

# Results of Conversion Total Hip Prosthesis Performed Following Painful Hemiarthroplasty

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Fifteen of 18 cases who underwent conversion total hip prosthesis due to painful hemiarthroplasty, between 1992 and 1997, were investigated retrospectively. The 13 (86.6%) women and two (13.4%) men (mean age, 59 years) were followed up for an average of 32 months. Pre-operative and post-operative Harris hip scores were 36.4 (28 – 42) and 85.9 (69 – 98), respectively. In all cases the femoral component had more than 2 mm radiolucency in Gruen zones I, IV and VII, and five cases had acetabular protrusion; other cases had cartilage erosion. In the last follow-up of conversion total hip prosthesis, there was no radiolucency in either femoral or acetabular components. Comparing our results of conversion total hip prosthesis with primary total hip prosthesis results for femoral neck fractures in the literature we conclude that, in elderly patients with femoral neck fractures, primary total hip prosthesis has better results.

KEY WORDS: HEMIARTHROPLASTY; CONVERSION TOTAL HIP PROSTHESIS; FEMORAL NECK FRACTURE

## ***I***NTRODUCTION

Hemiarthroplasty is a conservative operation in intracapsular displaced femoral neck fractures, especially in elderly patients, as only one site of joint is replaced, preserving bone stock in case of a possible future need

for total hip prosthesis. The effects of hemiarthroplasty on the long-term results of conversion total hip prosthesis are not clear.<sup>1</sup>

The revision rate following hemiarthroplasty, in the treatment of femoral

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neck fractures, has been reported as 10 – 19% after 3 years of follow-up and 16 – 26% after 7 years of follow-up.<sup>2 – 7</sup> Following hemiarthroplasty, pain, loss of function, loosening and infection are the most common reasons for conversion total hip prosthesis.<sup>1,8–10</sup> While Dupont and Charnley<sup>11</sup> reported 96% successful results following conversion total hip prosthesis, Amstutz and Smith<sup>12</sup> and Stambough *et al.*<sup>13</sup> reported 15% revision rate. Llinas *et al.*<sup>1</sup> reported that the acetabular components of converted hemiarthroplasties were at a lower risk of developing radiolucent lines ( $P > 0.01$ ) when compared with primary total hip prosthesis.<sup>1</sup> In contrast, the femoral components of patients in this group were at a significantly higher risk of loosening compared with primary total hip prosthesis ( $P < 0.001$ ).<sup>1</sup>

Although Delamarter and Moreland<sup>9</sup> reported that they did not have any revision of primary total hip prosthesis in 27 femoral neck fractures in 3.8 years of follow-up, other authors reported revision rates of 4 – 42%.<sup>8,10,14</sup>

In this retrospective study, we aimed to assess the results of conversion total hip prosthesis performed in 15 patients with painful hemiarthroplasty.

## PATIENTS AND METHODS

Total hip prosthesis without cement was performed on 18 patients because of pain following hemiarthroplasty between 1992 and 1997. Of these, 15 patients were included in this study, 13 women (86.6%) and two men (13.4%), with a mean age of 59 years (range 30 – 75 years), and the average follow-up period was 32 months (range, 12 – 54 months). Clinical assessment of the patients was done according to the Harris hip rating system both pre- and post-operatively.<sup>15</sup> In radiological work up, radiolucent lines in the femoral component

were evaluated according to Gruen zones,<sup>16</sup> and in acetabular components, according to DeLee and Charnley.<sup>17</sup> The assessment of acetabular erosion and protrusion was done according to Ranawat *et al.*<sup>18</sup>

Low-molecular-weight heparin (dalteparin sodium subcutaneously 5000 U once daily) was used for prophylaxis of thromboembolic disease. For antibiotic prophylaxis IV cephazolin sodium 50 mg/kg was given after tissue culture was taken intra-operatively, and was continued for 2 – 3 days depending on the culture results.

A lateral approach was used in 13 cases (86.6%) and a transfemoral approach was taken in two cases (13.4%). Cancellous allograft was used for the bone defects in the femur and acetabulum.

## RESULTS

The time interval between hemiarthroplasty and conversion total hip prosthesis was 7.3 years on average (range, 10 months – 12 years). Pain was the leading sign in all patients. The mean follow-up period after conversion total hip prosthesis was 32 months (range, 12 – 54 months).

The average Harris hip score was 36.4 (28 – 42) pre-operatively and 85.9 (69 – 89) at the final post-operative control.

From the radiological examination it was determined that all the femoral components had more than 2 mm radiolucent lines in Gruen zones I, IV and VII. Assessment of the acetabulum revealed protrusion in five cases and some degree of cartilage erosion in the remainder, which was also detected during surgery (Fig. 1). In the last follow-up controls of conversion total hip prosthesis there were no radiolucent lines in either acetabular or femoral components (Fig. 2).

Of the intra-operative tissue cultures, two patients (13.4%) grew *Staphylococcus aureus*, and one (6.6%) grew *S. epidermitis*.

