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Hospital Discharge Within 1 Day After Total Joint Arthroplasty From a Veterans Affairs Hospital Does Not Increase Complication and Readmission Rates

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ABSTRACT

Background: Attempts to control costs associated with total joint arthroplasty have included efforts to shorten hospital length of stay (LOS). Concerns related to patient outcomes and safety with decreased LOS persist. The purpose of this study was to investigate whether discharge on postoperative day (POD) 1 after joint replacement is associated with increased rates of 90-day return to the operating room, and 30-day readmissions and emergency department (ED) visits.

Methods: After chart review, 447 patients admitted between January 2, 2013 and September 16, 2016 met inclusion criteria. All patients underwent one total joint arthroplasty. Patients were either discharged on POD 1 (subgroup 1) or POD 2 or 3 (subgroup 2). Statistical evaluation was performed using Wilcoxon-Mann-Whitney tests for continuous variables, and Fisher exact tests for categorical and frequency data. Statistical significance was established at $P \leq .05$.

Results: Subgroup 1 had significantly fewer return trips to the operating room ($P = .043$) and significantly fewer 30-day readmissions ($P = .033$). ED visits were not significantly different between groups ($P = .901$).

Conclusion: Early discharge after joint arthroplasty appears to be a viable practice and did not result in increased rates of reoperation within the 90-day global period, or rates of 30-day readmission and ED visits. Our results support the utilization of an early discharge protocol on POD 1, with no evidence that shorter LOS results in higher rates of short-term complications.

The surgical treatment of osteoarthritis in North America with primary total joint arthroplasty (TJA) procedures continues to rise, with more than 1 million arthroplasty procedures performed in 2011 [1,2]. Current projections estimate that the number of primary arthroplasty procedures performed annually may exceed 3 million by the year 2030 [3]. In 2011, the Center for Disease Control and Prevention identified unilateral total knee arthroplasty (TKA) and total hip arthroplasty (THA) as the second and fourth most expensive hospital surgical procedures performed at noncommunity hospitals after inflation-adjusted national cost assessment, respectively [2]. From 2003 to 2010, the cost of a THA in the United States increased from $13,000 to $16,500 and the cost of TKA during the same period increased from $12,500 to $16,000 [4]. Hospital length of stay (LOS) contributes to the total cost associated with TJA. In 2010, the daily cost of a hospital bed in the United States was estimated to range from $1625 to $2025 [5]. It is worth noting that these costs represent those faced by private hospitals and the cost of such procedures through the Veterans Affairs (VA) healthcare system is largely unknown.

Subsequently, there has been a strong movement to decrease hospital LOS. Factors that have facilitated this change include better preoperative education, improved perioperative pain management, and early discharge pathways [6–9]. However, the overall safety of accelerated discharge protocols remains a controversial topic.

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Table 1
Preoperative Characteristics.

Variable	All Subjects			Hip			Knee		
	Subgroup 1	Subgroup 2	*P* Value	Subgroup 1	Subgroup 2	*P* Value	Subgroup 1	Subgroup 2	*P* Value
	1 d LOS, n = 206	2-3 d LOS, n = 241		1 d LOS, n = 66	2-3 d LOS, n = 81		1 d LOS, n = 140	2-3 d LOS, n = 160	
Age, y	63.8 ± 8.8	63.2 ± 8.4	.093	62.9 ± 10.6	64.2 ± 7.8	.666	64.2 ± 7.9	62.8 ± 8.6	.023*
Sex, % male	94%	93%	.999	0.94	0.96	.701	0.94	0.92	.660
BMI, kg/m^2	31.3 ± 4.5	31.2 ± 4.4	.950	30.2 ± 5.1	30.9 ± 4.3	.422	31.8 ± 4.1	31.4 ± 4.5	.621
Ethnicity, % white	83%	83%	.793	0.76	0.81	.423	0.86	0.83	.422
Smokers, %	19%	25%	.174	0.26	0.31	.583	0.16	0.22	.245
HTN, % yes	77%	70%	.087	0.7	0.7	.999	0.81	0.69	.033*
A1c, % normal	91%	93%	.795	0.94	0.9	.548	0.9	0.94	.270
DM, % diabetic	27%	28%	.721	21%	23%	.384	30%	31%	.981
COPD, % yes	10%	7%	.402	0.11	0.09	.781	0.09	0.07	.524
CHF, % yes	4%	2%	.427	0.06	0.04	.701	0.03	0.02	.709
CST, % yes	4%	6%	.291	0.05	0.05	.999	0.04	0.07	.303
Injection, % yes	4%	2%	.239	0.05	0.04	.999	0.04	0.01	.101
Cr, mg/dL	1.03 ± 0.25	0.97 ± 0.25	.003*	1.01 ± 0.30	0.98 ± 0.59	.207	1.03 ± 0.22	0.97 ± 0.24	.006*
BUN, mg/dL	16.6 ± 5.8	17.9 ± 6.6	.039*	16.4 ± 6.3	18.9 ± 9.1	.078	16.7 ± 5.6	17.4 ± 4.9	.212
Hct, %	41.8 ± 3.3	42.1 ± 4.0	.590	41.2 ± 3.4	41.2 ± 4.0	.945	42.1 ± 3.2	42.5 ± 4.0	.433
Platelets, 10^9/L	238 ± 65	227 ± 64	.129	245 ± 72	233 ± 67	.605	234 ± 62	224 ± 62	.132
ASA class (1/2/3/4)	1/91/114/0	1/94/138/8	.023*	1/29/36/0	0/25/52/4	.056	0/62/78/0	2/69/86/3	.222

