



Original research

The effect of a preoperative education class on the rate of manipulation under anesthesia after total knee arthroplasty in a veterans population

Vineet Tyagi, MD^{*}, Coridon Huez, MD, Shasta Henderson, MD, Adam Lukasiewicz, MD, Elizabeth Gardner, MD, Lee Rubin, MD, Lawrence Weis, MD

Department of Orthopaedics and Rehabilitation, Yale School of Medicine, New Haven, CT, USA

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ABSTRACT

Background: Arthrofibrosis after total knee arthroplasty (TKA) is a common complication, potentially occurring in up to 25% of patients, and may be treated during the early recovery period by manipulation under anesthesia (MUA). The majority of preoperative factors that predispose patients to postoperative stiffness are patient specific and not modifiable. The United States Veteran Affairs is a particularly challenging group given a higher baseline rate of medical comorbidities and opioid dependence than the general population. Patient education about postoperative expectations and complications has been shown to improve outcomes in certain orthopedic procedures. This retrospective study aims to determine if preoperative counseling for veterans undergoing primary TKA reduces the rate of postoperative stiffness, and consequently MUA, in this subset of patients.

Methods: We evaluated the medical records of 244 veterans at a single veteran affairs hospital who underwent 278 TKAs during a 6-year period under one surgeon. Patients were separated into groups based on attendance in the preoperative counseling session. Effects of various factors, including age, sex, body mass index, preoperative knee range of motion, and history of previous knee surgery, were compared between these 2 cohorts.

Results: Attendance in the preoperative course did not have a statistically significant impact on the rate of manipulation (odds ratio [OR], 1.07). Female gender and prior manipulation had an increased OR of knee manipulation, whereas age > 65 years had a decreased OR that did not reach significance.

Conclusions: Our results show that preoperative counseling did not have a benefit in terms of postoperative MUA rates in veterans. Preoperative education may be helpful for setting appropriate expectations of pain, recovery, and function after total joint arthroplasty and may be useful in an online or video format in small practices in which cost may be prohibitive. Further studies are needed to determine whether they provide any benefit in postoperative arthrofibrosis rates.

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Introduction

It is estimated that nearly 700,000 total knee arthroplasty (TKA) surgeries were performed in the United States in 2010 [1]. Though

long-term patient survival and patient satisfaction are typically high after TKAs, studies have estimated that 20%–25% of patients may suffer from postoperative stiffness [2]. Arthrofibrosis can have significant implications for functional outcomes after knee replacement, as patients require over 90 degrees of flexion to descend stairs and stand from a seated position [3]. Many factors contribute to postoperative stiffness, including previous knee surgery and diabetes, but preoperative stiffness is the most significant correlating factor [4]. Previous trauma, obesity, and hypertrophic scar formation may also play roles [5]. Intraoperative factors thought to contribute to stiffness include component malalignment, poor sagittal plane gap balancing, and inadequate osteophyte

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^{*} Corresponding author. 47 College Street, New Haven, CT 06510, USA. Tel.: +1 551 358 1949.

E-mail address: vineet.tyagi@yale.edu

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resection [6]. Pain control, patient compliance, and heterotopic ossification are postoperative risk factors contributing to stiffness [7,8].

Typical first-line therapy is physical therapy to break down fibrous tissue, which may result from tissue hypoxia or reaction oxygen species in the soft tissue near the surgical site [9]. More invasive approaches include arthroscopic or open arthrolysis and revision surgery [10], but management after failed physical therapy typically starts with manipulation under anesthesia (MUA), defined as the closed forced flexion of the knee under general anesthesia to gain an increased range of motion. This procedure has been shown to have better outcomes when performed within 12 weeks of the index surgery [10].

Multiple studies have confirmed that patients undergoing MUA have good clinical outcomes in terms of patients recovering the range of motion required for activities of daily living and performing similar to TKA patients not needing MUA [2,11,12]. This procedure, however, is not without its own risks, including exposure to anesthetic agents and possible extensor mechanism rupture or periprosthetic fractures [13]. Patients requiring MUA may also have an increased risk of early revision TKA [14]. Studies have shown that preoperative counseling may help to improve postoperative outcomes after orthopedic surgery [4]. Preoperative counseling that increases patient knowledge regarding pain science, multimodal pain management, and coping strategies may be beneficial in reducing postoperative pain in TKA patients [15]. Similarly, preoperative expectations, which can be significantly influenced through education and counseling, have been shown to impact outcomes in rotator cuff repairs [16].

