



Original Research

Outcomes of Inpatient Rehabilitation in Patients With Simultaneous Bilateral Total Knee Arthroplasty

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Abstract

Background: The number of total knee arthroplasty (TKA) procedures performed in the United States is increasing each year, and the number of bilateral TKA procedures has also increased during the past 2 decades. However, few studies in the literature have investigated the rehabilitation outcomes of patients who undergo bilateral TKA. This study was performed to provide information on the benefits and role of inpatient rehabilitation for patients after bilateral TKA.

Objective: To investigate the functional outcomes, complications, and transfer rates of patients in the inpatient rehabilitation setting who undergo simultaneous bilateral TKA.

Design: Retrospective cohort study.

Setting: Freestanding inpatient rehabilitation hospital.

Patients: Ninety-four patients admitted to an inpatient rehabilitation hospital after simultaneous bilateral TKA from 2008-2013.

Methods: Retrospective chart review of demographic, clinical, and functional data for patients admitted to inpatient rehabilitation after simultaneous bilateral TKA.

Main Outcome Measures: Length of stay, admission and discharge Functional Independence Measure (FIM), and FIM efficiency.

Results: The study included 27 male (28.7%) and 67 female (71.3%) patients aged 42.0-86.9 years, with a mean of 65.6 ± 10.2 years. Mean length of time between surgery and admission to inpatient rehabilitation was 4.5 ± 3.3 days. Mean length of stay in rehabilitation was 11.7 ± 4.2 days. Mean admission and discharge FIM scores were 87.3 ± 11.7 and 113.4 ± 4.8 , respectively, with a mean FIM gain of 26.1 ± 10.5 . The mean FIM efficiency was 2.33 ± 0.84 . Eight patients required transfer to an acute care hospital. Complications leading to transfer to acute care facilities included sepsis, cardiac arrhythmias, knee dislocation, and suspected small bowel obstruction. Eighty-eight patients were discharged home, 4 patients were discharged to skilled nursing facilities, and 2 patients were transferred to an acute care hospital and did not return to the inpatient rehabilitation hospital.

Conclusions: After undergoing simultaneous bilateral TKA, patients demonstrate functional gains when admitted to inpatient rehabilitation facilities based on FIM gains and FIM efficiency scores; 8.5% of patients in this cohort required transfer to an acute care facility as a result of complications during inpatient rehabilitation, and 93.6% of patients were discharged home.

Introduction

The number of total knee arthroplasty (TKA) procedures performed in the United States is increasing each year. In 2007, there were a reported 543,000 hospital discharges for patients who had undergone TKA in the United States [1]. The number of primary TKA procedures has been projected to grow to 3.48 million by the year 2030 [2]. Patients planning to undergo unilateral TKA may also have symptoms on the contralateral side and indication for bilateral TKA. During the past 15 years, the number of simultaneous (one-stage)

bilateral TKA performed in the United States has increased, from 19,288 in 1999 to 33,679 in 2008 [3]. The proportion of bilateral TKAs performed out of all TKA procedures has also been reported to increase, with bilateral TKA making up 3.68% of all hospital TKA discharges from 1990-2004 [4] and 6.52% of all hospital TKA admissions from 1998-2006 [5]. Debate has been ongoing about the benefits of simultaneous bilateral joint replacements versus sequential (two-stage) bilateral joint replacements [6-8]. Fu et al [6] performed a systematic review and reported that there is a significantly lower rate of deep infection and revision in simultaneous

bilateral TKA compared with sequential bilateral TKA, but a significantly higher prevalence of pulmonary embolism, blood transfusion, and mortality occurred at 30 days postoperatively after simultaneous bilateral TKA. Reuben et al [7] reported that simultaneous bilateral TKA was 36% less costly than 2 unilateral TKA procedures. Yoon et al [8] reported that simultaneous bilateral TKA is a relatively safe procedure with minimal increase in systemic complication risk compared with sequential bilateral TKA.

