# The Fate of the Acetabulum after Hip Hemiarthroplasty for Tumor

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## INTRODUCTION:

The proximal femur is one of the most common locations of disease for both primary bone tumors and metastatic disease to the extremities. While endoprosthetic reconstruction has been shown to be more durable than intramedullary nailing and open reduction and internal fixation, there remains no consensus on the use of hemiarthroplasty vs total hip arthroplasty in this patient population. Hemiarthroplasty is generally associated with shorter surgical time and lower dislocation rate than total hip arthroplasty, but comes with a risk of secondary acetabular erosion necessitating conversion to total hip arthroplasty in the future. The goal of this study is to evaluate the rates of acetabular wear and conversion to total hip arthroplasty in patients who underwent hip hemiarthroplasty for metastatic or primary bone lesions of the proximal femur.

### METHODS:

We performed a retrospective review of all patients who underwent hip hemiarthroplasty for primary bone tumors or metastatic disease in the proximal femur between January 2000 and December 2021. Patients with solely traumatic fractures (no tumor on final pathology) and benign lesions were excluded. Acetabular wear on the final follow up radiographs was measured using the Baker Criteria, which classified wear into the following groups: no wear (Grade 0), articular cartilage thinning without bone erosion (Grade 1), bony erosion (Grade 2), and acetabular protrusio (Grade 3). A competing risks analysis was performed using death as a competing event to determine the cumulative incidence of conversion to total hip arthroplasty over time. Univariable and multivariable cause-specific Cox proportional hazards models were used to analyze risk factors for conversion.

#### **RESULTS:**

A total of 913 patients who underwent 943 hip hemiarthroplasty operations were identified. 854 (90.6%) of these procedures were for metastatic disease, and 89 (9.4%) were for primary bone lesions. Of the 943 hip hemiarthroplasty operations, 735 (78%) had Grade 0 wear, 175 (19%) had Grade 1 wear, 24 (2.5%) had Grade 2, and 9 (1.0%) had Grade 3 wear at final follow up (Table 1). Overall survival [95% CI] was 42% [39%, 46%] and 14% [12%, 17%] at one and five years respectively for the metastatic cohort, and 82% [74%, 90%] and 52% [42%, 64%] at one and five years respectively for the primary bone tumor cohort (Figure 1).

A total of 19 patients underwent conversion to total hip arthroplasty. When accounting for death as a competing event, the cumulative incidence of conversion to total hip arthroplasty was 3.2% [1.9%, 5.0%] 15 years after surgery (Figure 2). In univariable analysis, the diagnosis of a primary bone tumor (HR 3.75, CI [1.44, 9.76], p = 0.007) and younger age (HR 0.97, CI [0.95, 1.00], p = 0.028) were associated with increased risk of conversion to total hip arthroplasty, although neither variable remained significant on multivariable regression analysis adjusting for fracture and implant type.

# DISCUSSION AND CONCLUSION:

Most patients undergoing hip hemiarthroplasty for oncologic indications do not survive long enough to develop symptomatic acetabular wear. The low conversion rate (3.2% at 15 years in our cohort) to total hip arthroplasty supports the use of hip hemiarthroplasty in the vast majority of patients. Further studies to evaluate functional differences between hip hemiarthroplasty and total hip arthroplasty may provide further insight on if/which patients may benefit from total hip arthroplasty.





#### Table 1

Characteristic	Overall, N = 943 <sup>1</sup>	Converted to THA, N = 19
Wear Grade		
Grade 0	735	4 (0.5%)
Grade 1	175	5 (2.9%)
Grade 2	24	7 (29%)
Grade 3	9	3 (33%)
<sup>1</sup> n (%)		