Bipolar hemiarthroplasty of the hip joint has been used for the treatment of femoral neck fractures and osteonecrosis of the femoral head.\textsuperscript{1,2} This prosthesis originally was believed to decrease shear stress on the acetabular cartilage, resulting in decreased migration.\textsuperscript{3,4} However, osteolysis of the acetabulum and migration of the head have been reported after bipolar hemiarthroplasty.\textsuperscript{5-7}

This article reports a case of severe proximal migration of a bipolar prosthesis into the innominate bone following revision hip arthroplasty.

**CASE REPORT**

In 1977, a 27-year-old man had a traffic accident and was transferred to an emergency hospital for emergency surgery because of liver and kidney damage. One week later, open reduction was performed for dislocation of the right hip joint.

The following year, the patient experienced acute onset of pain in the right hip after a misstep. Osteonecrosis of the femoral head was verified, and a Moore unipolar prosthesis (Stryker, Limerick, Ireland) was implanted.

Five years later, in 1983, revision surgery with a Lord bipolar prosthesis (Stryker, Saint Clar, France) became necessary because of loosening and migration (Figure 1). One year after the revision surgery, the patient reported pain while walking, and slight proximal migration of the prosthesis was noted. The migration was progressing, but the patient refused re-revision surgery.

Seventeen years later in 2000, the patient returned with severe hip pain and was unable to walk without crutches. The right lower limb demonstrated a shortening of 4.5 cm, and range of motion of the right hip was 20° to 70°. The modified Harris hip score was 35. The C-reactive protein was normal, and sedimentation rate was 36. Yellow joint fluid was aseptic.

An anteroposterior radiograph demonstrated advanced proximal migration of the head of the Lord bipolar prosthesis and osteolytic lesions in the secondary acetabulum (Figure 2). The migration of the prosthetic head was 45 mm. There was no radiographic evidence of loosening of the femoral stem. Computer tomography showed protrusion of the head into the innominate bone (Figure 3).

Because of severe bone loss and significant shortening, a two-stage procedure was planned. During the first stage, thick fibrous tissue was removed from around the bipolar prosthesis and the head and femoral stem were removed. The femoral stem was rigidly fixed and difficult to remove; therefore, an osteotomy of the femur was required. Breakage of the head and polyethylene liner were observed.

There was an extensive pseudomembrane within the acetabulum and the large bone cavity in the innominate bone. The cavity was packed with equal amounts of allograft and autogenous morselized bone and hydroxyapatite. Postoperatively, the patient was placed in traction for 2 weeks.

During the second stage, re-revision was performed using a cemented polyethylene cup (Depuy, Leeds, United Kingdom) and Hackstep hip system (Aesculup, Sheffield, United Kingdom).
United Kingdom) with structural bone allografts (Figure 4). Gram’s stains and cultures taken at both operations were negative. Histologic analysis of the granulomatous tissue showed numerous macrophages and polynuclear giant cells containing abundant particles with no polymorphonuclear cells.

Standing and assisted walking with partial weight bearing were permitted 1 month postoperatively. One year after the re-revision procedure, Harris hip score improved to 75 and the patient was able to walk with a cane without pain.

DISCUSSION

High rates of acetabular migration have been reported with unipolar hemiarthroplasty. Therefore, the bipolar prosthesis was designed to reduce shear stress and decrease the incidence of acetabular protrusion. However, significant migration of the head of the bipolar prosthesis has been reported. In our case, a 45-mm proximal migration of the head of prosthetic into the innominate bone was observed after revision surgery of the bipolar prosthesis.

Several factors including osteolysis, infection, cup design, and bone quality may singularly or in combination result in migration of the outer head of a bipolar prosthesis. In the present case, osteolysis may have been caused by a foreign-body reaction to polyethylene debris. The findings in the present case also suggest other causes such as biomechanical factors correlate with severe migration of the prosthesis as well as biological factors such as osteolysis.

Although complete information regarding the initial injury was not available, a certain degree of fragility of the acetabulum may have affected the rapid migration of the prosthesis in our patient. Moreover, the patient did not use crutches or undergo re-revision surgery at an early stage, thus resulting in stiffness of the hip and shortening of the limb because of proximal migration of the prosthesis. This led to the severe loss of acetabular bone stock, which resulted in increased technical difficulty of the re-revision arthroplasty. Two-stage reconstruction surgery was performed to prevent nerve complications. Our case suggests appropriate timing of revision surgery for migration of the prosthesis is essential.

For severe bone deficiency, several techniques including the use of a custom-made prosthesis and bone grafting have been reported. In the present case, autogenous and allograft bone and hydroxypatite were used for severe deficiency of the acetabulum. As we were unable to obtain sufficient allograft in Japan, hydroxypatite was used to fill defects of the acetabulum. Long-term follow-up of this case is required for clinical results of revision surgery using combined autogenous bone, allograft, and hydroxyapatite are rarely seen.

REFERENCES