In light of the considerable controversy surrounding simultaneous bilateral TKA and the lack of adequately powered prospective, controlled trials, a multidisciplinary group of experts was assembled to create recommendations to aid physicians who provide care for patients considering bilateral TKA. The Consensus Statement from the Consensus Conference on Bilateral Total Knee Arthroplasty Group addressed the major questions surrounding bilateral TKA, including safety and perioperative management [9]. According to this group, simultaneous bilateral TKA procedures are associated with more perioperative adverse events compared with unilateral TKA. They also reported that the role of rehabilitation after bilateral TKA deserves further investigation to optimize patient outcomes [9].

Few studies of functional outcomes of patients in the inpatient rehabilitation setting who have undergone TKA have been performed. Dauty et al [10] conducted a study in France that included 282 patients admitted to an inpatient rehabilitation hospital after unilateral TKA for osteoarthritis. They reported that the patients had a mean length of stay (LOS) in inpatient rehabilitation of 24.1 ± 8.1 days and found a linear relationship between LOS and female gender, living alone, presence of home help, and previous lower limb arthroplasty [10]. Only 2 retrospective studies have been performed to investigate the functional outcomes of patients with simultaneous bilateral TKA in the inpatient rehabilitation setting. Vincent et al [11] studied the outcomes of patients who underwent unilateral or simultaneous bilateral TKA and were admitted to inpatient rehabilitation. Vincent and Vincent [12] performed another retrospective, multicenter study of inpatient rehabilitation outcomes of patients with unilateral TKA, bilateral TKA, unilateral total hip arthroplasty (THA) or bilateral THA, but the bilateral TKA patient outcomes were not reported separately.

The purpose of the present study was to retrospectively investigate the functional outcomes, complications, and rates of transfer of patients who receive inpatient rehabilitation services after undergoing simultaneous bilateral TKA.

Methods

This study was approved by the Northwestern University Institutional Review Board. A retrospective

chart review of patients admitted to a freestanding inpatient rehabilitation hospital after simultaneous bilateral TKA for osteoarthritis between 2008 and 2013 was performed. Patients between the ages of 18 and 99 years were included in this study. All patients included in this study were admitted to an inpatient rehabilitation hospital directly after an acute hospital course during which simultaneous bilateral TKA was performed.

Patients admitted to inpatient rehabilitation received an average of 3 hours of therapy per day, including physical therapy and occupational therapy, with daily medical oversight from a PM&R physician. The patients also worked with rehabilitation nursing, social work services, and psychologists as needed.

Data collected included demographics (age and gender), medical history, complications reported during the inpatient rehabilitation course, number of and reasons for transfers from inpatient rehabilitation to an acute care hospital, and discharge destination. Types of complications were documented through retrospective chart review of daily progress notes and discharge summary notes for each patient. Functional data included admission and discharge Functional Independence Measure (FIM) scores and LOS. FIM efficiency for each patient was calculated by dividing the FIM change by LOS.

Descriptive statistics were used to analyze the collected data, including means and standard deviations (SDs). Paired *t*-tests were used to compare mean admission and discharge FIM scores. Statistical significance was defined as a *P* value of less than .05.

Results

Demographics

The study included 27 male (28.7%) and 67 female (71.3%) patients aged 42.0 to 86.9 years (mean, 65.6 ± 10.2 years). All patients had undergone simultaneous bilateral TKA as a result of osteoarthritis of the knees. The mean length of time between surgery and admission to inpatient rehabilitation was 4.5 ± 3.3 days (Table 1).

Table 1
Patient characteristics

Characteristic	Mean \pm SD	Range	n (%)
Age, y	65.6 ± 10.2	42.0-86.9	
Gender			
Male			27 (28.7)
Female			67 (71.3)
Length of time from TKA surgery to admission to rehabilitation, d	4.5 ± 3.3	1-33	

SD = standard deviation; TKA = total knee arthroplasty.

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