Delayed discharge after total hip arthroplasty is associated with an increased risk of complications

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Background: The purpose of this study was to evaluate the influence of discharge timing on 30-day complication rates following total hip arthroplasty.

Methods: We identified patients who underwent total hip arthroplasty between 2011 and 2017 from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database. Using propensity score matching, we matched patients who were discharged from the hospital on the day of surgery to those discharged on postoperative days 1, 2, 3 and 4, respectively. We used multivariable logistic regression to determine if the rates of complications and readmission differed depending on length of stay.

Results: We identified 141 594 patients who underwent total hip arthroplasty (average age 64.7 [standard deviation (SD) 11.4] yr) from the NSQIP database. The average length of stay was 2.3 days and decreased from 2.8 (SD 0.7) days in 2011 to 1.9 (0.9) days in 2017. The adjusted odds of a major complication increased by 1.33 (1.09–1.61) and 1.41 (1.05–2.21) for patients discharged on postoperative day 3 and 4, respectively, compared with patients discharged on postoperative day 2. Similarly, the adjusted odds of a minor complication increased by 1.22 (1.03–1.43) and 1.58 (1.11–2.26) for patients discharged on postoperative days 3 and 4, respectively, compared with those discharged on postoperative day 2. We found no difference in the risk of major or minor complications between patients discharged on the day of surgery or postoperative day 1 compared with patients discharged on postoperative day 2. We also found that a length of stay of 3 or 4 days increased the risk of readmission (odds ratio [OR] 1.15, 95% confidence interval [CI] 1.03–1.29, and OR 1.18, 95% CI 1.08–1.85, respectively) compared with a length of stay of 2 days.

Conclusion: Our data suggest that discharge on postoperative days 0–2 is associated with the lowest risk of 30-day complications following total hip arthroplasty. These findings support early discharge after total hip arthroplasty; however, more prospective clinical data are required to determine the optimal length of stay following total hip arthroplasty.

Contexte : Cette étude avait pour but d'évaluer l'incidence du moment du congé hospitalier sur les taux de complication dans les 30 jours suivant une arthroplastie totale de la hanche (ATH).

Méthodes : Nous avons interrogé la base de données du National Surgical Quality Improvement Program (NSQIP) du Collège des chirurgiens des États-Unis pour recenser des patients ayant subi une ATH entre 2011 et 2017. Nous avons utilisé la méthode d'appariement sur score de propension pour comparer des patients ayant reçu leur congé le jour de l'intervention à d'autres l'ayant reçu 1, 2, 3 et 4 jours après. Nous nous sommes servis d'une régression logistique multivariée pour déterminer si les taux de complications et de réadmission différaient selon la durée d'hospitalisation.

Résultats : Nous avons repéré 141 594 patients ayant subi une ATH dans la base de données du NSQIP. L'âge moyen était de 64,7 ans (écart type [ÉT] 11,4 ans). La durée moyenne de séjour s'élevait à 2,3 jours et a diminué de 2,8 jours (ÉT 0,7) en 2011 à 1,9 (ÉT 0,9) en 2017. Le risque de complications majeures était plus élevé chez les patients ayant reçu leur congé les jours 3 et 4, avec des rapports de cotes (RC) ajustés de 1,33 (1,09–1,61) et de 1,41 (1,05–2,21), par rapport aux patients ayant reçu leur congé le jour 2. De même, le risque de complications mineures a augmenté par un facteur de 1,22 (RC 1,03–1,43) pour le jour 3 et de

1,58 (RC 1,11–2,26) pour le jour 4. Nous n'avons relevé aucune différence en ce qui a trait au risque de complications majeures ou mineures pour les congés donnés le jour de l'intervention, le lendemain, ou le surlendemain. Nous avons aussi observé que le risque de réadmission était plus élevé pour les séjours de 3 ou 4 jours (RC 1,15, intervalle de confiance [IC] de 95 % 1,03–1,29; RC 1,18, IC à 95 %, 1,08–1,85) par rapport à ceux de 2 jours.

Conclusion : Ces constatations suggèrent une association entre un congé les jours 0–2 suivant une ATH et le risque minimal de complications 30 jours plus tard. Ces résultats appuient un congé précoce suivant l'intervention, mais d'autres données cliniques prospectives seront nécessaires pour déterminer la durée de séjour optimale après une ATH.

