

Heterotopic Ossification Following Arthroplasty for Femoral Neck Fracture

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Purpose: Heterotopic ossification (HO) is a potential complication following surgery or trauma to the hip. HO, if severe, can be a significant source of pain while also impairing patient function and ability to complete rehabilitation following hip surgery. The extent of HO formation is graded using the Brooker classification (Class I-IV), where severity increases with class. Using data from a trial of 1441 femoral neck fracture patients aged ≥ 50 years who were treated with total hip arthroplasty (THA) or hemiarthroplasty (HA), we aimed to: (1) determine incidence of HO in this population, (2) identify whether HO is associated with an increased risk of revision surgery within 24 months of fracture, and (3) identify factors associated with developing HO within 24 months of fracture.

Methods: We performed a multivariable Cox regression using revision surgery within 24 months of hip fracture as the dependent variable and HO as the independent variable. The analysis was adjusted for age, pre-fracture functional status, ASA (American Society of Anesthesiologists) Class, and type of arthroplasty. We also performed a multivariable interval-censored Cox regression with HO within 24 months of the hip fracture as the dependent variable. 25 plausible prognostic factors (26 parameters) were included as independent variables. Results were reported as hazard ratios (HRs), 95% confidence intervals (CIs), and associated P values.

Results: 287/1441 participants (19.9%) developed HO within 24 months of a femoral neck fracture treated with THA or HA. At the 24-month follow-up visit, 58 (20.2%) and 5 (1.7%) participants had clinically relevant HO with a Brooker classification of III and IV, respectively. 224 participants had HO with a Brooker classification of I (55, 19.2%) and II (169, 58.9%). HO was not associated with the need for revision surgery. Being male (HR 1.46, 95% CI 1.13-1.89; $P = 0.003$), African American (HR 3.73, 1.55-8.95; $P = 0.003$), being treated with a laterally based surgical approach (HR 2.91 vs posteriorly based approach, 2.04-4.16; $P < 0.001$), non-use of NSAIDs (nonsteroidal anti-inflammatory drugs) after arthroplasty (HR 2.13, 1.35-3.33; $P = 0.001$), and having an early fracture-related complication (HR 1.47, 1.03-2.10; $P = 0.03$) were found to be associated with a higher risk of developing HO within 24 months of fracture. Longer length of operation (HR 0.94 for every 10-minute increase, 0.90-0.99; $P = 0.02$) was associated with a reduced risk of developing HO within 24 months of fracture.

Conclusion: Identifying factors associated with HO may help optimize the care of hip fracture patients. Understanding which patients are at risk for developing HO following arthroplasty can allow surgeons to communicate these risks to patients. Future trials focused on investigating HO prophylaxis should consider our results in planning stratification or subgroup analysis.