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Antibiotic therapy was adjusted according to antibiotic sensitivities and was given by the parenteral route for 3 weeks and continued orally for a further 3 weeks. None of the patients developed deep infection during the follow-up period. Bone defects were detected during the operation in the femur in 10 patients (66.6%), in the acetabulum in four patients (26.6%), and in both the acetabulum and the femur in one patient (6.6%), and cancellous allografts were used for coverage of these defects.

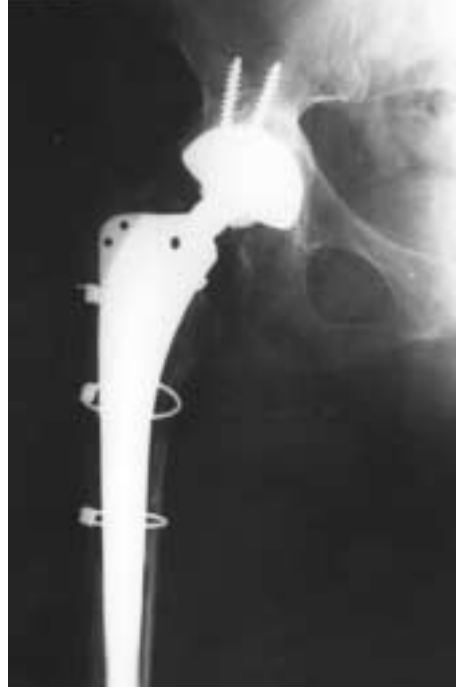
Complications were a superficial wound infection, which responded to antibiotic

FIGURE 1



**Radiograph of the femur of a 60-year-old woman 4 years after hemiarthroplasty, with protrusion and radiolucency between cement mantle and femoral cortex.**

FIGURE 2



**Post-operative radiograph of the femur of the same woman (as in Fig.1) 3 years after conversion total hip replacement with a transfemoral approach.**

treatment, in one patient, and a fissure in the trochanteric region, which was easily remedied with wire fixation, in another patient.

## DISCUSSION

There are a number of controversies concerning methods for the treatment of displaced fractures of the femoral neck in the elderly. Hemiarthroplasty is a conservative operation in intracapsular displaced femoral neck fractures, used particularly in elderly patients, as only one site of joint is replaced, preserving bone stock in case of a possible future need for

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total hip prosthesis.<sup>1,19,20</sup> Conversion total hip prosthesis is indicated after hemiarthroplasty to relieve pain, which may be due to loosening, acetabular cartilage erosion, protrusion, or infection, and to improve function.<sup>1,2,8,12,20</sup> D'Arcy and Devas<sup>7</sup> reported these problems in 26% of their patients with hemiarthroplasty. Holmberg *et al.*<sup>6</sup> and Swiontkowski<sup>21</sup> reported 16% and 20% revision rates, respectively, during 7 years of follow-up after hemiarthroplasty. The problems we observed in the painful hemiarthroplasty cases in our series and the time interval between hemiarthroplasty and conversion total hip prosthesis correlated well with the above-mentioned previous reports.

Following hemiarthroplasty, earlier revisions due to the above-mentioned problems are also reported in the literature. Sikorski and Barrington<sup>3</sup> reported a 19% revision rate after 2.5 years follow-up and Johnston *et al.*<sup>5</sup> reported 16.7% revision after 2 years follow-up. Kofodh and Kofod<sup>22</sup> reported 37% revision, due to acetabular erosions in 106 femoral neck fractures, in a 2-year follow-up period.

The results of conversion total hip prosthesis are not clear from the literature since they are related to the type of primary surgery. Amstutz and Smith<sup>12</sup> and Stambough *et al.*<sup>13</sup> reported a 15% revision rate in a 3-year follow-up of 42

cases and a 6-year follow up of 32 cases, respectively. In our series with a mean follow-up period of 36 months we did not have any revisions and the mean Harris hip score was 85.9. We did not detect any radiolucent lines, which may be the result of the brevity of the follow-up period and of implantation of the prosthesis with proper grafting of the bone defects without using cement.

Promising results have been reported following the use of total hip replacement for displaced femoral neck fracture.<sup>8 - 10,14</sup> Greenough and Jones<sup>10</sup> reported a mean Harris hip score of 81 after primary total hip replacement but found a 42% revision rate over a 5-year follow-up period. Delamarter and Moreland<sup>9</sup> reported excellent results without any revision in their 27-case study. Taine and Armour<sup>14</sup> found a 4% revision rate, during a 4-year follow-up period, in a series of 163 patients with primary replacement.

It is not easy to choose between hemiarthroplasty and total hip prosthesis for the treatment of displaced fracture of the femoral neck. Taking into account the reported results of hemiarthroplasty, conversion total hip prosthesis and primary total hip prosthesis, we conclude that in selected patients, primary total hip prosthesis results in better long-term success.

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