Cementless Femoral Stem Brand and Aseptic Revision Risk following Hemiarthroplasty Treatment of Geriatric Hip Fracture

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INTRODUCTION: Existing literature supports the use of cemented hemiarthroplasty for treatment of geriatric displaced femoral neck fractures due to a lower aseptic revision risk. Nevertheless, surgeons utilize cementless femoral stems for geriatric patients because they are associated with shorter operative times and lower complexity. There may also be lower cardiovascular risks and perioperative mortality in select patients. We sought to evaluate differences in all-cause revision risk among cementless femoral stem implants used within a US-based healthcare system for displaced femoral neck fractures treated with hemiarthroplasty.

METHODS: A cohort study was conducted using data from a US healthcare system's hip fracture registry. A total of 5,676 patients aged ≥60 years who underwent cementless hemiarthroplasty treatment of a displaced femoral neck fracture between 2009-2021 were identified. Stems that were used in at least 300 hemiarthroplasty procedures were included as treatment groups; other stems were excluded. Seven stems were compared including 4 by DePuy Synthes (Corail, Summit, Summit Basic, and Trilock) and 3 by Zimmer-Biomet (M/L Taper, Trabecular Metal, and Versys LD/FX). Multivariable Cox proportional hazard regression was used to evaluate the risk for aseptic revision with adjustment for confounders, including age, gender, ASA classification, medical comorbidities, time from admission to surgery, and surgeon annual hemiarthroplasty volume. Operating surgeon was also included in regression models to address clustering of procedures performed by the same surgeon. Summit was used as the reference group in all models. Hazard ratios (HR) and 95% confidence intervals (CI) are presented, a p <0.05 was considered statistically significant.

RESULTS: Mean age and BMI for the cohort was 80.8 years (standard deviation [SD]=8.7) and 24.2 kg/m2 (SD=4.6), respectively. Most of the cohort was female (65.8%) and Caucasian ethnicity (79.1%). The final sample included 653 Corail, 402 M/L Taper, 1,699 Summit, 1,590 Summit Basic, 384 Tri-lock, 637 Trabecular Metal, and 311 Versys LD/FX. In adjusted analysis, Summit Basic (HR=1.91, 95% CI=1.34-2.72, p<0.001), M/L Taper (HR=1.91, 95% CI=1.15-3.15, p-0.012), and Versys LD/FX (HR=2.12, 95% CI=1.25-3.61, p=0.005) had higher aseptic revision risks during follow up when compared to Summit. No differences were observed for Corail (HR=0.57, 95% CI=0.29-1.10, p=0.094), Tri-lock (HR=1.13, 95% CI=0.62-2.07, p=0.680), or Trabecular Metal (HR=1.14, 95% CI=0.69-1.89, p=0.610) compared to Summit.

DISCUSSION AND CONCLUSION: In a cohort of 5,676 cementless hemiarthroplasties, we found differences in aseptic revision risks among different femoral stem brands. Surgeons should consider differences in femoral stem brand performance when selecting cementless stems for hemiarthroplasty treatment of geriatric femoral neck fractures.

Figure.