

Medical Resource Utilization and Costs for Total Hip Arthroplasty – Benchmarking the Anterior Approach in the Medicare Population

Study Rationale

- Clinical studies indicate that the anterior approach (AA) to total hip arthroplasty (THA) allows for faster recovery when compared to other surgical approaches to THA.^{1,2}
- However, no studies have characterized the impact of a pre-specified AA technique on costs or resource utilization over the 90-day period relevant to the Centers for Medicare and Medicaid Services Comprehensive Care for Joint Replacement Program (CJR).
- No billing codes are available to discriminate approaches to THA, thus a unique method was required for retrospective identification of AA patients.

Study Objectives

- To assess 90-day medical resource utilization and costs for a cohort of AA patients, including:
 - **Proportion of patients discharged to home (primary endpoint),**
 - **Post acute care costs (primary endpoint),**
 - Hospital length of stay,
 - Days/costs of SNF care,
 - Days/costs of home health care, and
 - Days/costs of hospital outpatient care
- To benchmark this performance against that for *similar THA patients receiving care at similar institutions*

Data Source

- The Centers for Medicare and Medicaid Services (CMS) 100% Standard Analytic File was used to quantify episode costs:
 - Part A claims (Inpatient, home health, skilled nursing, hospital outpatient) for patients who received elective (non-fracture), primary total hip arthroplasty (THA) between Q1 2012 and Q3 2014.
 - All claims were wage-adjusted prior to analysis.
- All Medicare Part A (facility) payments from hospitalization through 90-days after the day of discharge were eligible for inclusion:
 - Hospitalization for chronic conditions, as stipulated by CMS under the Comprehensive Care for Joint Replacement (CJR) program, were excluded
- All cell counts <11 are hidden, per CMS requirements

Study Methods

- Six surgeons agreed to participate in this analysis, all of whom used the AA approach between 2012-2014.
 - All surgeons indicated that they used the AA technique as described by Dr. Joel Matta.³

- The CORAIL[®] Hip System and PINNACLE[®] Acetabular Cup System were the most commonly used implants for these procedures; other systems were used in a minority of cases.
- A two-stage analytical approach (matching and regression) sought to maximize similarity between patients/hospitals/surgeons in the AA cohort and those in the control group.
 - After patient matching was completed, regression analysis with generalized estimating equations (GEE) was applied to control for remaining imbalances and clustering of outcomes within hospitals.

Regression Analysis

- Multivariate regression using the GEE technique was used to compare AA versus the control cohort on the following primary outcomes:
 - Wage-adjusted Medicare payments from index discharge through 90-days post-discharge, and
 - The proportion of patients discharged to home or home health agency versus other settings (e.g., skilled nursing facility [SNF]).
- This model sought to account for patient clustering within hospitals and to control for all baseline patient characteristics.*
- Predicted adjusted means and 95% confidence intervals (marginal outcomes) were estimated based on GEE model results using the method of recycled predictions.

*Age category, sex, race, year of surgery, Charlson Comorbidity Index (CCI), obesity, morbid obesity, diabetes, OA, RA, osteoporosis, dual-eligible (Medicare + Medicaid), physician hip arthroplasty volume, hospital resident-to-bed ratio (teaching status), disproportionate share percentage (DSH), hospital volume, number of hospital beds.

Demographics for Matched Cohorts

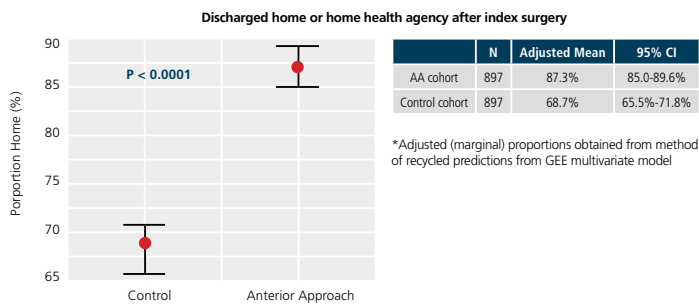
Variable	Control Cohort	AA Cohort	p-value	Standardized difference
Post-match/Pre-match counts	897/287,916	897/923		
Mean (SD) Age	72.11 (7.88)	72.12 (8.46)	0.968	0.002
Sex	%	%		
Female	59.5	59.4	0.962	-0.002
Race	%	%		
White	94.7	94.8	0.699	0.082
Black	3.5	2.9		
Other	1.8	2.3		
Dual Eligible Status	7.8	8.5	0.604	0.025
Year of Surgery	%	%		
2012	25.5	26.4	0.863	0.026
2013	37.1	37.4		
2014	37.4	36.2		

