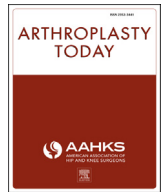




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Original research

Do shorter lengths of stay increase readmissions after total joint replacements?

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Background: Enhanced recovery after surgery protocols for total joint replacements (TJRs) emphasize early discharge, yet the impact on readmissions is not well documented. We evaluate the impact of a one-day length of stay (LOS) discharge protocol on readmissions.

Methods: We conducted a retrospective review of all primary TJRs (hip and knee) from April 2014 to March 2015. Patients who had adequate support to be discharged home were categorized into 2 groups, 1-day (n = 174) vs 2-day (n = 285) LOS groups. Patients discharged to rehabilitation were excluded (n = 196). **Results:** Patients in the 1 day group were more likely to be younger (61.7 vs 64.8 years, $P < .001$), be male (56.3% vs 40.4%, $P = .001$), and have a lower body mass index (30.0 vs 31.4 kg/m², $P = .012$). One-day LOS patients had shorter surgical times (79.7 vs 85.6 minutes, $P = .001$) and more likely had spinal anesthesia (46.0% vs 31.2%, $P = .001$). The overall 30-day all-cause (2.3% vs 2.5%, $P = .591$) and 90-day wound-related (1.1% vs 1.1%, $P = .617$) readmission rates were equivalent between groups.

Conclusions: Early discharge does not increase readmissions and may help attenuate costs associated with TJRs. Further refinement of protocols may allow for more patients to be safely discharged on postoperative day 1.

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Introduction

Enhanced recovery after surgery (ERAS) programs expedite postoperative recovery, support an early discharge, and decrease postoperative complications by promoting a multidisciplinary approach to patient care [1]. Originally developed for colon surgery, ERAS pathways are being adopted across a range of surgical specialties [2–4]. Developed using evidence-based medicine, ERAS emphasizes a reduction in postoperative morbidity with strategies targeting anesthesia, analgesia, fluid management, nutrition, and postoperative ambulation [1]. Specifically for total joint replacements (TJRs), protocols include preoperative patient education and preparation, regional anesthesia, multimodal nonopioid pain management, aggressive postoperative fluid administration, and early mobilization [5–7].

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According to the Centers for Disease Control and Prevention, there were 1.1 million TJRs performed in the United States in 2012, costing US \$18.75 billion [8]. By 2030, the demand for TJRs is projected to increase by 174% for primary total hip arthroplasties and 673% for primary total knee arthroplasties [9]. With two-thirds of all TJRs in the United States being performed on Medicare beneficiaries, these procedures represent a financial burden to the Centers for Medicare & Medicaid Services (CMS) [10,11]. Efforts to contain rising costs led to the creation of a bundled payments reimbursement model, which rewards hospitals and surgeons that can control costs. An important way to decrease costs is to decrease hospital length of stay (LOS).

Early concerns have been raised that decreasing hospital stay may result in an increase in hospital readmissions; however, studies demonstrate that ERAS programs shorten LOS without increasing complications or readmissions [12–18]. In 2014, CMS updated its Readmissions Reduction Program to improve patient outcomes after TJRs [10]. These TJR-specific quality measures define 7-day, 30-day, and 90-day causes for readmissions [19]. Hospitals now incur a financial penalty for complications and readmissions associated with TJRs.

Rapid recovery and shorter lengths of stay have become an early measure of success after TJRs for both patients and hospitals.

With growing emphasis on cost efficiency, research efforts are now being directed at updating ERAS pathways to further shorten hospital stay, without adversely impacting patient outcomes [20–22]. The purpose of this study was to evaluate our readmissions rate after updating our institution's ERAS program to promote a 1-day LOS discharge protocol. The primary end point of this study was to quantify the overall all-cause 30-day readmissions rate. Secondary end points were to identify variables associated with a shorter LOS.

Material and methods

All TJRs at our institution were performed under our ERAS program. This includes preoperative, intraoperative, and postoperative protocols for care delivery. Preoperative measures were patient education, physical therapy, and medical evaluations. Patient education involved educational programs overviewing daily activities after surgery, identifying a specific care companion “Coach” at home, and discussing expectations. Preoperative physical therapy aimed to strengthen the upper and lower extremities. All patients had a medical evaluation within 30 days of surgery. Perioperative protocols included regional anesthesia, multimodal pain management, aggressive intraoperative fluid management, tranexamic acid utilization, anticoagulation prophylaxis, and day of surgery ambulation. Table 1 summarizes our pharmacological protocol. Standard Surgical Care Improvement Guidelines for perioperative antibiotics was followed. Pharmacologic (Aspirin 325 mg bid or Coumadin INR 1.8–2.4) and mechanical postoperative deep vein thrombosis prophylaxis was maintained in all patients. Oxycodone (5 mg increments as needed) was prescribed for pain unresponsive to nonopioid analgesics.

