CASE REPORT

Complication of intraprosthetic dislocation of dual-mobility hip implant following closed reduction

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SUMMARY

Total hip replacement is a successful operation for the management of hip pain but there are potential complications, of which dislocation is one of the most common. The management of recurrent dislocation is a challenging problem that requires a multimodal approach and the use of dual-mobility implants is one option. We present a patient who was previously revised with a dual-mobility implant for recurrent dislocation, who had a complication after closed reduction of a subsequent intraprosthetic dislocation. Following a missed radiographical diagnosis, the patient experienced mechanical symptoms on hip flexion caused by a disassociated dual-mobility implant. Subsequent surgical removal of the failed implant and revision was required. Careful study of radiographs revealed an eccentric femoral head and evidence of the disassociated implant within the surrounding soft tissues. Radiographs following closed reduction of intraprosthetic dislocations should be scrutinised closely to detect implant failure to prevent further complications.

BACKGROUND

Total hip replacement (THR) is the most common elective operation in the UK for the management of hip pain and the incidence of this operation is projected to increase to 96 000 per annum by 2035.¹ There are a number of potential complications that may follow a hip replacement operation including instability and dislocation.

Patients who have suffered from, or who may be prone to, recurrent hip dislocations can be offered a dual-mobility implant (DMI) to reduce the risk of

this particular complication.² The DMI is a novel prosthesis designed to provide greater stability and movement that are a result of the large femoral head they possess and movement at two articulations rather than the conventional one (figure 1).³ However, DMI designs are not themselves immune to dislocation, which may occur between the two articulating balls, an intraprosthetic dislocation. A recent systematic review has shown that the mean rate of intraprosthetic dislocation of the DMI was 0.7% in primary implants and 1.3% in revised implants.⁴

This report highlights a potential complication following the closed reduction of an intraprosthetic dislocation of a DMI THR. We emphasise the detailed inspection of radiographical investigations following closed reduction of intraprosthetic dislocations of THR to identify any evidence of implant failure.

CASE PRESENTATION

We present a case of a 66-year-old female patient with a history of recurrent hip dislocations with bilateral DMI THRs. She experienced an unwitnessed fall, twisting and falling onto her side, resulting in a dislocation of her right THR (figure 2) that had previously been revised to a DMI for recurrent dislocation. Emergency physicians performed a closed reduction of the right hip and the patient was discharged following physiotherapy and adequate analgesia.

One day after the reduction, she experienced grinding noises and discomfort on walking and flexion of her hip. She had not previously experienced such phenomena following previous intraprosthetic dislocations, which had occurred with her left hip. She presented to her general practitioner who referred her for immediate orthopaedic review.

INVESTIGATIONS

Review of X-rays taken after emergency department reduction showed a malreduced right DMI, with an eccentric metal femoral head in the acetabulum and evidence of a disassociated plastic femoral head within the surrounding tissue (figure 3).

TREATMENT

Urgent revision surgery was performed to replace the disassociated DMI with a constrained acetabular device (figure 4).

Figure 1 Composition of the dual-mobility implant (DMI). The large outer polyethylene head allows a greater range of movement for the inner metal head, thus reducing the likelihood for dislocation.

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Figure 2 Radiograph of intraprostatic dislocation of right dual-mobility implant total hip replacement. The polyethylene component can be seen adjacent to the ball component.

OUTCOME AND FOLLOW-UP

Patient was seen by physiotherapists post surgery and was mobilising well. She had a slight ataxic gait on initial mobility secondary to history of hypermobility of her hips, knees and ankles. She gained confidence on day two and was mobilising with ease on the ward prior to discharge. Patient will be reviewed in one year's time with a pelvic X-ray.

DISCUSSION

DMIs for THR are designed to allow a greater range of motion of the joint prior to dislocation compared with traditional implants. The implant consists of two articulations, composed of an outer convex polyethylene head with an inner concave surface that accommodates an inner ceramic or metal head. This design reduces the likelihood of dislocation by allowing

Figure 3 Radiograph after closed reduction of right THR. Eccentric articulation of right femoral head with acetabulum compared with centric articulation of left side. Evidence of 'bubble sign' superolateral to THR indicating malposition of polyethylene liner. Missed radiographical diagnosis of implant failure resulting in patient discharge and emergence of complications. THR, total hip replacement.

Figure 4 Radiograph following the removal of failed dual-mobility implant and revision of right total hip replacement.

combined mobility of the inner head on polyethylene articulation and movement at the interface between the polyethylene and the metal shell liner. Furthermore, the large diameter of the polyethylene head creates a greater jump distance to dislocation. Studies have shown lower rates of post-operative implant instability and dislocation in DMIs compared with traditional implants.⁵

Disassociation of DMIs have been characterised in the literature by the appearance of a 'bubble sign' on radiographs indicating malposition of the polyethylene liner in the surrounding tissue.⁶ We have demonstrated evidence of the bubble sign in figure 3 and illustrated the eccentric right femoral head after reduction, compared with the contralateral concentric THR, which provides additional evidence of implant failure.

If there is an intraprostatic dislocation, there is no option for closed reduction as the two components cannot be engaged again. Therefore, if a disassociated intraprostatic dislocation is identified on radiograph, orthopaedic referral should be considered. This patient had a standard closed reduction following missed radiographical diagnosis of implant failure. The patient experienced mechanical symptoms from

Patient's perspective

'I have had recurrent hip dislocations in the past from both my own hip and the implants. I know what it feels like when I dislocate my hips and it is clearly not a comfortable experience. But this time I knew something was different, I had the usual pain but I also had a tingling sensation surrounding my hip. When the doctors in the accident and emergency department forced my hip back into place the pain got lower but the tingling was still there. I thought it would go away but the next day, but I began to hear grinding sounds when I would walk. This was frightening and I was concerned that my hip would give way again. Thankfully when I got sent to hospital for the second time they found out what the problem was and I had surgery to get a new hip. The pain and tingling sensation has now gone and I can return to my life'.

Learning points

- ▶ Emergency physicians should be aware of a potential implant failure after the reduction of a dual-mobility implant, as radiographical signs are subtle.
- ▶ Close study of the radiograph will reveal an eccentric femoral head within the acetabulum and surrounding tissues should be inspected for disassociated implant material.
- ▶ Orthopaedic referral should be made prior to closed reduction upon radiographic diagnosis of intraprosthetic dislocation of a dual-mobility implant.
- ▶ We recommend thorough inspection of post reduction radiographs for all types of total hip replacement to identify potential implant failure.

articulation between the inner ceramic femoral head and the metal liner of the socket. Furthermore, the patient was advised to walk on the hip normally, which resulted in irretrievable damage done to the metal socket by the ceramic head, which were in direct contact with each other due to extrusion of the polyethylene component.

Contributors NMN: substantial contributions to the conception or design of the work, or the acquisition, analysis or interpretation of data. NP: drafting the work or revising it critically for important intellectual content and also formally undertook

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