Factors Associated with Later Discharge After Total Joint Arthroplasty

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INTRODUCTION: The volume of total joint arthroplasty (TJA) continues to increase in the United States. Facilitating same-day discharge on postoperative day 0 (POD0) has become a priority to reduce costs and staffing demands while maintaining patient safety and satisfaction. Tools such as the Risk Assessment and Prediction Tool (RAPT) help to estimate discharge readiness, but other factors–both patient variables and hospital operational variables–also influence discharge readiness. The objective of this study is to evaluate clinical, social, and operational variables to identify predictors of POD0 discharge as compared to later-day discharge following primary TJA.

METHODS: We performed a single-institutional retrospective review of 971 primary total joint arthroplasties (TJA) conducted between 2022 and 2025 with available modified RAPT scores (excluding age and sex components). Additional data collected included age, sex, body mass index (BMI), Charlson Comorbidity Index score (CCI), distance traveled to the surgery center (miles), Distressed Community Index score (by ZIP code), time spent in the operating room (minutes), discharge disposition (home versus inpatient rehabilitation), and surgical start time (AM versus PM). Of the 971 TJAs included, there were 517 total knee arthroplasties (TKAs) and 454 total hip arthroplasties (THAs), consisting of 379 women and 592 men. Baseline demographic and clinical characteristics were compared using univariate analyses, and a multivariable logistic regression model was constructed to identify predictors of discharge timing. Scoring systems were then developed utilizing the significant variables extracted from the model. The models were then tested utilizing a subset of the original data, incorporating multivariable logistic regression to identify increased odds ratios of later-day discharge for those who scored higher in our model. A qualitative review of electronic medical records was performed to identify social barriers not captured in quantitative analyses.

RESULTS SECTION: Across 971 TJAs, patients who lived farther from the hospital, had lower modified RAPT scores (excluding age and sex), and underwent surgery later in the day were more likely to experience later-day discharge ($p < 0.01$). In the TKA subset, the multivariable logistic regression model identified a modified RAPT score ≤4 (OR 0.6, $p < 0.01$) and a later time out of the OR (OR 0.83 per hour, $p = 0.007$) as significant predictors of later-day discharge. In the THA subset, the multivariable logistic regression model identified a modified RAPT score ≤5 (OR 0.7, $p=0.02$), operative duration >120 minutes (OR 1.0, $p=0.01$), and a later time out of the OR (OR 0.7 per hour, $p<0.01$) as significant predictors of later-day discharge. A scoring system was developed based on these associations, with each category receiving one point. In TKA, patients who scored the maximum 2 points were significantly associated with later-day discharge compared to those who scored 0 ($p<0.001$). In THA, patients who scored 2-3 points were significantly associated with later-day discharge compared to those who scored 0 points ($p<0.001$). The qualitative review identified unanticipated delays in 15 patients, related to limited caregiver availability or lack of transportation.

DISCUSSION: Discharge timing after TJA is influenced by multiple, interconnected clinical, social, and operational factors. In TKA, the modified RAPT score and time out of the OR were predictive of later-day discharge. In THA, modified RAPT score, operative duration, and time out of the OR were predictive of later-day discharge. Based on these variables, we developed a simple scoring system to predict patients likely to be discharged after POD0. This system potentially allows for more efficient preoperative scheduling and may guide multidisciplinary teams in taking earlier actions for patients at higher risk of later-day discharge. Of note, this study has several limitations including the nature of a single-institutional study, which may lead to different results compared to other institutions with different guidelines, as well as incomplete RAPT data across our institution which has limited the sample size. Surgeon specific practices and other unmeasured factors may also bias our results.

SIGNIFICANCE/CLINICAL RELEVANCE: This study demonstrated that clinical, social, and operational factors stratified the risk for later discharge after primary TJA. These findings address a critical barrier to optimizing POD0 discharge and can directly inform surgical scheduling and preoperative planning to improve efficiency and patient care.