On April 1, 2014, our ERAS program was updated to promote an earlier (1 day LOS) discharge protocol. Specifically, patient education was updated to set expectations for discharge.

Table 1
Enhanced recovery after surgery pharmacological protocol.

Preoperative pain management (single dose within 2 h of incision)
Acetaminophen 975 mg PO
Lyrica 50 mg PO
Protonix 40 mg PO
Oxycontin 10 mg PO
Scopolamine patch ^a
Celebrex 200 mg PO ^b
Tranexamic acid (TXA)
Total knee replacement
Preincision 10 mg/kg, maximum dose 1000 mg
3 h after incision 10 mg/kg, maximum dose 1000 mg
Total hip replacement
Preincision 10 mg/kg, maximum dose 1000 mg
Periarticular injection
Morphine 5 mg
Toradol 15 mg ^a
Ropivacaine 0.5% 30 cc
Epinephrine 1/1000 0.3 cc
Saline 30 cc
Postoperative pain management
Total knee replacement
Acetaminophen 975 mg PO q 4 as needed
Lyrica 50 mg PO bid × 14 d
Celebrex 200 mg PO qd × 30 d
Oxycodone 5 mg as needed
Total hip replacement
Acetaminophen 975 mg PO q 4 as needed
Oxycodone 5 mg as needed
Lyrica 50 mg PO bid × 14 d ^c

PO, per oral.

^a Unless contraindicated.

^b Not given if periarticular injection included Toradol 15 cc.

^c In select patients with breakthrough pain.

Perioperative modifications included the increased use of regional anesthesia. The use of femoral nerve blocks for TKRs was discontinued. Patient-controlled anesthesia was discontinued. Day of surgery mobilization was attempted in almost all patients. Acetaminophen (975 mg) was added to the postoperative analgesic medication list.

Study design

Institutional review board approval was obtained. A prospectively maintained institutional Joint Outcomes database was queried for all primary total hip and knee replacements. All procedures were performed by 2 surgeons from April 2014 to March 2015. The 2 surgical techniques used for THRs were the direct anterior and posterior-lateral approach. There was no criterion for assigning patients to a particular surgical technique. It was determined using patient and surgeon preference. All TKRs were performed via a standard medial patellar arthrotomy. The new 1-day LOS protocol was introduced on April 1, 2014. The aim of this study was to evaluate the impact of an earlier (1-day LOS) discharge on readmissions.

A total of 655 TJRs met our initial criteria, of which 196 were discharged to rehabilitation and excluded. This exclusion criterion was based on Medicare's requirement for a minimum 3-day inpatient stay for patients to go to a skilled nursing facility. This left a total of 459 (70%) TJRs in this study. Patients were then categorized into the 1-day or 2-day LOS groups. Length of hospital stay was determined by medical clearance and the ability to safely ambulate after surgery.

Patient demographics of age, gender, body mass index (BMI), and comorbidity were recorded. Table 2 summarizes the patient demographics for patients discharged to rehabilitation facilities that were excluded (LOS ≥ 3 days) from this study. The primary end points were our readmissions rate, which were assessed using CMS's TJR-specific quality measures [19]. Secondary end points examined variables associated with early discharge.

CMS TJR-specific quality measures: patients were evaluated for a total of 8 postoperative complications [19]. Patients presenting with an acute myocardial infarct, pneumonia, or sepsis/septicemia/shock during the index of admission or within 7 days of admission

Table 2
Patient demographics for patients excluded from study.

Demographics	LOS ≥ 3 d
N	196
Age (y)	70.4
Body mass index (kg/m ²)	31.2
Gender	
Male	28.6%
Female	71.4%
Comorbidity	
Diabetes	25.0%
Hypertension	74.0%
Hyperlipidemia	57.7%
Gastroesophageal reflux disease	42.3%
Coronary artery disease	12.2%
Chronic obstructive pulmonary disease	11.7%
Congestive heart failure	4.6%
Liver cirrhosis	0.5%
Atrial fibrillation	14.3%
Pacemakers	1.5%
Past medical history	
History of DVT/PE	5.6%
History of CVA/TIA	8.2%
History of myocardial infarct	4.1%

CVA, cerebrovascular accident; DVT, deep vein thrombosis; PE, pulmonary embolism; TIA, transient ischemic attack.

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