

Evaluation of ATTUNE™ Knee Replacement Procedures in the Outpatient versus Inpatient Site of Care

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1. Introduction

The incidence of outpatient total knee arthroplasty (TKA) surgery has significantly increased as a result of improved perioperative recovery protocols, value-based and bundled payment initiatives, and the COVID-19 pandemic that forced hospitals to restrict access to hospital wards.^{1,2}

To the best of our knowledge, studies evaluating inpatient vs outpatient care have been brand agnostic. This study is designed to evaluate the outcomes of patients treated in the inpatient vs outpatient setting using the ATTUNE™ Knee System.

3. Results

There were 48,703 patients identified in the study cohort. 19.2% (9,365) were treated in the outpatient setting, 80.8% (39,338) were treated in the inpatient setting. Patient characteristics (baseline demographics, Elixhauser Comorbidity Index (ECI) score and top 5 ECI comorbidities) and hospital characteristics are shown in Tables 1 and 2 respectively, for the study cohort.

Table 1: Patient Characteristics

Variables	Inpatient		Outpatient	
	N	%	N	%
All	39,338	100.00%	9,365	100.00%
Gender: Female	23,954	60.89%	5,578	59.56%
Age: mean (SD)	66.87 (9.42)		67.23 (8.57)	
ECI Score				
0	4,701	11.95%	1,488	15.89%
1 or 2	20,436	51.95%	4,990	53.28%
3 or 4	11,240	28.57%	2,382	25.44%
5 or greater	2,961	7.53%	505	5.39%
Hypertension (with or without complications)	27,237	69.24%	6,070	64.83%
Obesity	12,154	30.90%	2,741	29.27%
Diabetes (with or without complications)	8,980	22.83%	1,803	19.25%
Hypothyroidism	6,743	17.14%	1,474	15.74%
Chronic pulmonary disease	6,267	15.93%	1,324	14.14%

Table 2: Hospital Characteristics

Variables	Inpatient		Outpatient	
	N	%	N	%
All	39,338	100.00%	9,365	100.00%
Hospital Teaching Status: YES	12,610	32.06%	2,856	30.50%
Hospital TKA Volume: mean (SD)	554.42 (395.24)		508.45 (379.72)	
Hospital Number of Beds				
0-99	4,113	10.46%	1,449	15.47%
100-199	6,919	17.59%	1,997	21.32%
200-299	9,304	23.65%	1,988	21.23%
300-399	8,082	20.55%	1,896	20.25%
400-499	4,481	11.39%	1,309	13.98%
500+	6,439	16.37%	726	7.75%

4. Discussion

The incidence of outpatient total knee arthroplasty (TKA) surgery has significantly increased as a result of improved perioperative recovery protocols, value-based and bundled payment initiatives, and the COVID-19 pandemic that forced hospitals to restrict access to hospital wards. There is a need to establish brand level confidence in the effectiveness of TKR solutions in the outpatient setting.

In this unmatched cohort study, the ATTUNE Knee System has been shown to be an effective solution in the outpatient setting, whilst also demonstrating 90-day cost savings when compared to patients receiving the same device in an inpatient setting. Further research is required in this area with propensity score matching to ensure cohort comparability and reduction of bias.



2. Methods

Data Source: The Premier database contains complete clinical coding, including diagnosis, procedures, and hospital-prescribed medications from more than 20% of all hospital admissions throughout the United States (> 750 hospitals and hospital systems).

Study Population: The study cohort includes patients with an elective TKA performed between Q4 2015 to Q1 2021 using the ATTUNE™ Knee System. Index is defined as the admission date for the TKA surgery (equivalent to service day for same-day/outpatient procedures).

Outcomes: The primary outcome was 90-day knee-related readmissions after TKA in the in- vs outpatient settings. Secondary outcomes included 90-day all-cause readmissions and TKA revision surgery after TKA. Exploratory outcomes included index- and 90-day hospital costs.

3. Results (Cont.)

OR Time consistent across the two groups (134.91 vs 132.24 minutes)

No difference in percentage of revisions or reoperations (0.59% vs 0.61%)

Reduced total cost of care for outpatient vs inpatient:

- Knee-related 90-day readmission \$316 vs \$546**
- All cause 90-day readmission \$845 vs \$1253**

Table 3: Outcomes*

Variables	Inpatient		Outpatient	
	N	%	N	%
All	39,338	100.00%	9,365	100.00%
Operation Room (OR) Time				
	134.91 (36.74)		132.24 (34.39)	
Visits 90-days post-TKA				
Knee-related readmissions	3,033	7.71%	550	5.87%
All-cause readmissions	12,175	30.95%	2,677	28.59%
Revisions/Reoperations	233	0.59%	57	0.61%
Total Cost of Care				
Index TKA	\$17,446 (\$63,496)		\$14,870 (\$5,396)	
Knee-related readmissions (90-days post-TKA)	\$546 (\$4,473)		\$316 (\$2,371)	
All-cause readmissions (90-days post-TKA)	\$1,253 (\$9,989)		\$845 (\$4,089)	

*Outcomes based on unmatched cohort

5. Conclusion

The ATTUNE Knee System has been shown to be a reliable solution in an outpatient setting, with no differences identified in revision or reoperations between patients operated within in- or outpatient settings.

The use of the ATTUNE Knee System in the outpatient setting has been shown to deliver decreased all cause and knee related 90-day costs.



References:
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 2. Edwards PK, Miles J, Stanbough JB, et al. Inpatient versus Outpatient Total Knee Arthroplasty. *J Knee Surg* 2019;32(8):730-35. doi: 10.1055/s-0039-1583035 [published Online First: 2019/03/20]
 3. Study 47491 – Attune Outpatient in Premier. RWE22_DEP_001