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Reducing Length of Stay Does Not Increase Emergency Room Visits or Readmissions in Patients Undergoing Primary Hip and Knee Arthroplasties

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ABSTRACT

Background: Total hip and total knee arthroplasty (total joint arthroplasty [TJA]) are 2 of the most common elective surgeries. Identifying which patients are at highest risk for emergency room (ER) visits or readmissions within 90 days of surgery and the reasons for return are crucial to formulate ways to decrease these visits and improve patient outcomes.

Methods: This is a retrospective review of a consecutive series of 7466 unilateral primary TJA performed from July 2013 to June 2017; any patients who had an ER visit or readmission in the first 90 days after surgery were identified, and a detailed chart review was performed. Patients discharged home or to rehab were analyzed separately.

Results: Three hundred thirty-six (4.5%) patients had 380 ER visits and 250 (3.3%) patients had 291 readmissions in the first 90 days after TJA. Patients returning to the ER were equivalent to those who did not. Patients who went to a rehab facility on discharge were significantly more likely to be readmitted ($P = .000$). Patients who were readmitted had a higher American Society of Anesthesiologists score ($P = .000$). Length of stay decreased over the study period from 2.66 days to 1.63 days, while the number of unplanned interventions remained steady. Pain and swelling was the most common reason for return for ER visits (33.2%) and readmissions (14.1%).

Conclusion: The overall number of unplanned interventions after TJA in this population was low and remained consistent over time despite decreasing length of stay. Patients who went to rehab were more likely to experience readmission. The majority of unplanned interventions occurred in the first 4 weeks after surgery.

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Total hip arthroplasty (THA) and total knee arthroplasty (TKA) are 2 of the most common surgical procedures performed in the United States, with the number of procedures performed increasing each year. In 2015, TKA and hip arthroplasty, both total and partial, were the 2 most common operations performed during inpatient hospital stay with 236 TKA and 167 hip arthroplasties performed

per 100,000 stays [1]. By the year 2030, the demand for primary TKA is projected to be 3.48 million and for primary THA is 572,000 [2]. Any surgical procedure comes with an inherent risk of complications and joint arthroplasty is no exception. Owing to the large numbers of THA and TKA performed each year, even a modest occurrence of complications requiring readmission or emergency room (ER) visits will have a significant impact on the health-care system. With the advent of the Affordable Care Act and the Centers for Medicare and Medicaid Services commitment to decrease health-care costs, there is a move toward alternative payment methods including bundled payment models. While this is not yet mandatory, joint arthroplasty is one of the most common procedures to utilize a bundled payment model, which will include all costs associated with a procedure for the first 90 days, including

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readmission and ER visits [3]. Other payers are also linking quality of care to insurance payments with readmissions being a common measure of quality [4].

Unplanned interventions, ER visits, or readmissions in the first 90 days after surgery significantly add to the cost of patient care and are associated with suboptimal patient outcomes [3]. Identifying which patients are at highest risk for unplanned interventions and the causes of return are crucial to formulate ways to decrease unplanned interventions, thereby improving patient outcomes. A number of factors have been hypothesized to increase the risk and the rate of unplanned intervention in TKA and THA patients including length of stay (LOS), discharge disposition, and patient factors including comorbidities [4–8].

There have been many studies examining readmission after total joint arthroplasty (TJA) with somewhat varied conclusions [7,9–11] though few studies have examined ER visits either independently or concurrently with readmissions [12–14]. We aim with this study to add to the current body of literature by examining both readmissions and ER visits experienced by patients after TJA from one high-volume institution. We seek to identify the timing of unplanned interventions and the reasons for the visits to identify necessary areas of improvement to care pathways. We also seek to evaluate whether decreased hospital length of stay increases the rate of unplanned interventions.

Methods

The institutional review board approval was obtained. A retrospective chart review was performed for a consecutive series of all primary unilateral TJA performed at this institution between July 2013 and June 2017. Surgeries were performed by one of 11 board-certified orthopedic surgeons. Basic demographic data including age, sex, and body mass index, discharge disposition, and LOS were recorded for the entire population. American Society of Anesthesiologists (ASA) score was used to quantify preoperative health status [15]. All patients who returned to this institution via ER or readmission were identified, and a detailed chart review was performed.