Total hip arthroplasty (THA) is one of the most common orthopedic procedures, and it is among the procedures associated with the highest surgical expenditures in some health care systems. Furthermore, the number of THAs performed has been steadily increasing over the past decade and is projected to grow by 174% by 2030 in the United States.[1,2] One of the primary drivers of the cost of THA is hospital length of stay.[3,4] Some have proposed that shorter lengths of stay (LOS) may reduce the cost of THA without increasing the risk of complications. A 2016 systematic review of inpatient versus outpatient THA and total knee arthroplasty (TKA) found no difference in adverse events between groups and that outpatient surgery was associated with lower hospital costs.[5] Several studies have found no difference in complication rates between patients discharged early and late following THA. In 2016 Sutton and colleagues compared the outcomes of patients undergoing THA and TKA who were discharged within 2 days with those of patients discharged on days 3–4 using American College of Surgeons National Surgical Quality Improvement Program (NSQIP) data from 2011 and 2012 and concluded that early discharge was not associated with a higher risk of complications.[6]

To our knowledge, no previous studies have evaluated the impact of LOS on the basis of a day-to-day comparison in an attempt to identify the optimal LOS following THA. In addition, as early discharge has become increasingly popular over the past decade, the effect of LOS on morbidity following THA warrants further study with more recent data.

The purpose of our study was to evaluate the effect of LOS on rates of short-term complications and readmission following THA and to determine if there is a specific LOS associated with better or worse outcomes.

Methods

Data sources and cohort development

We conducted a retrospective analysis using the NSQIP database. NSQIP collects data on more than 150 variables, is highly regulated and has an agreement rate of 98% with chart review.[7]

We identified all patients aged 18 years and older who underwent THA between 2011 and 2017 using the Current Procedural Terminology (CPT) code 27130 (arthroplasty, acetabular and proximal femoral prosthetic replacement [total hip arthroplasty], with or without autograft or allograft). We excluded patients with LOS longer than 4 days to eliminate outliers. We also excluded patients whose time to complication was shorter than their LOS to exclude patients who were discharged late because of a complication.

Covariables

We ascertained patient characteristics including age, sex, American Society of Anesthesiologists (ASA) classification, body mass index (BMI), functional and smoking status and preoperative hematocrit, as well as comorbidities (including hypertension, diabetes, congestive heart failure [CHF] and chronic obstructive pulmonary disease [COPD]). We also catalogued operation length and anesthesia type (including general, epidural or spinal anesthetic).

Outcomes

Our primary outcome was major complications within 30 days of the initial procedure. These included myocardial infarction (MI), deep vein thrombosis (DVT), pulmonary embolism (PE), stroke, septic shock, cardiac arrest, deep surgical site infection (SSI), unplanned reintubation, on ventilator for more than 48 hours and acute renal failure. Our secondary outcomes included minor complications (superficial SSI, pneumonia, urinary tract infection, wound dehiscence and renal insufficiency) and hospital readmission.

Statistical analysis

We report descriptive statistics, including means, standard deviations (SD) and frequencies for all variables of interest. We used multivariable Poisson regression to identify independent predictors of LOS. We used propensity score matching to ensure comparability between groups. We used patients discharged on the day of surgery as the cases because this was the smallest group, and these patients tended to be younger and healthier. Each patient discharged on the day of surgery was matched 1 to 9 patients discharged on postoperative day 1, 1 to 23 patients discharged on postoperative day 2, 1 to 35 patients discharged on postoperative day 3, and 1 to 3 patients discharged on postoperative day 4. We retained all patients who had at least 1 eligible control. We hand-matched for age (± 3 yr), BMI (± 2 points), sex and ASA class, and we included all other variables in the propensity scores. We used a caliper of 0.2 SD.

We used multivariable logistic regression to evaluate the association between LOS and the odds of complications and readmissions while adjusting for other relevant variables. For the logistic regression analyses, we evaluated LOS as a categorical variable to determine if there was a specific discharge timing associated with better or worse outcomes. We also dichotomized patients into those whose LOS was 0–2 days versus 3–4 days and present these analyses in Appendix 1 (Tables A1–A4, available at www.canjsurg.ca/lookup/doi/10.1503/cjs.021219/tab-related-content). We checked the models for multicollinearity using tolerance and variance inflation factors and evaluated the fit of each model using C-statistics and Hosmer–Lemeshow tests. All statistical analyses were performed using SAS 9.4 (SAS Institute). The level of significance was set as p less than 0.05.

