Outpatient Total Knee Arthroplasty

Are We There Yet? (Part 2)

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KEYWORDS

- Outpatient total joint arthroplasty • Total knee arthroplasty • Length of stay
- Unicompartmental knee arthroplasty • Early discharge

KEY POINTS

- Regional anesthesia with various combinations of pain control medication has proved successful, with a combination of oxycodone hydrochloride, ketorolac, hydrocodone, and acetaminophen.
- With regard to perioperative care, it is recommended to avoid use of Foley catheterization, screen and decolonize for methicillin-resistant *Staphylococcus aureus*, and provide appropriate antibiotic dosing in a timely fashion and appropriate DVT prophylaxis with aspirin in select patients.
- Various accelerated clinical care pathways have been implemented and proved successful in enhancing postoperative outcomes. These are generally optimized when coupled with best evidence-based medical interventions, such as enhanced recovery pathways.

INTRODUCTION

Total knee arthroplasty (TKA) is considered among the most effective and successful procedures in medicine because it regains functionality and quality of life to patients. As such, the rate of performance of the procedure is expected to continue its ongoing rise to reach up to 3.48 million procedures per year by 2030, from the current rate of approximately 700,000 annual procedures.[1,2] With the recent drive toward decreasing cost of care, while simultaneously elevating quality, TKA in the outpatient setting gained popularity as a cost-efficient option in specific patient populations.[3]

As value became a topic of heightened focus in care delivery, serious efforts have been undertaken to minimize wastes and resource consumption, tackling variables that might have an impact on care-related outcomes and quality. With hospital length of stay (LOS) now considered a source of added unnecessary cost with minimal benefit, and even added risk for postoperative complications, the drive toward outpatient TKA has been reinforced and accelerated.[4,5]

The role of patient selection and global optimization in the success of performing outpatient TKA is discussed (See Khaled J. Saleh's article, "Outpatient Total Knee Arthroplasty: Are We There Yet? (Part 1)," in this issue for further details). This article focuses on perioperative care

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requirements, pain management protocols, surgical techniques, accelerated care pathways, rehabilitation, and discharge protocols.

ANESTHESIA AND ANALGESIA MODALITIES

Preoperative and Postoperative Pain Control

Patients are typically instructed to take 10 mg of controlled-release oxycodone hydrochloride prior to coming into the hospital on the morning of their surgery. Immediately after surgery, patients often receive intramuscular ketorolac (10–15 mg) and/or oral hydrocodone (5 or 7.5 mg) plus 325 mg of acetaminophen (350 mg).[5] Preemptive management with acetaminophen or cyclooxygenase-2 selective nonsteroidal anti-inflammatory drugs (NSAIDs) is often used.

Regional Anesthesia

Regional anesthesia allows for less narcotic use, which decreases postoperative nausea and hypotension and allows for faster time to ambulation. Adductor canal and infiltration between the popliteal artery and capsule of knee blocks are becoming increasingly popular. They provide appropriate analgesia, while having muscle weakness-sparing characteristics.[6]

Memtsoudis and colleagues[7] looked at the records of 191,570 elective TKA and compared the rates of inpatient falls after surgery. The study found that 10.9% of the patients had received neuraxial anesthesia, 12.9% combined neuraxial/general anesthesia, and 76.2% had general anesthesia.

Kerr and Kohan[8] developed an intraoperative anesthetic protocol for total hip and knee arthroplasty. They used a combination of ropivacaine Hydrochloride (HCL), 2.0 mg/mL, mixed with 30-mg ketorolac tromethamine and 10 μg/mL of adrenaline (ropivicanine, ketorlac, and adrenaline [RKA] mixture). The mixture was injected into the tissues around the surgical field for pain control. This local infiltration analgesia technique allows earlier postoperative mobilization and an earlier discharge. Almost all TKAs were performed with combined spinal (3.0 mL bupivacaine 0.25%) and light general anesthesia (propofol infusion or O_2/N_2O/sevoflurane). Postoperative pain was kept at less than or equal to 3 using the numeric rating scale. Only one-third of patients required morphine for postoperative pain control. Reinjection of the same anesthetic mixture was given using a catheter that was placed just anterior to the posterior capsule on the medial side approximately 20 hours after surgery in the TKA patients; 71% of the patients were discharged home after 1 night in the hospital. Unless contraindicated, ibuprofen, 400 mg was given every 4 hours for 24 hours postoperatively.[8]

Previous studies have shown that periarticular injection (PAI) of liposomal bupivacaine provides decreased use of narcotics and shorter LOS after TKA.[9] Recent studies have shown, however, that liposomal bupivacaine may not be superior to ropivacaine PAI or femoral catheter plus sciatic nerve blocks for TKA.[10–12]

Liposomal bupivacaine has also not been shown superior to standard bupivacaine after TKA. Schroer and colleagues[13] compared pain management after TKA for patients who received 266 mg (20 mL) liposomal bupivacaine combined with 75 mg (30 mL) 0.25% bupivacaine to a control group who received 150 mg (60 mL) 0.25% bupivacaine; 58 patients received the liposomal bupivacaine and 53 patients were in the control group. Although pain score and narcotic use were similar during hospitalization for the 2 groups, the cost was significantly higher for the liposomal bupivacaine ($285 vs $2.80 for the control group).

Kuang and colleagues[11] did not recommend using liposomal bupivacaine PAI for TKA over traditional PAI methods. This study found that liposomal bupivacaine had comparable pain control and functional recovery compared with conventional PAI methods (usually 2 or more agents, such as opioids, NSAIDs, steroid hormones [eg, dexamethasone or betamethasone], and local anesthetics of amide derivatives [eg, bupivacaine or ropivacaine]), but the cost for this medication did not justify a recommendation as a long-acting analgesic for TKA. A review of recent literature references comparing liposomal bupivacaine to other analgesics is listed in **Table 1**.[10,12]

Both adductor canal blocks (ACBs) and femoral nerve blocks (FNBs) have been shown efficacious in reducing postoperative pain after TKA. Elkassabany and colleagues[14] showed that ACB resulted in a superior preservation of quadriceps muscle strength postoperatively from TKA compared with an FNB. ACB should facilitate earlier ambulation by avoiding quadriceps weakness. The study, however, showed no significant difference in fall risk comparing ACB and FNB on postoperative day (POD) 1 or POD 2, but it may be present in a larger study cohort. Indwelling FNB catheters prolong quadriceps dysfunction and have been associated with an increased risk of falls and adverse postoperative events.[15,16]

Local periarticular and intra-articular injection using ropivacaine, ketorolac, and epinephrine has been shown to be preferred over FNB because average postoperative pain at rest