Evidence-Based Practice
Caring for a Patient Undergoing Total Knee Arthroplasty

Rebecca J. Parker

More than 500,000 total knee arthroplasty (TKA) surgeries were performed in 2006 and the number is expected to continue to increase (S. Kim, 2008). A background in evidence-based nursing care will assist any nurse assigned in caring for a postoperative TKA patient. Strong pain assessment and reassessment skills with an understanding of multimodal pain management benefits pain control and patient recovery from TKA surgery. Safe mobilization and therapy techniques that reflect evidence-based practice will keep patients safe. Providing nursing interventions that prevent complications from infections or thromboembolism will reduce never events from occurring. This article will present evidence for the care of a postoperative TKA patient.

Total knee arthroplasty (TKA) is a successful, cost-effective, low-risk therapy that offers pain relief and improves function for patients who do not respond to nonsurgical treatment (Zhang et al., 2008). DeFrances, Lucas, Butie, and Golosinski (2008) report that 542,000 TKA surgeries were performed in 2006, almost double the number from 2000. Kim (2008) estimates that 1.5 million primary TKA surgeries will be performed in 2015. Total knee arthroplasty is performed for patients who suffer joint failure from osteoarthritis, rheumatoid arthritis, juvenile rheumatoid arthritis, or osteonecrosis. Because of the expanding number of people undergoing TKA surgery, the chances that a nurse will provide postoperative care for a TKA patient is highly likely. This article will examine evidence-based practices of postoperative nursing care for TKA patients.

Pain Management
Aggressive postoperative pain management is required for TKA patients (National Institute of Health, 2003). Strong assessment of the patient’s pain is the first step toward intervening to manage pain. Pain management interventions are both pharmacologic and nonpharmacologic. Table 1 includes a synthesis of evidence related to pain management. Pain management requires a skilled assessment, involvement of patient, and the use of a multimodal approach (Institute for Clinical Systems Improvement [ICSI], 2008; Registered Nurses’ Association of Ontario [RNOA], 2002).

Pain Assessment
The most reliable indicator of pain is through self-report (ICSI, 2008). The nurse should educate the patient to report the amount of pain that is being experienced. The amount and type of pain should be assessed using a valid and reliable pain scale such as the Numeric Rating Scale or the Wong/Baker Facial Pain Scale (ICSI, 2008; RNOA, 2002). Guidelines from the ICSI (2008) support pain assessment upon admission, at least once a shift, and at discharge. Additional reassessment should take place following any intervention provided when the patient’s pain goal is not being met. Assessing the patient’s current pain, pain goal, and how the pain interferes with activities will help the nurse develop a plan for managing pain (Akyol, Karayurt, & Salmond, 2009).

Pharmacologic Interventions
Acute pain is best managed using pharmacologic agents (ICSI, 2008). Because of the severe pain experienced after TKA, preemptive analgesia appears to be the best way to begin pain management. Aiming to start the analgesic process early and aggressively prevent pain, preemptive analgesia is sometimes initiated even before the surgical incision is made as anesthesiologists place epidural catheters or continuous femoral infusions (CFI; Ginsberg, 2001). Chelly et al. (2001) found that patients who recovered with a CFI had shorter lengths of stay, decreased blood loss, and better postoperative pain control. It has also been reported that patients with a CFI had better pain management and improved immediate mobilization than patients with an epidural catheter or patient-controlled analgesic (Chelly et al., 2001). A retrospective review study by Duellman, Gafligan, Milbrandt, and Allan (2009) found that preemptively administering oxycodone and a selective COX-2 inhibitor resulted in reduced intraoperative narcotics postoperatively, increased participation in therapy, and decreased length of stay.

A multimodal approach to pain uses two or more drug categories to relieve pain by different mechanisms (Duellman et al., 2009; Pasero & McCaffrey, 2007). The most effective regimen uses “around the clock” oral opioids, such as oxycodone, and an around-the-clock nonsteroidal anti-inflammatory drug, such as celecoxib, with immediate release opioid for breakthrough pain (Ginsberg, 2001).
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Note: CFI = continuous femoral infusions; CPM = continuous passive motion; LOS = length of stay; POD = postoperative day; PCA = patient-controlled analgesic; ROM = range of motion; TKA = total knee arthroplasty; TKR = knee replacement.
Because postoperative pain is typically continuous and severe, pain should be continuously treated with around-the-clock medications for the first few days (Pasero & McCaffrey, 2007; RNOA, 2002). The preferred method for administration for postoperative pain medication is oral because of convenience, cost, and patient tolerance (Pasero & McCaffrey, 2007; RNOA, 2002). It is reported that when pain is managed with a multimodal approach, patients use less as needed basis (PRN) narcotic, increase participation in rehabilitation, have less postoperative nausea and vomiting, shorter lengths of stay, and decrease need for skilled nursing at discharge (Duellman et al., 2009). It is important to treat postoperative pain promptly, especially breakthrough pain, because inadequate pain control has been linked to slower mobilization of TKA patients and longer hospital stays (de Beer et al., 2005; RNOA, 2002). In addition to around-the-clock analgesics, patients should have analgesics prior to walking, exercise, and sleep to best control their pain (Akyol et al., 2009). For pain that is difficult to control, consider a consult for pain management from a pain management expert (RNOA, 2002). Pain that is adequately controlled improves patient satisfaction scores (Smith-Miller, Harlos, Roszell, & Bechtel, 2009).