Results

We identified 141 594 patients who underwent THA (average age 64.7 [SD 11.4] yr) from the database. The average LOS was 2.3 days; it decreased from 2.8 (SD 0.7) days in 2011 to 1.9 (SD 0.9) days in 2017. Following matching, we retained 54 422 patients (average age 65.5 [SD 9.4] yr, average LOS 2.4 [SD 0.8] d). We present the characteristics of the matched and unmatched cohorts in Table 1 and Table 2.

We identified older age, female sex, a higher BMI, longer operation length, ASA class 4 (v. 1), COPD, bleeding disorder, diabetes, steroid use, current smoking, dependent functional status and lower preoperative hematocrit as independent predictors of LOS. In contrast, ASA class 2 (v. 1) and neuraxial anesthesia (v. general) were associated with a shorter LOS. We present the multivariable analysis of independent predictors of LOS in Table 3.

In the matched cohort, a total of 545 (1.0%) patients experienced a major complication, 754 (1.4%) experienced a minor complication and 1579 (2.9%) were readmitted within 30 days of the initial procedure. We present unadjusted rates of total complications and readmission in Table 4, and the most common reasons for readmission in Appendix 1 (Tables A5 and A6).

Following covariable adjustment, patients discharged on postoperative days 3 and 4 had increased odds of major

Table 1: Characeristics of patients in the unmatched cohorts for length of hospital stay

	No. (%) of patients*; length of stay					
Variable	0 d *n* = 2431	1 d *n* = 27 816	2 d *n* = 51 305	3 d *n* = 49 127	4 d *n* = 10 915	*p* value†
Operation length, min, mean ± SD	82.1 (32.2)	87.7 (32.0)	90.6 (36.7)	92.6 (40.5)	99.2 (46.1)	< 0.001
Mean age, yr, mean ± SD	61.5 (10.5)	62.2 (10.6)	63.3 (10.9)	67.0 (11.7)	67.9 (12.3)	< 0.001
Sex, female	1107 (45.5)	12 442 (44.7)	26 412 (51.5)	30 117 (61.3)	6970 (63.9)	< 0.001
BMI, kg/m^2, mean ± SD	29.2 (5.3)	29.7 (5.7)	30.3 (6.2)	30.5 (6.6)	30.4 (6.9)	< 0.001
Hypertension	1079 (44.4)	13 659 (49.1)	27 245 (53.1)	29 501 (60.1)	6580 (60.3)	< 0.001
COPD	63 (2.6)	616 (2.2)	1478 (2.9)	2290 (4.7)	705 (6.5)	< 0.001
CHF	2 (0.1)	22 (0.1)	84 (0.2)	155 (0.3)	53 (0.5)	< 0.001
Bleeding disorder	17 (0.7)	331 (1.2)	827 (1.6)	1124 (2.3)	361 (3.3)	< 0.001
Diabetes	209 (8.6)	2505 (9.0)	5364 (10.5)	6466 (13.2)	1588 (14.6)	< 0.001
Steroid use	59 (2.4)	772 (2.8)	1704 (3.3)	1847 (3.8)	532 (4.9)	< 0.001
Smoker	272 (11.2)	3475 (12.5)	6975 (13.6)	6266 (12.8)	1402 (12.8)	< 0.001
General anesthesia	739 (30.4)	11 806 (42.4)	25 854 (50.4)	26 672 (54.3)	5831 (53.4)	< 0.001
ASA class						
1	156 (6.4)	1451 (5.2)	2212 (4.3)	1607 (3.3)	394 (3.6)	< 0.001
2	1637 (67.3)	17 445 (62.7)	29 707 (57.9)	24 614 (50.1)	4774 (43.7)	
3	617 (6.4)	8701 (31.3)	18 781 (36.6)	22 012 (44.8)	5427 (49.7)	
4	21 (0.9)	219 (0.8)	605 (1.2)	894 (1.8)	320 (2.9)	
Dependent functional status	14 (0.6)	187 (0.7)	558 (1.1)	1136 (2.3)	337 (3.1)	< 0.001
Preoperative hematocrit, %, mean ± SD	41.9 (4.0)	42.0 (3.9)	41.5 (4.0)	40.7 (4.1)	40.1 (4.3)	< 0.001

ASA = American Society of Anesthesiologists; BMI = body mass index; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; SD = standard deviation.
*Unless indicated otherwise.
†Adjusted for all variables in this table plus admission year.

