

Thirty-Day Readmissions following Total Hip Arthroplasty (THA): Findings from a Comprehensive 5-Year Analysis of the Frequency, Causes, and Patterns of THA Readmissions

Pedro Javier Rullan, Nicholas Sauder, Ahmed Emara, Melissa Nicole Orr, Alison K Klika¹, Kim L Stearns, Robert M Molloy, Viktor Erik Krebs, Nicolas Santiago Piuizzi

¹Cleveland Clinic

INTRODUCTION:

Considering the advent of value-based orthopaedic care and the growing adoption of outpatient total hip arthroplasties (THAs), it is paramount to continually assess readmissions as an important metric for quality of surgical care. Furthermore, with the incorporation of 30-day readmissions into reimbursement models, more research is warranted to investigate the frequency, causes, and patterns of 30-day inpatient readmissions, with the overall objective of lowering readmissions in this patient population. Therefore, this study aimed to: 1) determine the overall 30-day THA readmission rate; 2) report the timing of readmission by weeks post-discharge; 3) identify the most frequent causes of 30-day readmissions (i.e., medical- or orthopaedic-related); and 4) develop a 30-day readmission risk calculator for THA patients.

METHODS:

A consecutive cohort of all primary THAs performed from 2016-2020 at a large tertiary academic center were followed using a validated, institutional prospective data collection system (n=6,503 patients). This system flags readmissions that occur within 30 days within dozens of hospitals, rehabilitation centers, and healthcare facilities in an integrated health care system. All flagged readmissions were thoroughly chart reviewed to verify them and determine the primary cause of readmission (medical or orthopaedic related). The number of weeks after discharge when patients were readmitted was determined from medical records. Days 22-30 post-discharge were categorized together as "Week 4+". A 30-day readmission risk calculator was developed with the following patient baseline data: demographics, comorbidities, laboratory values, medications, substance use history, hospitalization history, emergency room visit history, and health literacy. The calculator estimated the patient-specific risk of 30-day readmission based on findings from a multivariate binary logistic regression of the cohort. Receiver operating characteristic (ROC) analysis was performed to evaluate the efficacy of the calculator in predicting readmissions. ROC curve analysis allowed for both 1) a visualization of the overall performance of the calculator at predicting readmissions by determining the area under the curve (AUC); and 2) selecting an ideal cutoff for the readmission risk calculator by identifying a score that yielded the greatest combination of sensitivity and specificity in predicting readmissions.

RESULTS:

Overall, the 30-day readmission rate was 2.74% (178 out of 6,503 patients). Inpatient readmission occurred most commonly during the 1st week post-discharge (n=56; 31.5%), while the 3rd week post-discharge had the lowest proportion of readmissions (n=35; 19.7%) (**Figure 1**). Medical readmissions (n=121; 68.0%) were more frequent than orthopaedic readmissions (n=57; 32.0%). The most frequent medical causes of 30-day readmissions were gastrointestinal bleeding (n=15) and sepsis (n=9) (**Figure 2**). The most frequent orthopaedic causes of 30-day readmissions were periprosthetic joint infections (n=15) and periprosthetic fractures (n=13) (**Figure 3**). The least frequent orthopaedic causes of 30-day readmissions were cellulitis of the operated area (n=7) and wound complications (n=6) (**Figure 3**). ROC analysis of the 30-day readmission risk calculator revealed an AUC of 0.727, indicating acceptable performance (**Figure 4**). The optimal cutoff for the risk score was determined to be 14, as this maximized the sum of sensitivity and specificity in predicting readmissions (Sensitivity: 0.63; Specificity: 0.75; Accuracy: 0.74) (**Figure 4**).

DISCUSSION AND CONCLUSION:

Overall, approximately 1 of 35 patients who undergo THA are expected to be readmitted within 30-days of discharge. Enhanced and targeted medical care should be emphasized during the first two weeks post-discharge considering the higher rates of medical-related complications during this period. While orthopaedic-related complications warranting readmissions were rare, they were commonly due to acute periprosthetic joint infections or periprosthetic fractures; highlighting the importance of continued vigilance throughout the early postoperative period for early complications, and the need for innovation that may continue to lower the infection and fracture burden in THA. Our institutional 30-day readmission risk calculator performed well and may contribute to high-value patient-centered care, and personalized approaches to mitigating the risk of readmission. However, future research endeavors are needed to identify additional drivers of inpatient readmission. Additionally, orthopaedic surgeons should be cognizant of the limitations of these calculators and their current inability to predict all readmissions.

Figure 1. Histogram of number of weeks post-discharge when patient was readmitted following THA.

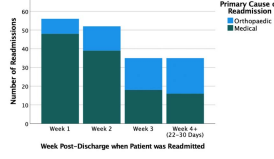


Figure 2. Most common medical causes of THA 30-day readmissions.

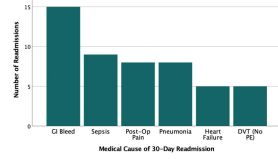


Figure 3. Most common orthopaedic causes of THA 30-day readmissions.

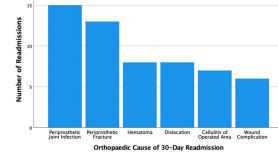


Figure 4. ROC curve of the 30-day readmission risk calculator efficacy at predicting 30-day readmissions following THA.