Provider & Surgeon Characteristics for Matched Cohorts

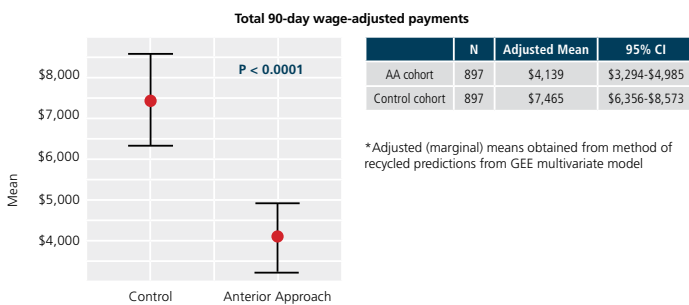
Variable	Control Cohort %	AA Cohort %	p-value	Standardized difference
Teaching Hospital (Yes)	27.0	20.0	0.0004	-0.166
Large Urban	52.6	40.6	<0.0001	0.292
Other Urban	46.4	59.4		
Mean (SD) Surgeon THA volume (2012-2014)	172.44 (198.08)	273.90 (145.69)	<0.0001	0.584

Results

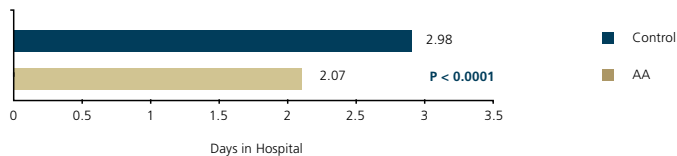
Proportion of Patients Discharged Home*



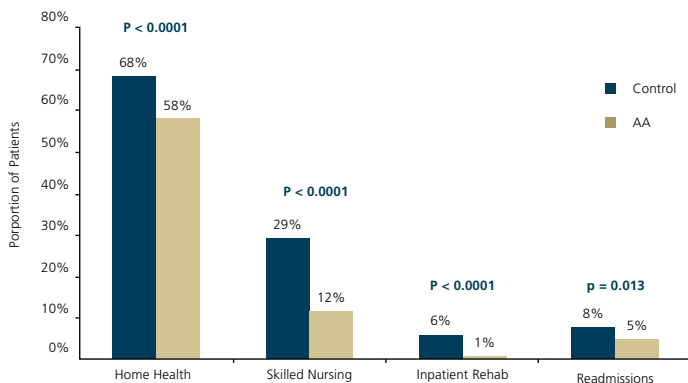
Post-Acute Total Claim Payments*



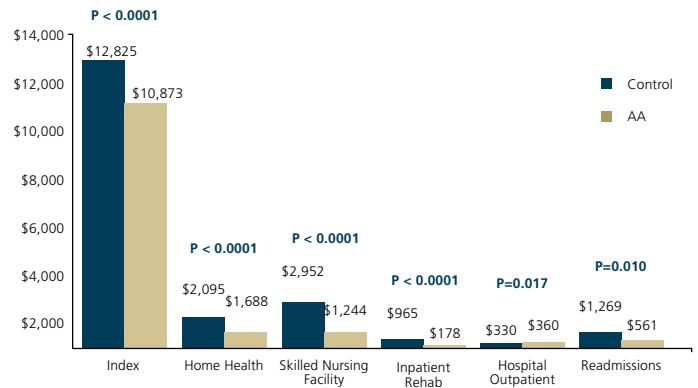
Hospital Length of Stay



Matched, Unadjusted Proportion of Patients Receiving any 90-day Post-acute Care in Each Setting



Matched, Unadjusted Payments 90-day Episode, by Setting



Conclusions

- After control for variables spanning multiple patient and provider domains:
 - Patients who received AA from the participating surgeons had lower in-hospital length of stay than those in the control cohort (2.07 vs. 2.98 days);
 - Patients who received AA from the participating surgeons were significantly more likely than those in the control arm to be discharged home (87% vs. 69%); and
 - Patients incurred nearly 50% lower post-acute costs: (\$4,139 vs. \$7,465, for per-patient 90-day savings of \$3,326).
- These differences represent a large proportion of post-acute care resource use after THA, and are highly relevant for the transition to value-based care.

Limitations

- This is not a purely comparative study, given mixed surgical approaches within control cohort.
- The participating surgeons were not a random, independent sample, and may not be representative of the broader population of surgeons who use the AA technique.
 - In particular, all surgeons were highly experienced with the AA technique prior to the observation period.
- All limitations and biases inherent to analysis of retrospective administrative data apply; principally, relationships cannot be considered causal.

DISCLOSURE & ACKNOWLEDGEMENTS:

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