Table 2: Characteristics of patients after propensity score matching for length of hospital stay

Variable	No. (%) of patients*; length of stay 0 d *n* = 782	1 d *n* = 6733	2 d *n* = 17 932	3 d *n* = 27 211	4 d *n* = 1764	*p* value
Operation length, min, mean ± SD	86.2 (36.2)	87.4 (33.4)	88.5 (33.7)	89.6 (36.5)	91.4 (39.8)	< 0.001†
Mean age, yr, mean ± SD	64.6 (9.5)	65.6 (9.3)	65.3 (9.4)	65.5 (9.5)	65.9 (9.3)	0.002†
Sex, female	427 (54.6)	3777 (56.1)	9826 (54.8)	15 049 (55.3)	1019 (57.8)	0.63
BMI, kg/m², mean ± SD	30.0 (5.6)	30.0 (5.1)	30.1 (5.3)	30.1 (5.3)	30.2 (5.3)	0.30
Hypertension	451 (57.7)	4026 (59.8)	10 563 (58.9)	14 821 (54.5)	954 (54.1)	< 0.001†
COPD	28 (3.6)	217 (3.2)	586 (3.3)	746 (2.7)	72 (4.1)	0.05†
CHF	1 (0.1)	5 (0.1)	4 (0.0)	7 (0)	2 (0.1)	0.27
Bleeding disorder	13 (1.7)	105 (1.6)	230 (1.3)	315 (1.2)	24 (1.4)	0.08
Diabetes	92 (11.8)	854 (12.7)	2155 (12.0)	2982 (11.0)	198 (11.2)	< 0.001†
Steroid use	28 (3.6)	219 (3.3)	556 (3.1)	743 (2.7)	62 (3.5)	0.025†
Smoker	89 (11.4)	728 (10.8)	1987 (11.1)	3543 (13.0)	238 (13.5)	< 0.001†
General anesthesia	334 (42.7)	3096 (46.0)	8427 (47.0)	13 057 (48.0)	844 (47.9)	0.002†
ASA class						
1	28 (3.6)	155 (2.3)	464 (2.6)	688 (2.5)	41 (2.3)	0.26
2	462 (59.1)	3937 (58.5)	10 352 (57.7)	15 752 (57.9)	1001 (56.8)	
3	290 (37.1)	2637 (39.2)	7106 (39.6)	10 754 (39.5)	721 (40.9)	
4	2 (0.3)	4 (0.1)	10 (0.1)	17 (0.1)	1 (0.1)	
Dependent functional status	7 (0.9)	77 (1.1)	150 (0.8)	155 (0.6)	15 (0.9)	< 0.001†
Preoperative hematocrit, %, mean ± SD	41.1 (3.9)	41.0 (3.8)	41.1 (4.1)	41.5 (3.8)	41.3 (3.9)	< 0.001†

ASA = American Society of Anesthesiologists; BMI = body mass index; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; SD = standard deviation.
*Unless indicated otherwise.
†Adjusted for all variables in Table 1 plus admission year.

Table 3: Independent predictors of length of hospital stay

Variable	Point estimate	*p* value
Age, yr	0.006 (0.005 to 0.007)	< 0.001*
Female sex	0.075 (0.067 to 0.083)	< 0.001*
BMI	0.004 (0.003 to 0.005)	< 0.001*
Operation length	0.001 (0 to 0.002)	< 0.001*
ASA class		
1	Ref.	
2	–0.039 (–0.058 to 0.020)	< 0.001*
3	0.010 (–0.010 to 0.030)	0.22
4	0.053 (0.020 to 0.087)	0.001*
Hypertension	0.004 (–0.004 to 0.012)	0.30
COPD	0.063 (0.045 to 0.081)	< 0.001*
Bleeding disorder	0.058 (0.034 to 0.083)	< 0.001*
Diabetes	0.017 (0.006 to 0.028)	0.001*
Steroid use	0.033 (0.014 to 0.051)	< 0.001*
Smoker	0.049 (0.039 to 0.060)	< 0.001*
Neuraxial anesthesia	–0.056 (–0.063 to 0.049)	< 0.001*
Dependent functional status	0.093 (0.067 to 0.118)	< 0.001*
Preoperative hematocrit	–0.008 (–0.009 to 0.007)*	< 0.001*

