

Is the Use of Bipolar Hemiarthroplasty Over Monopolar Hemiarthroplasty Justified? A Propensity Score-Weighted Analysis of a Multicenter Randomized Controlled Trial

*Marianne Comeau-Gauthier, MD; Sofia Bzovsky, MSc; Mohit Bhandari, MD, PhD; Daniel Axelrod, MD; Rudolf W. Poolman, MD, PhD; Frede Frihagen, MD, PhD; Sheila Sprague, PhD; Emil H. Schemitsch, MD; HEALTH Investigators
McMaster University, Hamilton, ON, Canada*

Purpose: The theoretical advantages of bipolar over unipolar hemiarthroplasty (HA) have yet to be demonstrated in clinical studies, and thus far, have not justified the higher initial cost associated with bipolar HA. Using data from another trial, we sought to determine if a difference exists between monopolar and bipolar HA using modern implants.

Methods: We compared the Western Ontario and McMaster University Arthritis Index (WOMAC) scores and Short Form (SF-12) component scores between participants with unipolar and bipolar HA at 24 months postoperatively. An inverse probability treatment weighting model was performed to calculate the propensity score and generate a weighted cohort for each functional outcome measure. The following variables were controlled for in each comparison group: age, sex, body mass index, American Society of Anesthesiologists classification (I-II versus III-IV), depression, prefracture living status, prefracture ambulatory status, surgical approach, type of femoral stem (cemented versus press-fit), and preinjury health-related quality of life score. We included the propensity score weights as an adjustment variable. A subgroup analysis was performed, including only those participants aged 70 years and younger.

Results: Of 746 HAs performed in the trial, 404 were bipolar prostheses and 342 were unipolar prostheses. After propensity score weighting, adequate balance between the bipolar and unipolar groups was obtained as shown by standardized mean differences less than 0.1 for each of the covariates. 24 months after HA, the overall WOMAC score and its subcomponents showed no statistically significant difference between the unipolar and bipolar groups. Similarly, no statistically significant difference was found in the physical component summary and mental component summary scores of the SF-12 questionnaire. In participants aged 70 years and younger, no differences were found in any of the functional outcomes.

Conclusion: From the results of this study, the use of bipolar HA over unipolar does not provide superior functional outcomes at 24 months postoperatively. The theoretical advantage of reduced acetabular wear with bipolar designs does not appear to influence functional outcomes in the first 2 years postoperatively in this cohort of hip fracture patients.