ASA, American Society of Anesthesiologists; BMI, body mass index; BUN, blood urea nitrogen; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; Cr, creatinine; CST, systemic corticosteroid; DM, diabetes mellitus; Hct, hematocrit; HTN, hypertension; LOS, length of stay.
* Differs significantly between subgroups.

Several smaller studies demonstrated no increase in complications or short-term readmissions in early or outpatient discharges in patients undergoing TJA [10,11]. A more recent study examined the National Surgical Quality Improvement Program database and reported that hospital discharge within 2 days of TJA did not increase major complication or readmission rates [12].

The primary objective of this study was to evaluate the independent effect of early discharge on postoperative day (POD) 1 on the 90-day risk of return to the operating room (OR), and rates of 30-day readmissions and emergency department (ED) visits. A secondary objective was to evaluate the effect of early discharge on the 30-day risk of major complications. Our null hypothesis was that there would be no increased risk of return to the OR, readmission, visits to the ED, or major complications between early and standard discharge groups.

Materials and Methods

In April 2015, the orthopedic surgery service consisting of 2 joint replacement surgeons, one who performs both hip and knee arthroplasty (senior author) and one who performs knee arthroplasty only (see Acknowledgements), at our VA medical center began discharging primary TJA patients on POD 1. Previously, patients were discharged on POD 2 or 3. All patients included in the study experienced the same educational protocol. Before surgery, all patients attended a preoperative visit at which a history and physical examination was performed with documentation of leg length discrepancies, ambulatory status, and gait abnormalities. All veterans watched an educational video that detailed surgical indications and postoperative rehabilitation for the planned procedure. On that same day, an anesthesia evaluation was performed. The healthcare provider team met the week before surgery for a templating conference to discuss patient-specific preoperative comorbidities and anticipated discharge disposition. All TKAs included in the present study were performed at our facility with a proximal thigh tourniquet. Both discharge groups (for both TKA and THA) received intravenous tranexamic acid and most arthroplasty procedures were performed with spinal anesthesia (for specific breakdown with regard to anesthesia type see Table 2). After surgery, patients were placed on a regimented multimodal analgesia protocol. This protocol includes the administration of the following medicine: gabapentin 300 milligrams (mg) every 8 hours, tramadol 50 mg every 6 hours, ketorolac 15 mg injection every 6 hours for 3 doses, acetaminophen 975 mg every 8 hours, oxycodone 5 mg 1-2 tabs every 4 hours as needed, and hydromorphone 0.5 mg every 4 hours as needed for pain. Patients are discharged home with prescriptions for oral oxycodone/acetaminophen and tramadol. Patients were expected to work with in-hospital physical therapy on POD 0. All patients discharged home on POD 1 had home health care services arranged and were provided contact information for our orthopedic clinic to facilitate calls at any time in the postoperative period. Home physical therapy was arranged for all TKA patients. Patients had their first postoperative appointment 3 weeks after the index procedure.

This study analyzed a cross-sectional sample of patients at our VA facility, subdivided into 2 independent LOS subgroups for comparison. Subgroup 1 was discharged on POD 1 and subgroup 2 was discharged on POD 2 or 3. A total of 492 patient records including 572 procedures were initially reviewed. Patients were eligible if they had at least one primary hip or knee replacement performed between January 2, 2013 and September 16, 2016, with an actual LOS that matched the planned LOS. Any observation for which LOS did not match concurrent policy was excluded from the sample (ie, if a patient underwent joint replacement under the new policy, and was discharged after POD 1, they were excluded; likewise, patients discharged on POD 1 under the old policy were excluded). When a patient had multiple qualifying primary procedures (66 patients), a random number generator was used to select a single admission event for inclusion in the corresponding subgroup. Thus, no patient had more than one admission event, and no single patient was included in more than one subgroup. Further no crossover between groups occurred with patients only having one joint included for analysis if they underwent an arthroplasty procedure both before and after the institution of the new discharge protocol. Applying these filters resulted in a sample of 206 patients in subgroup 1 and 241 patients in subgroup 2.

Primary outcomes were unexpected return to the OR within 90 days of discharge, and readmissions and ED visits at 30 days. All outside hospital visits are recorded in the VA system, ensuring accurate tracking of ED visits and admissions to hospitals outside