Deep Infection After Hip Hemiarthroplasty: Risk Factors and Outcomes After DAIR

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Purpose: Deep surgical site infection (SSI) remains an unsolved problem after hip hemiarthroplasty. Debridement, antibiotic, and implant retention (DAIR) has become a mainstream treatment in elective total joint infection. Evidence for DAIR after infected hip hemiarthroplaty is lacking.

Methods: Patients who underwent a hip hemiarthroplasty at our institution between March 2007 and August 2018 were identified. Case notes, microbiology reports, and radiographs were reviewed up to 1 year post-surgery. SSI was diagnosed using the Centers for Disease Control and Prevention criteria. Multivariable logistic regression was performed to risk factors for SSI and to identify patient characteristics predicting a successful DAIR. The primary outcome for a successful DAIR was a functioning implant in a living patient at 1 year post-surgery.

Results: 3966 patients underwent a hip hemiarthroplasty during the study period. The overall rate of SSI within the cohort was 1.7%; 52 patients (1.3%) were diagnosed with a deep infection, while 17 (0.4%) were treated for a superficial wound infection. 50 underwent revision surgery for deep infection (43 underwent DAIR, 7 excision arthroplasty, and 2 died before surgery). After adjustment for other variables, only concurrent urinary tract infection (odds ratio [OR] 2.78, 95% confidence interval [CI] 1.57 to 4.92, $P<0.001$) and increasing delay to theater post-fracture (OR 1.31 per day, 95% CI 1.12 to 1.52, $P = 0.01$) were predictors of developing an SSI, while a cemented arthroplasty was protective (OR 0.54, 95% CI 0.31 to 0.96, $P = 0.031$). 43 underwent a planned DAIR as their first surgery for infection, of whom 9 patients (20.9%) were alive at 1 year with a functioning hemiarthroplasty. Most patients required multiple surgical debridements. 18 were converted to an excision arthroplasty due to persistent infection, with 6 alive at 1 year. Of these patients, 3 underwent eventual reimplantation of a prosthesis (2 total hip replacement [THR], 1 hemiarthroplasty). 7 patients underwent a removal of their prosthesis as their initial treatment; 2 (28.7%) were alive at 1 year compared to 34.9% of patients after a DAIR. The causative organism appeared to influence success of DAIR; no cases of DAIR were successful with methicillin-resistant Staphlycoccus aureus (MRSA) or Pseudomonas infection. The presence of any gram-negative organism reduced rates of success to 12.5%. Favorable organisms included Citrobacter, Proteus, and Cornybacterium; all had success rates of 60% to 100%. We were unable to identify a statistically significant patient factor influencing success of DAIR.

Conclusion: Preventing SSI remains a vital requirement in hip fracture care. Treating concurent urinary tract infections and avoiding delays to theater may reduce deep SSI. Deep infection after hip hemiarthroplasty is a devastating complication, with high mortality, regardless of the treatment strategy employed. Success rate of DAIR is poor compared to elective THR and should be reserved for favorable organisms and in patients felt to be able to tolerate multiple surgeries.