CASE REPORT

Painful hemiarthroplasty due to acetabular erosion

A NEW TECHNIQUE OF TREATMENT

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We describe a technique to salvage a painful hemiarthroplasty due to erosion of the acetabular cartilage in the absence of loosening of the femoral component. A press-fit metallic acetabular component which matched the femoral component was used as a metal-on-metal articulation. The procedure offered a shorter operation time with less blood loss and no risk of femoral fracture as might have occurred during conventional revision to a total hip replacement. The patient made an unremarkable recovery with a good outcome at follow-up of 15 months.

Cemented or uncemented hemiarthroplasty is one of the most common operations performed for fracture of the neck of femur in elderly patients. However, with time and restoration of mobility some patients may experience progressive pain in the groin. Erosion of acetabular cartilage by the hemiarthroplasty is recognised as a cause for this symptom.\(^1\) The appearance of these symptoms is dependent on the level of activity of the patient and the length of follow-up.\(^1\) The clinical situation is likely to be accompanied by radiological signs of acetabular erosion and medial migration of the prosthesis. Commonly, treatment for this complication is revision to some form of total hip replacement (THR). However, for an elderly frail patient this can be a major undertaking, which might involve extensive exposure, prolonged operating time and bleeding, difficulty in removal of the component, and risk complications, including infection and iatrogenic fracture.

We report a new technique in which removal of the existing hemiarthroplasty is not required.

Case report

A 77-year-old woman had an intracapsular fracture of the neck of femur, which was originally treated by cemented Thompson hemiarthroplasty in another hospital. Prior to the injury she had been very active. About five to six months after operation she developed pain in the groin, initially only after walking but later at rest. On examination she had an antalgic gait, but there was no leg-length discrepancy. Active and passive movements were painful. Her Harris Hip Score (HHS)\(^2\) was 29.1 points. Appropriate investigations excluded the presence of infection and plain radiographs showed no evidence of loosening of the hemiarthroplasty. There was, however superior and medial erosion of the acetabulum (Fig. 1).

She took analgesic and anti-inflammatory medication for about three months without any benefit. The symptoms became more severe and consideration was given to undertaking revision to THR recognising the difficulties of removing a well-fixed cemented hemiarthroplasty.

As an alternative, we thought it might be possible to resurface the acetabulum with a large-diameter metallic component compatible with the hemiarthroplasty. We obtained the manufacturer’s identification labels for the hemiarthroplasty from the originating hospital and established its metallic composition and surface geometry. We found that a press-fit resurfacing acetabular component from the Conserve Plus metal-on-metal resurfacing arthroplasty (Wright Medical UK Ltd, Chester, United Kingdom) made of high-carbon cobalt-chrome alloy would be compatible with the prosthetic head, in terms of both composition and surface geometry. We found that a press-fit resurfacing acetabular component from the Conserve Plus metal-on-metal resurfacing arthroplasty (Wright Medical UK Ltd, Chester, United Kingdom) made of high-carbon cobalt-chrome alloy would be compatible with the prosthetic head, in terms of both composition and surface geometry. We found that a press-fit resurfacing acetabular component from the Conserve Plus metal-on-metal resurfacing arthroplasty (Wright Medical UK Ltd, Chester, United Kingdom) made of high-carbon cobalt-chrome alloy would be compatible with the prosthetic head, in terms of both composition and surface geometry.

These two options for revision were discussed with the patient, with an explanation that our proposed resurfacing technique was new and had no long-term results available, but we considered the technique simple, with less morbidity than revision to THR. She elected to have the acetabulum resurfaced. The operation was performed under general anaesthesia with...
equipment for revision and resurfacing arthroplasty available. We used a Hardinge approach through the previous wound. The hemiarthroplasty was dislocated and examined for any evidence of loosening or breakage of the cement mantle. The size of the Thompson hemiarthroplasty had been recorded as 48 mm in the previous operation note, and this was confirmed per-operatively. There was erosion of superior acetabular cartilage with exposure of underlying bone.

The metallic acetabular component selected had an outer diameter of 54 mm and an inner articulating diameter of 48 mm. The acetabulum was reamed and a trial component was inserted; reduction was obtained and congruency was noted in all directions of movement. After a thorough pulsed-lavage of the wound the definitive component was introduced. The hip was reduced and stability, range of movement and absence of impingement were confirmed. The operating time was 68 minutes and produced 400 ml of blood loss, for which there was no need for transfusion. The patient recovered uneventfully, was mobilised fully weight-bearing under the direction of a physiotherapist, and was discharged on the eighth day after operation. The post-operative radiographs confirmed the satisfactory position of the components (Fig. 2).

At the six-week review she reported almost complete relief from pain and she did not require a walking aid. At the time of final review at 15 months she remains free of symptoms with an HHS of 88.

**Discussion**

Persistent pain after implanting a hemiarthroplasty in the management of intracapsular fracture of the femoral neck is common and may be due to infection, acetabular erosion, aseptic loosening and impingement. For uncemented prostheses, inadequate calcar seating, inappropriate choice of head size, subsidence and rotational instability of the prosthesis may also cause pain. Capsular impingement against the inner bearing of the acetabular component has been described as a source of pain following bipolar hip arthroplasty; it was completely relieved after capsular excision.

Erosion of the acetabular cartilage might result from direct injury during the original incident, excessive pressure on the cartilage due to lengthening of the leg, local stress concentration due to a mismatch between the acetabulum and the prosthetic head diameters, as well as penetrative wear of the hard metallic head against soft articular acetabular cartilage. Degeneration of the articular cartilage has been correlated to the length of time since the hemiarthroplasty. In animal studies, the majority of the cartilage has been lost by 24 weeks after hemiarthroplasty, although intense subchondral activity has been identified.

Elsewhere, a review of 69 patients treated with primary cemented Thompson hemiarthroplasty for fractured neck of femur concluded that the factors predisposing to acetabular erosion were the level of physical activity and the length of follow-up.

Bipolar arthroplasty has been advocated for the treatment of fracture of the neck of femur in active patients, with favourable results reported by some authors. However, others have failed to show any advantage of bipolar over unipolar components. The use of ceramic headed prostheses has been reported, with little evidence of acetabular erosion in the long-term, but others have contradicted these findings.
Revision of a failed hemiarthroplasty to a THR is a major undertaking in an elderly patient, who may have extensive co-morbidities. The revision rate is higher for younger patients, those who lived independently prior to injury and those with good mobility and mental function.

A modified Thompson prosthesis and a one-piece cobalt-chrome acetabular combination was first described for THR in 1953. The initial results were compromised by impingement of the neck of the femoral component on the acetabular component, causing subluxation, and also by the poor metallic composition of the components. The improved design of the current acetabular components from the metal-on-metal resurfacing technique encouraged us to undertake resurfacing of the acetabulum in our patient. The acetabular component which we used did not have any rim flare, so there was no possibility of impingement. This was confirmed intra-operatively by taking the limb through a full range of movement. As the existing femoral component did not require extraction the risks associated with cement removal were avoided.

We believe this technique to treat a painful cemented hemiarthroplasty in the absence of infection or loosening can be an effective alternative to the standard treatment of revision to a THR.

We have no long-term follow-up information and recognised the importance of properly informed consent and careful subsequent surveillance.

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References