

Periprosthetic Fractures: A Rising Tide of Total Hip Arthroplasty Failures Noted in the American Joint Replacement Registry (AJRR) and the Role of Cemented Stems in Preventing Them

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INTRODUCTION:

Periprosthetic fractures (PPFx) have been previously noted to represent a common mode of failure for Total Hip Arthroplasty (THA). This failure is commonly seen following cementless fixation and in patients with poor bone stock. Despite this, the use of cemented femoral components seems to be less common. This study utilized the AJRR to evaluate the rate of cement utilization and compare this to the rate of PPFx failures.

METHODS:

All primary cemented THA procedures, ages 65+, from 2012 to 2021 were analyzed. The following variables were added to the study dataset: age, gender, race, region, teaching status, year, Charlson Comorbidity Index (CCI), and institution bed size. Analysis compared fixation types for THA on all-cause linked revision and PPFx. Logistic regression models were used to analyze the odds ratios for all-cause linked revision and PPFx for any follow-up time as well as for 90-day revision. The logistic regression models were also adjusted for the above listed variables.

RESULTS:

During the study period, the rate of cement utilization as a percentage of primary THAs performed and reported to the AJRR increased from 4.43% to 8.27%. The rate of THA failure for PPFx increased from 11.39% to 33.33%. When both fixation groups were compared in the univariate analysis, there was a significant difference in CCI and age ($p < 0.001$). There were also significant associations between the additional variables ($p < 0.001$). The logistic regression model for PPFx linked revision and early linked revision showed a significant difference between fixation types for THA (OR: 0.456, 95% CI: 0.347;0.599, $p < 0.0001$ and OR: 0.342, 95% CI: 0.237;0.493, $p < 0.0001$), favoring cemented stems.

DISCUSSION AND CONCLUSION: Periprosthetic fractures are becoming a leading failure mode for THAs in AJRR. Given cemented fixation's relative resistance to this failure mode when compared to cementless fixation, we should consider increasing utilization of this technique.