Nonpharmacologic Approaches to Pain

Many nonanalgesic methods to managing pain have been studied. Nonpharmacologic interventions include cold application, relaxation, imagery, and music therapy (RNOA, 2002). Muscle relaxation, music, massage, and stress balls are other ways of managing pain that have been reported in the literature (Pellino et al., 2005). Pellino et al. (2005) offered TKA patients a kit that included a cassette player with earphones, a tape of relaxing music, a tape with instructions for progressive muscle relaxation, a plastic massager with instructions for massage in nonsurgical areas, a stress ball, and a booklet with information about how to use forms of relaxation. The study found that patients who received the kit required less opioids and reported lower levels of anxiety on postoperative day 2 (Pellino et al., 2005). Music has been reported to have a positive impact on pain. A review of the effects of music on pain found that postoperative pain intensity was decreased by 0.5 units (Cepeda, Carr, Lau, & Alvarez, 2006). Music is a safe, low-cost intervention that nurses can provide to improve the patient environment by distracting from postoperative pain and increasing feelings of comfort (Cepeda et al., 2006; McCaffrey, 2008). All nonpharmacologic interventions are based on individual preference and should not be considered a substitute for medications but rather complimentary therapy.

Another method for pain control is cryotherapy or the application of cold to the surgical site. In a systematic review and meta-analysis, Adie, Naylor, and Harris (2009) found that patients who used cryotherapy saw a significant reduction in pain on postoperative day 2 compared with those who did not use cryotherapy. Although reduced pain was reported, this study found that there was no significant decrease in the use of postoperative narcotics with cold therapy. While cryotherapy is a safe and economical way to attempt to manage pain, its benefits are uncertain and may be more related to pain wants (Adie et al., 2009).

Education About Pain Management

Patients who have had a TKA require education about pain. The education should be done immediately postoperatively and on an ongoing basis during the hospitalization. Standards from the ICSI (2008) recommend educating on topics that include how long to expect pain, the goal of pain management, preventing pain rather than “chasing the pain,” treatments to manage pain, how to ring the nurse for analgesic when needed, and the plan for pain management, including the schedule for medication administration. Instructing patients to report unrelieved pain “promptly” is critical to effective pain management (RNOA, 2002). Prior to discharge, instructions regarding pain management, analgesic uses, and side effects and interactions of medications are reiterated (Akyol et al., 2009).

Patient Mobilization and Therapy

Postoperative TKA patients need the opportunity to mobilize and ambulate. Postoperative complications are prevented with ambulation. Physical therapy should be an important part of the multidisciplinary team to teach the patient how to use assistive devices and adhere to any weight-bearing restrictions that are ordered. The American Association of Orthopedic Surgeons (AAOS) supports mobilization and ambulation by the first day postoperative (Johanson et al., 2009). Although patients will participate in therapy daily, they need the opportunity to practice their new abilities with their nursing caregivers (Radawiec, Howe, Gonzalez, Waters, & Nelson, 2009). Evaluating each patient for fall risk to confirm whether needs are met during the early mobilization phase will translate to safe ambulation for the patient (Radawiec et al., 2009).

The National Association of Orthopedic Nurses has developed an algorithm to help healthcare professionals determine the assistance needs of the patient on the basis of weight-bearing status, safety risk, and ability of other extremities (Radawiec et al., 2009). The algorithm will lead the nurse to the safest option for ambulation and list the number of caregivers needed to assist (Radawiec et al., 2009). Mobilizing patients should be done in a safe fashion following established guidelines to maintain safety for all parties (Nelson & Baptiste, 2006). Many evidence-based strategies, including patient lift devices, establishing “no lift zones,” using patient lift teams, and patient care ergonomic assessment protocols, have been recommended by Nelson and Baptiste (2006). These strategies will help promote patient safety, reduce falls, and minimize employee injuries.

