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Day of Surgery Discharge after Unicompartmental Knee Arthroplasty: An Effective Perioperative Pathway

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ABSTRACT

Day of surgery (DOS) discharge after unicompartmental knee arthroplasty (UKA) allows for safe, efficient care of the appropriately selected patient. Refinement of our perioperative pathway over the last decade has allowed for successful DOS discharge of 160 consecutive patients. The cohort averaged 65 years and American Society of Anesthesiology class was 1–3 (mean, 1.8). Perioperative pain control included a preoperative single shot femoral nerve block. Mean recovery room time was 121 (SD = 37) minutes. No patient required overnight admission for uncontrolled pain or nausea. Significant improvements in Knee Society Clinical Rating System (KSCRS) scores and high patient satisfaction were observed. This study details critical components of our simple perioperative pathway that can be utilized to safely perform UKA with discharge on the DOS.

The role of unicompartmental knee arthroplasty (UKA) in the treatment of the arthritic knee continues to be debated because of challenges in patient selection, surgical technique, and implant design. Although technically challenging, UKA can offer excellent outcomes and lower perioperative morbidity compared to total knee arthroplasty (TKA) [1–3]. Using a refined perioperative pathway, day of surgery (DOS) discharge of the appropriate patient after UKA may allow for safe, efficient care and be met with high patient satisfaction.

The advantages of reduced length of stay (LOS) are many, including a decreased rate of perioperative complications such as infection, and improved patient satisfaction and outcomes. Reduced LOS may also have financial advantages, a significant issue given the economic pressures in the modern healthcare environment [4,5]. "Outpatient" knee arthroplasty has been suggested previously [4–10]. Most studies that report data on "outpatient" arthroplasty define it as a LOS that is less than 24 hours but that may include overnight admission. Same day surgery (SDS), or discharge on the day of surgery (DOS), has significant advantages beyond a less than 24-hour stay, especially with respect to cost-savings, patient satisfaction, and the ability to perform the surgery in settings that do not routinely allow for overnight stays. Very few studies, with small patient numbers for UKA, focus on patient discharge on the DOS [4,10].

The objective of this study is to determine the safety and efficacy of DOS discharge after UKA in an outpatient setting. With modifications to routine perioperative pathways, we hypothesize that it is possible to safely discharge appropriately selected UKA patients on the DOS with a low surgical complication rate and acceptable short to mid-term clinical outcomes.

Materials and Methods

We prospectively collected data on 207 consecutive patients who underwent UKA at an outpatient surgical center between January 2003 and February 2013. Data for all patients with a minimum follow-up of 60 days were analyzed after obtaining local IRB approval. In May 2008 we transitioned from planned overnight stay to discharge on the DOS. Thus, the total group of 207 patients consists of two cohorts, one pre-transition with planned overnight stay (n = 47) and a second post-transition with planned discharge on the DOS (n = 160).

Patients with unicompartmental knee arthritis who failed standard non-operative modalities were considered candidates for arthroplasty. Patient symptoms localized to the effected compartment and corresponding radiographic findings were considered prerequisites. Patients with inflammatory arthritis, anterior cruciate ligament deficiency, a non-passively correctable deformity, or severe flexion contracture (>15 degrees) were excluded. Preoperative evaluation consisted of routine weight-bearing x-rays of the effected knee, as well as varus and valgus stress views. If previously performed, close evaluation of MRI, arthroscopy pictures, or the operative report was done to corroborate the status of the knee cartilage with clinical and

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radiographic findings. Because UKA was planned in an outpatient setting without the possibility of conversion to TKA, strict indications were followed in order to ensure the appropriateness of the patient for UKA.

Patients were considered for discharge on the DOS after UKA based on multiple medical and social factors. Preoperative medical clearance by a primary care physician was required for all patients. Cardiac clearance was obtained for patients with a significant history of cardiovascular disease. Only ASA class 1–3 patients were considered. The patient's social situation and home environment needed to be deemed safe with adequate aid of a caregiver available. Patients with significant cognitive issues who were not capable of complying with the perioperative protocol were not considered for DOS discharge.

Preoperatively, patients were educated about the perioperative plan for recovery verbally, by the surgeon and/or his allied health professional, and in writing through the receipt of a standard "Partial Knee Replacement" handbook, detailing expectations for the procedure and postoperative course of recovery. During the patient's preoperative visit, prescriptions for postoperative medicines were provided. These included an oral narcotic medicine (hydrocodone/acetaminophen combination), antibiotic (cephalexin or alternate for allergy), and a sleep aid (usually temazepam). Those with a significant history of postoperative nausea were prescribed a scopolamine patch to be applied preoperatively on the morning of surgery. Deep venous thrombosis (DVT) prophylaxis for the study period initially consisted of daily injectable low molecular weight heparin for ten days postoperatively. In 2008, we transitioned to the use of full strength daily aspirin (325 mg) for six weeks. This change was driven by general concern of wound drainage with low molecular weight heparin agents in UKA, as well as the ease of administration and efficacy of aspirin. Preoperative physical therapy was not routinely initiated. Postoperative home physical therapy was arranged before surgery for all patients, to begin on postoperative day number one. All patients underwent screening for methicillin resistant staphylococcus aureus (MRSA), with preoperative decolonization treatment as needed. Standard preoperative laboratory data and urinalysis were performed. Once the patient was considered a candidate for UKA but prior to the surgical intervention, the patient met with a mid-level provider. At this visit, all preoperative laboratory studies and medical clearances were reviewed, and a thorough understanding of the perioperative pathway was ensured.