Perioperative Protocol

All patients were subject to the same perioperative protocols in a coordinated Joint Replacement Center Program. Throughout the study, all patients received preoperative education consisting of written materials and a class, preoperative medical evaluation, and preoperative strengthening via a home exercise program or formal physical therapy. All patients underwent a standard decolonization protocol with intranasal mupirocin ointment twice daily for 3 days before surgery and chlorhexidine body wash for 3 days before surgery. All patients also received parenteral antibiotics per the Surgical Care Improvement Project guidelines. Before the implementation of an enhanced recovery after surgery (ERAS) protocol, patients received either general anesthesia with a femoral nerve block for TKA or spinal anesthesia and pain control via infiltrative anesthetic and patient-controlled analgesia transitioning to oral pain medication on postoperative day one. In this time period, warfarin was the primary pharmacologic prophylaxis for deep vein thrombosis (DVT) along with mechanical prophylaxis, and patients were typically mobilized in the morning of postoperative day one. Patients received group physical therapy twice daily while in the hospital and were discharged either to a skilled nursing facility (SNF) or to home health or outpatient physical therapy 3 times a week. After the implementation of the ERAS protocol in April 2015, patients received regional anesthesia wherever appropriate; femoral nerve blocks and patient-controlled analgesia were

discontinued, and multimodal pain management regimens were initiated with celecoxib, acetaminophen, pregabalin and short-acting opioids. Patients also received aggressive intraoperative fluid management, tranexamic acid utilization, and day of surgery ambulation. Aspirin 325 mg bid became the primary pharmacologic DVT prophylaxis, using warfarin in selected high-risk patients. Postdischarge physical therapy protocols did not change.

Study Population

A total of 7466 patients were included in the study. All TKAs (4720 patients) were performed via a standard medial patellar arthrotomy, posterior approach THA (924 patients) in the lateral decubitus position and anterior approach THA (1822 patients) using a modern fracture table. There were a total of 671 unplanned interventions in the first 90 days postoperatively by 586 patients, 7.8% of the study group. There were 380 visits were made to the ER by 336 (4.5%) patients and 250 (3.3%) patients experienced 291 readmission events.

Study Outcomes

We examined incidence and risk factors of patients who experienced an unplanned intervention, either ER visit or readmission in the first 90 days after surgery. The entire group was analyzed, and then patients discharged home or to an SNF were analyzed separately. Unplanned ER visits or readmissions were defined as any return to the hospital within 90 days of the index admission. The primary diagnosis documented in the patient chart was considered to be the reason for the return visit.

Statistical Analysis

Pearson's chi-squared tests were used to analyze the differences in categorical variables between groups. A series of *t* tests and analysis of variance were used to analyze continuous variables. A *P* value less than or equal to .05 was treated as statistically significant. All analyses were performed using SPSS (SPSS 24.0, IBM Inc., Somers, NY).

Results

A total of 7466 patients were included in the study. Of the total sample, 5835 (78.2%) patients were discharged home and 1631 (21.8%) patients discharge to an SNF. In the group of patients that discharged home 264 (4.5%), patients experienced 303 ER visits and 169 (2.9%) patients experienced 194 readmissions. Of the patients who discharged to an SNF, 72 (4.4%) patients experienced 77 ER visits and 81 (5.0%) patients experienced 97 readmissions. The percentage of patients experiencing an ER visit was not significantly different between patients discharged to home vs an SNF ($P = .827$) though the readmission rate was ($P < .000$). There was a 47.4% decrease in patients discharged to an SNF instead of home, from 29.3% in year 1 to 15.4% in year 4 ($P < .000$).

There was a significant decrease of 38.7% in overall LOS, from 2.66 days to 1.63 days over the course of the study ($P < .000$). Patients who discharged home also experienced a decrease in LOS, from 2.38 days to 1.35 days ($P < .000$). The decrease in LOS experienced by patients discharged to an SNF was minimal (3.23 to 3.13 days, $P = .574$). An ERAS protocol was implemented at this institution halfway through the study period. There was a 23.1% increase in the overall number of patients having joint arthroplasties during the study, from 1674 the first year to 2061 by the last year. The overall number of patients experiencing unplanned interventions was unaffected by decreasing LOS or implementation of

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