Risk Factors for Delayed Conversion to Total Hip Arthroplasty After Femoral Head Fracture: A Multicenter Review

Anastasia Hunt, MD*; Henry Wong, MS; Jayme Koltsov, PhD; Lawrence H. Goodnough, MD, PhD; Julius A. Bishop, MD; Michael J. Gardner, MD; North American Femoral Head Fracture Consortium*

Purpose: Our objective was to determine the risk factors associated with delayed conversion to total hip arthroplasty (THA) in patients with femoral head fracture (FHF).

Methods: A retrospective review of adults age 18 to 60 years who sustained FHFs (AO/OTA Classification 31C) between 2005 and 2023 was performed across 32 ACS Level I trauma centers. Patients with less than 3 months of follow up were excluded. Patient demographics, injury characteristics, treatment, and complications data were collected. Patients were grouped based on whether or not they underwent delayed THA. Descriptive statistics were presented as means and standard deviations for continuous variables and counts and percentages for categorical variables. Uni- and multivariable mixed-effect models evaluated the relationship among patient factors, treatment, and postoperative clinical course.

Results: Within the study period, 711 patients with FHF (37 ± 11 years, 30.3% female) were identified. Of those identified, 156 (21.9%) underwent delayed THA. Patients undergoing delayed THA were older (mean age 41 vs 35, $p<0.001$), heavier (body mass index [BMI] 32.1 vs 29.1, $p = 0.002$), and underwent unplanned procedures (15.3% vs 7.1%, $p = 0.006$). Avascular necrosis (AVN) and post-traumatic osteoarthritis (PTOA) developed at higher rates (45.5% vs 11.6%, $p<0.001$; 53.2% vs 7.9%, $p<0.001$, respectively). After risk adjustment, older age ($p<0.001$) and increased BMI ($p = 0.003$) remained associated with delayed THA. Odds of conversion to THA increased 4.8-fold if AVN developed (95% CI: 1.7–13.0; $p = 0.002$) and 8.4-fold (95% CI: 3.4–20.5; $p<0.001$) if PTOA developed. Having an unplanned procedure was not statistically significant in multivariate models. Pipkin classification, surgical approach, fixation of the femoral head, and excision of the labrum, femoral head fragments, or a foreign body (e.g., bullet) were not associated with undergoing delayed THA.

Conclusion: FHFs are rare, devastating injuries with high rates of conversion to THA. Conversion is more likely in older, heavier patients in whom AVN or PTOA develop. During the index treatment, patients sustaining an FHF should be counseled appropriately about their risk of conversion to THA, so that early shared decision-making between the patient and the surgeon can occur.