The Veterans' Affairs (VA) health-care system deals with a particularly challenging population undergoing TKA, often with an increased baseline burden of comorbid illnesses. These patients often have chronic pain issues and opioid use, psychological disorders, and a high rate of preoperative use of nonnarcotic medications such as muscle relaxers and benzodiazepines. Hadlandsmyth et al. [17] showed an increased risk of prolonged opioid use in veterans after TKA and also found that patients at the VA were more likely to have chronic preoperative opioid use than the general population. The authors suggested the use of cognitive behavioral therapy in the VA population, who they also found to have a higher rate of psychological disorders than the general population undergoing TKA. The veteran population also has a higher rate of homelessness than the general population. Bennett et al. [18], however, found that with the proper counseling and resources, TKA could be performed successfully and achieved good outcomes even in homeless VA patients. These studies show that with the appropriate resources, education and counseling can be used to effectively improve outcomes in TKA in the veteran population.

Kiskaddon et al. [19] described a program designed to facilitate early discharge after total joint arthroplasty. Part of their protocol included a preoperative counseling class that they postulated, which may have contributed to reduced visits to the emergency department postoperatively as a result of improved patient education and expectations. Gayed et al. [20] reported a joint-replacement program that made use of the Lean Six Sigma process-improvement methods to increase total joint volume at the VA while reducing costs and complications. The implementation of a preoperative class for all patients undergoing total joint arthroplasty was also included in their protocol. They felt that this class helped to set postoperative expectations, perform baseline physical therapy and functional status evaluations, and determine potential discharge needs. The aforementioned studies show that with proper education, veterans undergoing TKA can have improved outcomes despite their higher rate of comorbidities and risk factors for complications than the general population.

The purpose of this study was to determine if the initiation of mandatory preoperative counseling for primary TKA would lead to a decrease in the rates of MUA after the procedure. We also aimed to evaluate the effects of medical comorbidities, knee-specific factors, and demographics as risk factors for MUA.

Material and methods

Study design

Between 2010 and 2016, 244 patients underwent 278 primary TKAs at the Veterans Administration Hospital in West Haven, Connecticut. In March of 2013, the West Haven Veterans Administration instituted a mandatory preoperative total joint education course that provided patients with general information regarding total joint replacement and details of the operation but focused primarily on the expected postoperative course. The course is administered by a multidisciplinary team consisting of an orthopedic physician assistant, physical therapist, and surgical case manager. During the class, the importance of active participation in physical therapy to ensure progression toward a functional range of motion is emphasized. In addition, the necessity of compliance with deep vein thrombosis prophylaxis and discharge to home vs a short-term rehabilitation center are discussed.

After Institutional Review Board approval, a chart review of these 244 patients was conducted. The inclusion criterion was primary TKA performed by surgeon L.W. Exclusion criteria included revision knee arthroplasty, conversion of unicompartmental knee arthroplasty to TKA, postoperative follow-up of less than 3 months, and ligamentous instability requiring more constrained components.

Surgical technique

All TKAs were performed by a single surgeon (L.W.) using a cemented Zimmer NexGen Legacy Posterior Stabilized Knee through a medial parapatellar arthrotomy for exposure. The surgical technique remained the same throughout the duration of this study. Tourniquets were used for cementation and as necessary for the approach. A deep Hemovac drain was placed at the end of surgery in all cases. Patients were placed in a knee immobilizer postoperatively, which was discontinued when they were able to achieve a straight leg raise against gravity. This was performed as it has been shown to reduce falls in patients who received femoral nerve blocks preoperatively [21]. Drains were discontinued on postoperative day 2. All patients underwent our standard rehabilitation protocol that included ambulation and initiation of physical therapy on postoperative day 1. Enoxaparin was used for venous thromboembolism prophylaxis for 6 weeks, unless the patient was previously on anticoagulation.

Follow-up

All patients were seen at 2, 6, and 12 weeks postoperatively with a range of motion assessments. Patients who failed to achieve 90 degrees of flexion beginning at their 6-week appointment were counseled about MUA and seen at 8 weeks postoperatively to determine if they were candidates for MUA. Failure to achieve 90 degrees of flexion by 12 weeks was considered an absolute indication for MUA.

Statistical analysis

Patient and procedure characteristics were tabulated, and differences between the groups were assessed using t-statistics for

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