Periprosthetic Fracture Following Arthroplasty for Femoral Neck Fracture: Is a Cemented Stem Protective?

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INTRODUCTION:

Periprosthetic femoral fractures (PFF) carry significant morbidity following arthroplasty for femoral neck fracture (FNF). This study assessed fracture complications following arthroplasty for FNF and the effect of cement fixation of the femoral component on intraoperative and post-operative PFF. Our null hypothesis was choice of procedure and use of cement would not affect incidence of PFF.

METHODS:

Between February 2014 and September 2021, 740 patients with a FNF who underwent arthroplasty were analyzed for demographics, surgical management, use of cement for fixation of the femoral component and subsequent PFF. Variables were compared with Mann-Whitney or chi-square as appropriate. Multivariate logistic regression was used to assess independent risk factors associated with intraoperative or post-operative PFF.

RESULTS:

There were 163 THAs (41% cemented) and 577 HAs (95% cemented). There were 28 PFFs (3.8%): 18 post-operative and 10 intraoperative. Fewer post-operative PFFs occurred with cemented stems (1.63% vs. 6.30%, p=0.002). Mean time from surgery to presentation with post-operative PFF was 14 months (0-45 months). Mean follow-up time was 10.3 months (range: 0 – 75.7 months). In multivariate regression, use of cement and THA were independently associated with decreased post-operative PFF (Cement: OR 0.112, 95% CI 0.036-0.352, p<0.001; THA: OR 0.249, 95% CI 0.064-0.961, p=0.044). More intraoperative fractures occurred during THA (3.68% vs. 0.69%, p=0.004) and non-cemented procedures (5.51% vs. 0.49%, p<0.001). In multivariate regression, use of cement was protective against intraoperative fracture (OR 0.100, CI 0.017-0.571, p=0.010).

DISCUSSION AND CONCLUSION:

In patients with a FNF treated with arthroplasty, cementing the femoral component is associated with a lower risk of intraoperative and post-operative PFF. Choice of procedure may be based on patient factors and surgeon preference.

Table 1: Multivariate Regression for Post-Operative and Intraoperative Periprosthetic Femoral Fracture

Post-Operative Periprosthetic Femoral Fracture					
	Odds Ratio	**Std. Error**	**P-Value**	**95% Conf. Interval**	
THA	0.212	0.165	**0.046**	0.046	0.973
Use of Cement	0.138	0.086	**0.001**	0.041	0.466
Age	0.977	0.027	0.408	0.926	1.032
BMI	0.985	0.054	0.780	0.884	1.097
CCI	1.125	0.152	0.382	0.864	1.465
White*	0.729	0.379	0.544	0.263	2.020
Assistive Device	0.707	0.393	0.533	0.238	2.102
Female Gender	1.506	0.836	0.460	0.508	4.471
Adjusted Multivariate					
THA	0.249	0.172	**0.044**	0.064	0.961
Use of Cement	0.112	0.065	**<0.001**	0.036	0.352
Intraoperative Periprosthetic Femoral Fracture					
	Odds Ratio	**Std. Error**	**P-Value**	**95% Conf. Interval**	
THA	2.509	2.590	0.373	0.332	18.978
Use of Cement	0.083	0.076	**0.007**	0.014	0.501
Age	1.026	0.040	0.520	0.949	1.108
BMI	0.971	0.071	0.684	0.842	1.120
CCI	0.978	0.244	0.930	0.600	1.594
White*	0.480	0.338	0.297	0.121	1.904
Assistive Device	2.152	1.877	0.380	0.389	11.897
Female Gender	4.581	4.983	0.162	0.543	38.624
Adjusted Multivariate					
THA	1.296	1.086	0.757	0.251	6.694
Use of Cement	0.100	0.089	**0.010**	0.017	0.571

**Race was white vs. not white as the full patient cohort was mostly white.*

THA = Total Hip Arthroplasty; BMI = Body Mass Index; CCI = Charlson Comorbidity Index