ASA = American Society of Anesthesiologists; BMI = body mass index; COPD = chronic obstructive pulmonary disease; Ref. = reference category.
*Adjusted for all variables in Table 1 plus admission year.

complications (odds ratio [OR] 1.33, 95% confidence interval [CI] 1.09–1.61, and OR 1.41, 95% CI 1.05–2.21, respectively), compared with patients discharged on postoperative day 2. Similarly, patients discharged on days 3 and 4 had an increased odds of minor complications (OR 1.22, 95% CI 1.03–1.43, and OR 1.58, 95% CI 1.11–2.26, respectively), compared with patients with a 2-day LOS. We found no difference in the odds of major or minor complications between patients discharged on the day of surgery or on postoperative day 1 compared with patients discharged on postoperative day 2 (Table 5).

We also found that prolonged LOS increased the odds of readmission. After we adjusted for potential confounders, an LOS of 3 or 4 days increased the odds of readmission (OR 1.15, 95% CI 1.03–1.29, and OR 1.18, 95% CI 1.08–1.85, respectively), compared with patients discharged on postoperative day 2.

Discussion

To our knowledge, ours is the first study evaluating the impact of LOS on a day-to-day basis following THA. We have shown that discharge on postoperative days 0–2 may be associated with better outcomes than discharge 3 or 4 days following THA and that there may be no increased risk of adverse events following outpatient THA.

Our study expands upon previous studies evaluating the impact of LOS on outcomes following THA. In 2016, Sutton and colleagues found that that early

Table 4: Unadjusted rates of specific complications and readmission after propensity score matching

Variable	No. (%) of patients; length of stay					p value
	0 d n = 782	1 d n = 6733	2 d n = 17 932	3 d n = 27 211	4 d n = 1764	
Major complications	9 (1.2)	45 (0.7)	157 (0.9)	312 (1.2)	22 (1.3)	< 0.001*
Myocardial infarction	2 (0.3)	2 (0)	16 (0.1)	29 (0.1)	5 (0.3)	0.021*
Deep vein thrombosis	3 (0.4)	17 (0.3)	37 (0.2)	101 (0.4)	8 (0.5)	0.020*
Pulmonary embolism	1 (0.1)	7 (0.1)	32 (0.2)	45 (0.2)	0 (0)	0.90
Stroke	0 (0)	0 (0)	0 (0)	12 (0)	0 (0)	0.017*
Septic shock	0 (0)	0 (0)	3 (0)	10 (0)	0 (0)	0.34
Cardiac arrest	0 (0)	0 (0)	1 (0)	9 (0)	0 (0)	0.16
Deep surgical site infection	4 (0.5)	17 (0.3)	73 (0.4)	130 (0.5)	8 (0.5)	0.04*
Reintubation	0 (0)	3 (0)	5 (0)	14 (0.1)	1 (0.1)	0.76
Ventilator > 48 h	0 (0)	2 (0)	1 (0)	8 (0)	0 (0)	0.58
Minor complications	10 (1.3)	73 (1.1)	224 (1.3)	411 (1.5)	36 (2.0)	< 0.001*
Superficial surgical site infection	0 (0.0)	28 (0.4)	86 (0.5)	150 (0.6)	14 (0.8)	0.008*
Pneumonia	1 (0.1)	7 (0.1)	18 (0.1)	34 (0.1)	5 (0.3)	0.32
Urinary tract infection	9 (1.2)	35 (0.5)	88 (0.5)	168(0.6)	14 (0.8)	0.05
Wound dehiscence	0 (0.0)	5 (0.1)	21 (0.1)	20 (0.1)	3 (0.2)	0.89
Sepsis	0 (0.0)	9 (0.1)	25 (0.1)	57 (0.2)	2 (0.1)	0.08
Renal insufficiency	0 (0.0)	3 (0.0)	6 (0.0)	7 (0.0)	2 (0.1)	0.86
Readmission	18 (2.3)	174 (2.6)	489 (2.8)	840 (3.2)	58 (3.4)	0.002*

*Adjusted for all variables in Table 1 plus admission year.

