

Comparative Effectiveness of the ATTUNE[®] Knee System vs. the Triathlon[™] Knee System



Real-world Hospital Length of Stay and Discharge Status

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BACKGROUND

Hospitals and health systems bear increasing responsibility for demonstrating not only superior clinical outcomes, but also improved economics for patients who require total joint replacement. Most recently, the Centers for Medicare and Medicaid Services (CMS) finalized its Comprehensive Care for Joint Replacement Model (CJR) to shift financial risk to hospitals for a 90-day episode of care for lower extremity joint replacements. Hospital length of stay (LOS) has a well-understood impact on the economics of acute care, and discharge disposition has important implications for the care trajectory and costs incurred during the post-acute period after total joint replacement.

DePuy Synthes Companies of Johnson & Johnson understands that our hospital customers require products and services that streamline care and reduce costs, and are interested in quantifying real-world comparative data on LOS and discharge disposition after total knee arthroplasty. The ATTUNE[®] Knee System was designed to address the needs of patients, surgeons, and hospital providers around the world. Extensive research and science has gone into the design to help improve functional outcomes for patients, performance for surgeons, and efficiency for providers.

OBJECTIVES

To compare hospital length of stay (LOS) and discharge status for TKA patients who received an ATTUNE Knee or Triathlon[™] Knee.

METHODS

We queried the Premier Perspective[™] Database to identify patients with knee osteoarthritis who received unilateral, primary TKA with either the ATTUNE Knee or

Triathlon[™] between January 2013 and December 2014. The Premier Perspective[™] Database includes billing, cost, device, medication, and procedure data from more than 670 hospitals in the United States. Patients were identified in the database as having received TKA with either device using a combination of ICD-9-CM codes for total knee replacement and hospital charge descriptions for the ATTUNE Knee and Triathlon[™]. To minimize the impact of hospital-specific practice patterns, only hospitals that used both systems during the study period were included.

Patient, provider, and procedure characteristics were included in generalized estimating equation (GEE) models to explore the impact of the TKA device used on LOS and discharge status after accounting for clustering within hospitals (i.e., correlation of outcomes within a hospital). A 1:1 propensity score matching sensitivity analysis was also conducted to ensure that there were no statistical differences between cohorts on key baseline variables. Tests for interactions revealed no significant relationships between implant type and other independent variables on the measured outcomes.

The following covariates (i.e., potential explanatory variables) were included within these models: Type of device (ATTUNE Knee or Triathlon[™]), patient demographics (age, gender, race, and marital status), procedure characteristics (payer, year of surgery, source of admission, osteoarthritis diagnosis), provider characteristics (urban/rural, teaching status, geographical location, bed size, costing procedure, hospital procedure volume, and physician specialty), and patient comorbidities (Charlson Comorbidity Index and individual comorbidities with bivariate significance at a p-value significance level of 0.10).

Adjusted Hospital Length of Stay, Mean (95% Confidence Interval)

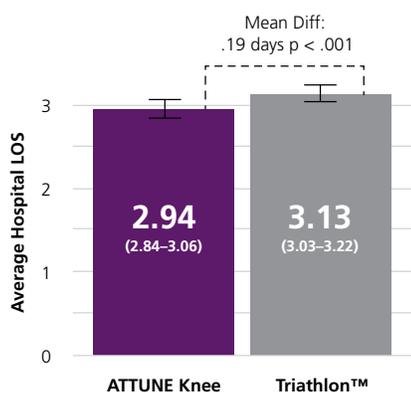


Figure 1

Adjusted Proportion of Patients Discharged to SNF, Mean (95% Confidence Interval)

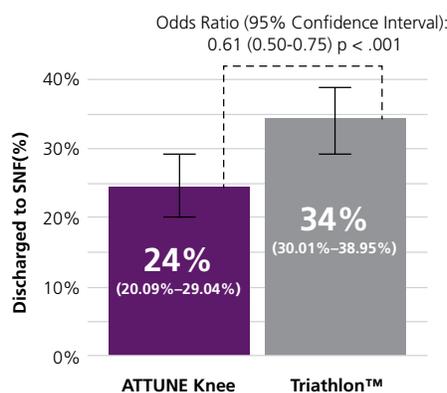


Figure 2

Adjusted Proportion of Patients Discharged Home, Mean (95% Confidence Interval)

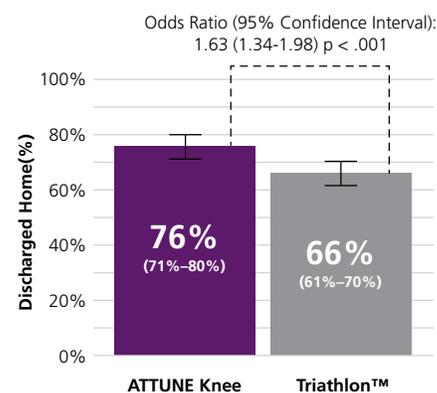


Figure 3

RESULTS

A total of 38 hospitals were identified in the study period that represented 1,178 TKAs with the ATTUNE Knee and 5,707 TKAs with Triathlon™. ATTUNE Knee patients were more likely to be older, single, less likely to be covered by commercial insurance, and treated in the West region. Unadjusted mean (Standard Deviation) LOS for ATTUNE Knee patients was 2.82 days (0.98) and 3.14 days (1.25) for Triathlon™ patients (Figure 1). Adjusted mean LOS for ATTUNE Knee patients was 0.19 days shorter than for Triathlon™ patients (2.94 vs. 3.13; $p < 0.001$). The mean adjusted proportion of ATTUNE Knee patients who were discharged to a skilled nursing facility (SNF) was 24.29%. This compares to an adjusted mean of 34.34% of Triathlon™ patients who were discharged to a SNF (Figure 2). The adjusted odds of ATTUNE Knee patients being discharged to a SNF were 39% lower than for Triathlon™ patients (Odds Ratio= 0.61; 95% Confidence Interval: 0.50-0.75; $p < .001$). Conversely, ATTUNE Knee patients had 63% increased odds of being discharged to home when compared to Triathlon™ patients (Figure 3). Consistent findings were obtained from the propensity matched sub cohort of 2,044 patients, which was balanced on baseline covariates between devices (standardized differences were $\leq 8\%$).

CONCLUSIONS

Patients who received TKA with the ATTUNE Knee had a slightly shorter LOS and were less likely to be discharged to a skilled nursing facility and more likely to be discharged home versus patients who received Triathlon™. Sensitivity analyses suggest that these effects could not be explained by patient factors including age, insurance or marital status. These outcomes are increasingly relevant as hospitals bear more risk for episodes of care and the costs incurred during the post-acute period after total joint replacement.

STRENGTHS AND LIMITATIONS

This study provides data for a large sample of patients who received primary, unilateral TKA, and is unique in its linkage between medical devices and short-term in-hospital outcomes. Patient and hospital-level covariates allowed for development of robust statistical models, accounting for clustering of outcomes within hospitals. The ATTUNE Knee and Triathlon™ patients identified within the Premier Perspective™ Database may not be representative of all patients who receive TKA with these implant systems, and the analyzed cohorts reflect the subset of patients in the Premier Perspective™ Database for whom detailed device information was present. Finally, this analysis is subject to the limitations inherent to non-randomized, retrospective analyses of administrative data.

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