al*,⁶ and Stockley and Bickerstaff⁷ described similar presentations of sciatic nerve palsy where the nerve was entwined around the hip prosthesis after closed reduction. The patients all underwent surgical exploration to release the nerve. Their outcome varied with only one⁷ regaining full recovery of nerve function.^{4–7}

Lazansky⁸ reported a case of sciatic nerve palsy following closed reduction in his review of 501 Charnley THRs. No details on treatment or outcome were described.

In our case, the patient developed complete sciatic nerve palsy following a difficult closed reduction. This was not present preoperatively. Her initial primary total replacement was performed 12 years prior through a Hardinge approach. None of the cases^{4–8} described previously had the initial hip replacement performed through this approach.

Although the previous cases reported entwinement of sciatic nerve as the cause of sciatic nerve palsy following closed reduction, traction injury was the most likely cause in our case. Forceful, prolonged traction and external rotation were required to reduce the dislocated hip. The femoral head was displaced superiorly and lodged on the edge of the acetabulum.

The patient also sustained another dislocation while putting on the foot drop splint after the initial dislocation. The combination of sciatic nerve palsy and recurrent dislocations prompted us to undertake revision THR. We undertook a Hardinge approach through the old incision to avoid weakening the previously undamaged soft tissues around the hip.

The patient started to develop improved sensation on the dorsum of her foot 2 months after the onset of nerve palsy. This improved sensation remained after the revision surgery. Recovery of sciatic nerve palsy following THRs is reported to be 36%, and took on average 21 months.¹² At our patient's 4-month postoperative review, she had further improvement in sensation.

In cases where reduction is difficult, the patient should be placed in a lateral position with appropriate supports. Under the guidance of fluoroscopy, reduction can be achieved through a combination of flexion and traction with internal or external rotation depending on the direction of dislocation. If the reduction is unsuccessful after this, an open reduction and consideration of revision surgery should be performed.

In conclusion, careful reduction manoeuvres must be undertaken to reduce a dislocated THR. Excessive force could result in traction injury of the sciatic nerve. Scar tissue around the hip can also displace the sciatic nerve and cause it to become entrapped around the hip prosthesis, as described in the

literature.^{4–7} Neurovascular examination must be performed and carefully documented. We recommend using the lateral position in cases where reduction is difficult and proceeding to open reduction to reduce the risk of fracture and nerve injury. We advocate revision surgery in this rare case of sciatic nerve palsy and recurrent dislocation.

Learning points

- ▶ Although rare, sciatic nerve palsy can develop following closed reduction of dislocated total hip replacement.
- ▶ Examination of the neurovascular status must be performed and clearly documented in patients with dislocated total hip replacement, before and after reduction.
- ▶ In cases where reduction is difficult, the patient can be placed in the lateral position to aid reduction. If this is still unsuccessful, open reduction should be undertaken.
- ▶ Revision surgery with visualisation of the sciatic nerve should be undertaken in cases of sciatic nerve palsy and recurrent dislocations.

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Contributors JN undertook review of the case notes and literature, and preparation of the manuscript. BAM and AB contributed to preparation of the manuscript.

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