Continuous Passive Motion

One aspect of therapy for knee replacement patients is use of continuous passive motion (CPM) machines that are used to gently flex and extend the knee. They are used to help the patient make progress by increasing range of motion postoperatively. Following the initial setup of the machine by the physical therapist, it is often the responsibility of the bedside nurse to ensure the proper use. However, the use of the machines has been questioned as to their value. A review of eight studies by Grella
(2008) found that the use of the CPM machine has no influence on short- and long-term knee extension, long-term knee flexion, pain, complications such as infection, deep vein thrombosis (DVT), and need for manipulation, or length of stay when compared to rehabilitation with early knee mobilization. Better outcomes with short-term knee flexion have been seen when the CPM is applied immediately postoperatively at a "high flexion arc of motion, and for a significant amount of time each day" (Grella, 2008, p. 277). A study examining the use of CPM in 65 patients undergoing computer-navigated TKA found no benefit postoperatively of CPM use. There was no statistically significant difference in flexion between the no-CPM group and the CPM group at 2 weeks, 6 weeks, and 3 months (Alkire & Swank, 2010).

Prevention of Thromboembolism

For patients undergoing an orthopaedic surgery, including TKA, DVT and pulmonary embolism (PE) are the most common life-threatening complications (Rice & Walsh, 2001). Without prophylaxis, 40%–60% of patients undergoing elective total hip replacement, total knee replacement, and hip fracture repair would develop a DVT within 7–14 days following surgery (Geerts et al., 2008). The Centers for Medicare & Medicaid Services (2010) named DVT following total joint replacement surgery a never event in 2008.

Mechanical and Chemical Prophylaxis

Prophylaxis of DVT and PE is an important part of postoperative care for the TKA patient. Guidelines from the AAOS (Johanson et al., 2009) recommend mechanical and chemical prophylaxis. Intermittent compression devices should be applied to the TKA patient’s legs either intraoperatively or immediately postoperatively. All members of the multidisciplinary team should ensure that the compression devices are on the legs at all times, even when the patient is out of bed. TKA patients should mobilize as soon as it is possible. Patients should be taught to perform dorsi and planterflexion of the ankles 10 to 20 times every half hour while awake. The AAOS recommends that patients be in a chair several times per day. Even patients with epidurals should be encouraged and expected to be out of bed, and they can begin to stand and ambulate when they are physically able (Johanson et al., 2009). Chemical prophylaxis will vary on the basis of physician preferences and patient preoperative identified risk of PE and bleeding tendency. The AAOS guidelines recommend the use of aspirin, low-molecular-weight heparin such as enoxaparin or dalteparin, synthetic pentasaccharides such as fondaparinux, or warfarin (Johanson et al., 2009).

Patient Education

The AAOS guidelines recommend making sure that patients are educated on the signs and symptoms of DVT and PE. Signs and symptoms of DVT are pain, swelling, tenderness, redness, or skin discoloration that is localized to one site. Signs and symptoms of PE include shortness of breath, rapid pulse, feelings of apprehension, chest pain that is worse with deep breaths, coughing up blood, hypotension, and lightheadedness (Johanson et al., 2009).

Elimination

Indwelling urinary catheters are sometimes used for patients undergoing TKA with operative bladder draining as the indication (Madeo & Roodhouse, 2009). Placement of an indwelling catheter increases the patient’s risk of developing the most common nosocomial infection: a catheter-acquired urinary tract infection (CAUTI) (Newman, 2007). A patient who develops CAUTI has a longer length of stay and the cost to treat the infection increases the hospital bill (Madeo & Roodhouse, 2009). The Centers for Disease Control and Prevention lists prolonged surgical duration as an indication for a Foley catheter but states that it should be removed as soon as possible and especially within 24 h of insertion (Gould, Umscheid, Agarwal, Kuntz, & Pegues, 2009).

Nursing Role

The Centers for Medicare & Medicaid Services includes CAUTIs on the list of “never events” (Centers for Medicare & Medicaid Services, 2010). The bedside nurse is an essential participant in ensuring that the catheter is maintained appropriately. Assess that the catheter bag is positioned below the bladder to avoid reflux of urine into the bladder and prevent kinks in the tubing that will prevent the urine from flowing freely (Maido & Roodhouse, 2009). The recommendations from the Centers for Disease Control and Prevention include securing the catheter to prevent movement (Gould et al., 2009). Tubing is usually anchored or secured to the upper thigh (Newman, 2007). The nurse should review the need for catheterization and remove the indwelling catheter as soon as possible after placement. Because duration of the catheter is directly linked to the risk of bacteruria and development of CAUTI, prompt removal is of utmost importance (Maido & Roodhouse, 2009).

The nursing care provided to a TKA patient will help the patient recover safely and quickly. Managing pain, mobilizing patients, following recommendations for thromboembolism prophylaxis, and decreasing the risk of CAUTI all contribute to safe postoperative care. Using evidence-based practices to guide the nursing care for TKA patients will help to ensure patient safety and recovery.

References


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