IMAGES AND TABLES:

Table 1. Initial Patient Demographics: Same Day versus Later Day Discharge after Primary Total Joint Arthroplasty

Characteristic	Same Day	Later Day [a]	*P*-value
Total (n, %)	901 (92.7)	70 (7.2)	
Procedure			
TKA	472 (91.3)	45 (8.7)	
THA	429 (94.5)	25 (5.5)	
Age in Years (mean, SD)	66.0 (10.1)	64.5 (12.3)	0.32
Sex (n, %)			
M	348 (61.4)	31 (44.3)	0.42
F	553(38.6)	39 (55.7)	
BMI (mean, SD)	30.5 (5.6)	30.1 (5.2)	0.64
CCI (mean, SD)	3.0 (1.2)	2.9 (1.3)	0.64
DCI Score (mean, SD)	38.7 (26.1)	42.6 (27.6)	0.25
Miles Traveled (mean, SD)	32.2 (94.8)	115.5 (144.5)	**<0.01***
Modified RAPT Score [b]	6.3 (1.5)	5.9 (2.1)	**0.04***
THA OR duration (min)	107.5 (25.1)	137.1 (63.2)	**<0.01***
TKA OR duration (min)	123.9 (24.7)	122.2 (24.5)	0.65
Time out of OR (n, %)			
8-9am	98 (96.1)	4 (3.9)	**<0.01***
9-10am	167 (96)	7 (4)	
10-11am	123 (94.6)	7 (5.4)	
11-noon	123 (92.5)	10 (7.5)	
Noon-1pm	142 (94.7)	8 (5.3)	
1-2pm	90 (91.8)	8 (8.2)	
2-3pm	71 (85.5)	12 (14.5)	
3-4pm	58 (85.3)	10 (14.7)	
4-5pm	20 (87)	3 (13)	
5-6pm	11 (73.3)	4 (26.7)	
After 6pm	4 (66.7)	2 (33.3)	

a. Average LOS is 2.3 days
b. Modified RAPT Score excludes age and sex components

BMI, Body Mass Index; CCI, Charlson Comorbidity Index; DCI, distressed community index

Table 2. Model Assessment for Same Day versus Later Day Discharge in Total Knee Arthroplasty Subset

Variable	Odds Ratio	95% CI	*P*-value
Age	1.0	0.9 – 1.1	0.75
Sex (male)	1.3	0.5 – 3.6	0.58
BMI	0.9	0.9 – 1.0	0.16
CCI	0.9	0.7 – 1.3	0.75
Distance (miles)	1.0	0.9 – 1.0	0.08
Modified RAPT [a]	0.6	0.5 – 0.8	**<0.01***
DCI Score	1.0	0.9 – 1.0	0.70
OR Duration (minutes)	1.0	0.9 – 1.0	0.76
Time out of OR (per hour)[b]	0.83	0.7 – 0.9	**0.007***

a. Modified RAPT score ≤4 identified as a significant predictor
b. Per hour starting after 8am

Table 3. Model Assessment for Same Day versus Later Day Discharge in Total Hip Arthroplasty

Variable	Odds Ratio	95% CI	*P*-value
Age	1.0	0.9 – 1.0	0.52
Sex (male)	1.4	0.4 – 4.6	0.56
BMI	1.0	0.9 – 1.1	0.64
CCI	1.1	0.6 – 1.8	0.83
DCI Score	1.0	0.9 – 1.0	0.22
Miles Traveled	1.0	0.9– 1.0	0.08
Modified RAPT Score [a]	0.7	0.5 – 0.9	**0.02***
OR Duration (minutes) [b]	1.0	1.0 – 1.1	**0.01***
Time out of OR (per hour) [c]	0.7	0.6 – 0.8	**<0.01***

a. Modified RAPT score ≤5 identified as a significant predictor
b. OR time >120 minutes identified as a significant predictor
c. Per hour starting after 8am