Periprosthetic Acetabular Fracture in Over 25,000 Uncemented Acetabular Components: 20-Year Survivorship

Niall Hayward Cochrane, Nicholas Bedard, Charles Patrick Hannon, David G Lewallen, Daniel J Berry, Matthew Philip Abdel

INTRODUCTION: Periprosthetic acetabular fractures may occur intraoperatively or postoperatively in total hip arthroplasty (THA). The purpose of this study was to evaluate the incidence, risk factors, management technique, and implant survivorship related to periprosthetic acetabular fracture during and after primary THA in the largest series with the most extended follow-up.

METHODS: We identified 113 periprosthetic acetabular fractures in 25,855 primary THAs with uncemented acetabular components performed from 2000-2022 at a single academic institution. Osteoarthritis (68%) was the most common indication for THA. Mean age was 68 years, mean BMI was 28 kg/m^2, and 76% were women. Mean follow-up was 6 years.

RESULTS: The incidence of intraoperative acetabular fracture was 0.2%. The 20-year cumulative probability of postoperative acetabular fracture was 0.4%. Periprosthetic acetabular fractures were more common in females, and patients with osteoporosis ($p<0.01$). Intraoperative fracture occurred most during cup impaction (93%). Index treatment of intraoperative fractures included supplemental screws with or without bone grafting (n=36), intraoperative cup revision (n=11), supplemental internal fixation (n=4), and augments or cup-cage construct (n=2). Index treatment of post-operative fractures included protected or full-weight bearing with serial radiographs (n=57), internal fixation (n=1), and cup revision (n=1). The 20-year survivorship free of any revision and free of acetabular component revision after index treatment for periprosthetic acetabular fracture were both 91%. In total, 8 acetabular components underwent subsequent revision, with aseptic loosening (n=4) and dislocation (n=2) as the most common surgical indications. Both column acetabular fractures (n=4) were the most common morphology in subsequently revised acetabular components.

DISCUSSION AND CONCLUSION: Periprosthetic acetabular fractures during and after primary THA are rare (0.2% intraoperatively and 20-year postoperative cumulative probability of 0.4%). Females and osteoporosis are risk factors. Survivorship free of any acetabular component revision after index treatment was 91% at 20 years. Both column acetabular fractures portended a higher risk of failure.