Irreducible dislocated total hip replacement due to intra-articular incarceration of bone cement: A case report

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INTRODUCTION: Dislocation following total hip replacement is a well-documented complication. We present an unusual cause of failure to achieve a concentric closed reduction of a cemented total hip replacement which has never previously been reported.

PRESENTATION OF CASE: A 78-year-old female patient had an unsuccessful closed reduction of a posteriorly dislocated total hip replacement. Careful review of perioperative radiographs revealed a fragment of bone cement incarcerated within the acetabular component blocking reduction. This was confirmed on a subsequent computed tomography scan. Open reduction via a posterior approach with retrieval of the cement fragment was eventually required.

DISCUSSION: Observation of important radiological features which may prevent unnecessary further attempts at closed reduction are discussed. We consider reasons for a non-concentric reduction and reflect on the dangers of multiple forced attempts.

CONCLUSION: This case emphasises the importance of clinical judgement during closed reduction and highlights a previously unreported cause for non-concentric reduction in a dislocated cemented total hip replacement.

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1. Introduction

Dislocation following total hip replacement (THR) is a well-known complication with an incidence of 1–6% of primary surgery.1 Two-thirds of these are successfully treated in the acute setting with closed reduction without the need for subsequent surgery.2 However, there are several recognised causes for unsuccessful closed reduction including soft tissue interposition, component loosening and inadequate muscle relaxation during anaesthesia. This case report details an unusual complication of closed reduction in which a fragment of bone cement from the acetabular rim was dislodged into the acetabular component during manipulation thereby preventing complete reduction.

2. Presentation of case

A 78-year-old female patient with a background history of osteoarthritis, hypertension and chronic kidney disease underwent a left metal-on-polyethylene cemented Furlong (JRI, London, UK) primary THR in 1999. This was an uneventful procedure with no immediate postoperative complications. She suffered a posterior dislocation in 2011 following a simple slip on a wet floor causing a twisting injury to the left hip. This was successfully managed with closed reduction under general anaesthesia. She subsequently made a full recovery and returned to her usual daily activities. Two years later, she presented with a second posterior dislocation sustained whilst lowering herself onto a toilet seat. Examination revealed a painful, shortened and internally rotated left leg with no distal neurovascular deficit. Radiographs confirmed a posterior dislocation with no associated bony injury (Fig. 1).

This was initially managed with an attempted closed reduction under general anaesthesia. With the knee flexed, longitudinal traction was applied followed by adduction with gentle rotation. A ‘clunk’ was felt and there was gross correction of the limb deformity suggesting successful reduction. However, intraoperative radiographs revealed a non-concentric reduction i.e. the prosthetic femoral head was not fully engaged within the acetabular component (Fig. 2). The hip was unstable and re-dislocated at 45° of flexion in neutral rotation. A radio-opaque object was seen to be incarcerated within the acetabular component obstructing complete relocation of the hip. No further attempts were made to re-manipulate the hip in order to avoid further damage to the articulating surfaces. Computed-tomography subsequently confirmed the intra-articular presence of a 10 mm × 5 mm fragment

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of bone cement blocking reduction (Fig. 3). There was no periprosthetic lucency to suggest loosening of the acetabular component or femoral stem.

She subsequently underwent open reduction and retrieval of the loose cement fragment through a posterior approach (Figs. 4 and 5). The femoral head was found to be sitting on the rim of the acetabular component. With retraction of the femoral head, the cement fragment could be visualised directly and was removed. As the joint surfaces were found to be intact with no macroscopic evidence of excessive wear, the original implants were retained. A congruent reduction was then achieved and stability was confirmed prior to closure of the hip joint. The patient was ambulating the day after the procedure and was discharged a week later.

3. Discussion

Dislocation following THR is often a painful and dramatic event. Many individual risk factors have been identified but the cause is often multifactorial.3 Reported dislocation rates vary wildly in the literature with some series observing rates of up to 15%.4 In the majority of cases successful initial management consists of closed reduction under either sedation or general anaesthetic. Patients with recurrent dislocations often require revision surgery. Numerous manoeuvres for achieving closed reduction have been described and adequate analgesia or sedation with sufficient muscle relaxation are essential.1,5 Perioperative fluoroscopy is a useful adjunct for both guiding reduction manoeuvres and confirming a concentric reduction. Non-concentric reduction should alert the surgeon to the possibility of soft tissue or third body interposition. To our knowledge, there have been no cases previously described of
bone cement incarceration obstructing closed reduction of a dislocated THR. Gakuu described a difficult reduction due an occult free bone fragment in the acetabulum.6 Similarly, Canale and Manugian reported a non-concentric reduction due to an osteocartilaginous loose body in the acetabulum.7 Most recently, Leversedge et al. reported a case of entrapment of the sciatic nerve following closed reduction of a THR thereby preventing complete relocation.8

Immediately following attempted closed reduction, we noticed that the reduction was non-concentric. Following retrospective analysis, a prominent cement cuff on the inferior aspect of the acetabular rim was evident on the patient’s initial radiograph. The block of cement obstructing complete reduction could have easily been overlooked on the perioperative radiographs. This highlights the importance of vigilance and maintaining a high index of suspicion when attempting to reduce a dislocated cemented THR. Furthermore, we recommend that further forceful attempts should not be made at reduction due to the risk of sustaining either an intraoperative fracture or damaging the articulating bearing surfaces. Damage to the femoral head could potentially lead to surface roughening, abrasive wear and subsequent aseptic loosening.9

4. Conclusion

We emphasise the importance of careful monitoring of intraoperative radiographs during closed reduction of dislocated cemented THRs. It is also essential to maintain a high index of suspicion regarding the presence of a loose cement fragment when non-concentric reduction occurs. In these cases, repeated closed attempts should be avoided in order to prevent further damage. Further three-dimensional imaging may also be of benefit i.e. computed tomography.

Conflict of interest

None declared.

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Hai Fon Lim had made data acquisition, drafted the article, and made final approval of the version. Sameen Jain, Ben Haughton, Veysi Veysi, and David Shaw analysed the data, revised the article, and helped Hai Fon Lim in final approval of the version.

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