Surgery was performed under a general inhalational anesthetic (most commonly isoflurane or sevoflurane) utilizing primarily a laryngeal mask airway. Standard preoperative medications included ranitidine 150 mg PO and midazolam 2 mg IV. Preoperative single injection femoral nerve block was performed under ultrasound guidance in the operating room utilizing ropivicaine 0.5% plain (20 mL) and marcaine 0.5% with epinephrine (1:200 000) (10 mL). Intraoperative medications included intravenous narcotics as needed (morphine sulfate 10 mg, fentanyl 100–200 mcg, or meperidine 25–50 mg). Standard preoperative antibiotics were given, usually a first-generation cephalosporin. A minimally invasive incision was utilized without patellar eversion for all medial and lateral UKAs. Soft tissue dissection and vigorous retraction was minimized. The most common UKA implants utilized included the Oxford (Biomet, Warsaw, IN) in 117 (73.1%) and the EIUS (Stryker Howmedica, Limerick, Ireland) in 27 (16.9%). A tourniquet was employed in all cases. Intraoperative local injection of periarticular tissues was performed utilizing 20–40 mL of 0.2% ropivacaine. Injection area included the posterior capsule, retinaculum, anterior capsule and subcutaneous tissue at the incision site. A single drain was placed. A bulky dressing was applied using soft cotton and bias wrap after skin closure with staples. Most patients elected to use a cold therapy device. A knee immobilizer was applied prior to leaving the operating room.

Facility based postoperative recovery included treatment of pain or nausea as needed. Pain complaints were treated with an oral hydrocodone/acetaminophen combination, with intravenous fentanyl (25–50 mcg) for breakthrough discomfort. Prior to discharge, intravenous antibiotics were re-dosed and the intra-articular drain was removed, irrespective of drain output. Discharge criteria included an awake, alert patient with adequate pain control and stable vital signs. Clearance for discharge by the anesthesiologist was required. Full weight-bearing status was allowed, and a physical therapist assessed all patients for safety and mobility, including the use of a front wheel walker or crutches, and provided the patient with home exercise instructions. Patients were instructed to wear the knee immobilizer for all weight-bearing activities until they were able to perform five normal straight leg raises.

Upon discharge patients were seen by a physical therapist at home, beginning postoperative day one, and then three times a week for one hour for 2–3 weeks. Therapy was then continued at an outpatient clinic for most patients as needed for up to three months based upon progress. Patients returned to clinic for the first time 3–5 days postoperatively for an initial wound check. Staples were removed 10–14 days postoperatively by their home therapist. Patients were encouraged to progress, with the aid of their therapist, from a front wheel walker to crutches and then on to a cane as needed. The second clinic follow-up was scheduled at 4–6 weeks postoperatively, when routine x-rays were obtained. Routine postoperative clinic visits were then scheduled at 3 months, 6 months and 1 year postoperatively.

Preoperative and postoperative patient and surgical data were collected from clinical notes and surgical center charts. Patient-reported Knee Society, Knee, and Functional Score data were collected prospectively and analyzed. Patient satisfaction was self-reported. All adverse events were recorded and investigated. Data comparisons between the groups before and after planned DOS discharge were performed using an unpaired two-tailed Student's *t* test utilizing Microsoft Excel and Access software (Microsoft Corp, Redmond, WA).

Results

During the study period 207 UKAs were performed on 186 patients by two surgeons (SB and RG). Over the same study period 3,992 TKA were performed by these two surgeons. UKA made up 4.95% of their knee arthroplasty volume. Of the 207 UKAs, forty-seven surgeries had planned one-night admission prior to the May 2008 transition to planned discharge on the day of surgery (DOS). After the transition, 160 patients underwent UKA with planned discharge on the DOS. All patients with planned DOS discharge met discharge criteria and were able to return to home the evening of surgery. One patient in this group was discharged but presented to the emergency room later that evening for complaints of wound drainage. She was held for observation and discharged to home after resolution of minor drainage from her drain site.

In that the safety, feasibility, and efficacy of DOS discharge after UKA is being investigated in this study, data for the 160 procedures performed using this pathway were analyzed. It should be mentioned that no changes to surgical indications or patient parameters were made upon transition to planned discharge on the DOS. Both patient groups had no significant difference in gender, BMI, or ASA class (Table 1). Patients in the DOS discharge group were significantly older than the overnight admission cohort (average 65 vs. 58, respectively). Of the 160 procedures performed in the DOS discharge group, 104

Table 1
Patient Characteristics Before and After Transition to DOS discharge.

	Age (y)	Sex (% male)	BMI (kg/m^2)	ASA class
Overnight admission (n = 47)	57.89	58.7%	28.12	1.81
DOS discharge (n = 160)	65.29	65.0%	27.72	1.84
Significance (p-value)	<0.05	0.51	0.56	0.73