Table 5: Multivariable logistic regression analyses for each outcome for propensity matched cohorts

Variable	OR (95% CI)	p value
Major complications		
LOS 0	1.33 (0.68–2.63)	0.56
LOS 1	0.76 (0.54–1.06)	0.11
LOS 2	Ref.	—
LOS 3	1.33 (1.09–1.61)	0.005*
LOS 4	1.41 (1.05–2.21)	0.024*
Minor complications		
LOS 0	1.04 (0.55–1.97)	0.79
LOS 1	0.86 (0.66–1.13)	0.32
LOS 2	Ref.	—
LOS 3	1.22 (1.03–1.43)	0.032*
LOS 4	1.58 (1.11–2.26)	0.022*
Readmission		
LOS 0	0.86 (0.53–1.39)	0.38
LOS 1	0.94 (0.79–1.12)	0.32
LOS 2	Ref.	—
LOS 3	1.15 (1.03–1.29)	0.041*
LOS 4	1.18 (1.08–1.85)	0.022*

CI = confidence interval; LOS = length of stay; OR = odds ratio; Ref. = reference category.
*Adjusted for all variables in Table 1 plus admission year.

discharge (LOS 0–2 d) was not associated with a higher risk of overall complications than discharge on day 3 or 4.[6] Our results confirm these findings with more recent data and expand upon their results by separately evaluating discharge on the day of surgery and postoperative days 1 and 2. These data suggest that there may be no difference in complications between discharge on the day of surgery or the day after surgery compared with discharge on postoperative day 2.

Likewise, Basques and colleagues compared the outcomes of patients undergoing THA or TKA as either an outpatient (same-day discharge) or inpatient (discharge ≥ 1 d postoperatively) via propensity score matching.[8] They found no differences in 30-day complications or readmission between discharge groups. Unfortunately, their multivariable analyses for readmission included only 13 events, indicating that their model for this outcome was overfitted. In addition, while the authors included age, sex, BMI, smoking status, ASA class, anesthesia type and some comorbidities in their propensity scores, they did not account for other potential confounders such as functional status, preoperative hematocrit or steroid use, which we have shown can affect patients' LOS. Further, we believe that grouping all patients discharged 1 or more days after surgery oversimplifies the potential effect of discharge on postoperative day 1 or 2 versus postoperative day 3 or 4.

Lovecchio and colleagues used NSQIP data from 2011–2013 to compare the outcomes of patients undergoing outpatient versus "fast-track" (LOS 1–2 d) THA and TKA. Interestingly, after propensity score matching the 2 groups for a variety of covariables, the authors found that the outpatient group had significantly higher rates of overall complications.[9] This is different from our results that showed no difference in complication or readmission rates among patients discharged on days 0–1 versus day 2. This could be the result of the authors grouping THA and TKA patients together, as the complication and readmission risk relative to discharge timing following these procedures may be different. In addition, the authors did not include functional status in their propensity score calculation, which we have shown may be associated with LOS.

While there may be some overlap with our study and previously published articles, ours is an important addition to the literature for several reasons. First, previous studies have focused mainly on early versus late, or same-day versus inpatient surgery. In contrast, our data evaluate the impact of LOS on a day-to-day basis. Second, we believe that the previous studies were not as comprehensive in terms of potential confounder adjustment. As previously mentioned, none of the studies included functional status, steroid use or anesthesia type. As evidence of the importance of adjusting for these variables, our data indicate that a longer operation time, female sex, older age, higher BMI, steroid use, COPD, bleeding disorder, dependent functional status, current smoking, diabetes, ASA class, anesthesia type and preoperative hematocrit all significantly influence LOS following THA. Finally, unlike previous studies, our data include patients from 2006 to 2017. As the number of hospitals that participate in NSQIP has increased substantially over the years, the inclusion of data from 2016–2017 resulted in an increased sample size of 63 321 patients. Not only does this reflect more recent findings, but it also increases the power of our analyses and allows for more robust multivariable models.

Limitations

Limitations of this study include those inherent in using administrative data. Whereas NSQIP is highly regulated and has shown 98% agreement with chart review, there is always the possibility of coding errors. Furthermore, the NSQIP database allows the analysis only of 30-day outcomes, missing potential intermediate or long-term complications and readmission. Finally, NSQIP does not capture potentially critical clinical variables and outcomes. Therefore, while we believe that this study provides an important addition to the literature surrounding the effect of LOS on 30-day morbidity following THA, prospective clinical studies are required in this area. Our study can serve to generate hypotheses for future clinical studies to determine the optimal discharge date following THA.

Conclusion

Our data indicate that discharge on days 3 and 4 may be associated with a higher risk of morbidity than discharge on days 0–2 after THA. While these data build upon previous evidence in this area, we believe that prospective clinical data are required to determine the optimal length of stay following THA.

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