Equivalent Rates of 90-Day Revision for Instability between Dual Mobility Total Hip Arthroplasty and Hemiarthroplasty for Acute Femoral Neck Fractures: An American Joint Replacement Registry Study

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INTRODUCTION:

The use of hemiarthroplasty (HA) versus total hip arthroplasty (THA) for acute femoral neck fractures (FNF) is somewhat controversial. The advantages of HA include a shorter operative time and increased hip stability when compared to conventional THA bearings. Dual mobility (DM) bearings have been shown to reduce dislocation risk in THA patients when compared to conventional bearings, but there remains a lack of well-powered studies comparing DM-THA to HA for FNF. In this study, we used a national registry to compare 90-day outcomes between FNF patients treated with DM-THA versus HA, hypothesizing that DM-THA and HA would have similar rates of revision for instability.

METHODS:

ICD-9/10 and CPT codes were used to query the American Joint Replacement Registry (AJRR) for all FNF patients 65 and older that underwent DM-THA or HA between 2012 and 2021. Open, subacute, and pathologic fractures were excluded. AJRR data was merged to available Medicare claims data to supplement revision capture through March 2022. Demographics (age, sex, BMI, race, year, region, Charlson Comorbidity Index (CCI)), 90-day outcomes (mortality, all-cause revision, revision for periprosthetic fracture, revision for infection, revision for instability), and long-term all-cause revision rates were compared between treatment cohorts. Multivariate logistic regression models adjusting for age, sex, and CCI were performed for each 90-day outcome.

RESULTS:

A total of 94,926 patients were identified, of which 2,078 (2.2%) underwent DM-THA and 92,848 (97.8%) underwent HA. The DM-THA cohort was younger and had lower CCI on average compared to the HA cohort (Table 1). DM-THA utilization increased over the study period (Figure 1).

DM-THA and HA patients had similar rates of 90-day revision for instability (0.67% vs. 0.50%, p=0.27) and infection (0.48% vs. 0.37%, p=0.39). DM-THA patients had lower rates of 90-day mortality compared to HA (1.68% vs. 7.45%, p<0.001) but higher rates of revision for fracture. DM-THA patients also had higher rates of all-cause revision at both 90-days and for the entire study period (Table 2). Multivariate regression confirmed the univariate findings, that DM-THA was associated with equivalent rates of revision for instability/infection, decreased mortality (OR 0.31, 95% CI 0.22-0.43, p<0.001), and increased all-cause revision (OR 1.40, 95% CI 1.04-1.88, p=0.028) compared to HA.

DISCUSSION AND CONCLUSION:

The number of FNF managed with DM-THA continues to increase. The rate of 90-day revision for instability was equivalent in FNF that underwent DM-THA or HA, and patients treated with DM-THA had lower mortality rates than those that underwent HA. However, DM-THA was associated with higher rates of revision for fracture and all-cause revision.

Figure 1.

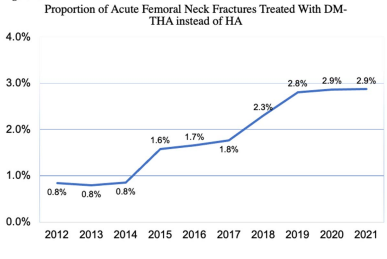

Table 1. Demographics and Epidemiology

	Hemiarthroplasty (N=92,848)	Dual Mobility Total Hip Arthroplasty (N=2,078)	P-value
Age	83.81 (7.90)	76.59 (7.54)	<0.001
Sex			0.88
Female	63,103 (67.96%)	1,423 (68.48%)	
Male	29,275 (31.53%)	645 (31.04%)	
Charlson Comorbidity Index	4.21 (1.53)	3.56 (1.52)	<0.001
Body Mass Index			<0.001
Underweight (<18.5)	4,816 (9.04%)	77 (5.25%)	
Normal (18.5-24.9)	26,568 (49.89%)	641 (43.69%)	
Pre-Obesity (25-29.9)	15,383 (28.89%)	492 (33.54%)	
Obesity I (30-34.9)	4,985 (9.36%)	183 (12.47%)	
Obesity II (35-39.9)	1,071 (2.01%)	51 (3.48%)	
Obesity III (>40)	430 (0.81%)	23 (1.57%)	
Race			0.017
American Indian	526 (0.57%)	12 (0.58%)	
Asian	1,627 (1.75%)	51 (2.45%)	
Black or African American	2,868 (3.09%)	49 (2.36%)	
Native Hawaiian or Pacific Islander	54 (0.06%)	0 (0.00%)	
Not Reported	10,086 (10.86%)	199 (9.58%)	
Two or More	1,245 (1.34%)	19 (0.91%)	
White	76,440 (82.33%)	1,748 (84.12%)	
Region			<0.001
Midwest	24,906 (26.85%)	375 (18.05%)	
North-East	16,442 (17.72%)	417 (20.07%)	
South	28,514 (30.74%)	484 (23.29%)	
West	22,910 (24.69%)	802 (38.59%)	
Year			<0.001
2012	1,062 (1.14%)	9 (0.43%)	
2013	3,008 (3.24%)	24 (1.15%)	
2014	5,604 (6.04%)	48 (2.31%)	
2015	7,104 (7.65%)	114 (5.49%)	
2016	10,552 (11.36%)	178 (8.57%)	
2017	12,564 (13.53%)	226 (10.88%)	
2018	12,984 (13.98%)	306 (14.73%)	
2019	12,742 (13.72%)	368 (17.71%)	
2020	13,751 (14.81%)	406 (19.54%)	
2021	13,477 (14.52%)	399 (19.20%)	

Table 2. Outcomes

	Hemiarthroplasty (N=92,848)	Dual Mobility Total Hip Arthroplasty (N=2,078)	P-value
90-Day Revision for Instability	465 (0.50%)	14 (0.67%)	0.27
90-Day Revision for Infection	339 (0.37%)	10 (0.48%)	0.39
90-Day Revision for Fracture	231 (0.25%)	13 (0.63%)	<0.001
90-Day Mortality	6,913 (7.45%)	35 (1.68%)	<0.001
90-Day All-cause Revision	1,326 (1.43%)	47 (2.26%)	0.002
All-cause Revision	2,381 (2.56%)	84 (4.04%)	<0.001