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Is Outpatient Unicompartmental Knee Arthroplasty Safe to Perform at an Ambulatory Surgery Center? A Comparative Study of Early Post-Operative Complications

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ABSTRACT

Background: Unicompartmental knee arthroplasty (UKA) lends itself to the outpatient surgical setting. Prior literature has established a low rate of readmission and post-operative complications when performed in a hospital outpatient setting (HOP). To our knowledge, there have been no studies comparing complications of UKA performed at an ambulatory surgery center (ASC) and those in a HOP.

Methods: We retrospectively reviewed all patients who underwent outpatient UKA by a single surgeon from 2012 to 2016. In all 569 outpatient UKAs were performed: 288 in the ASC group and 281 in the HOP group. We compared the groups with regard to all complications within the first 90 days after surgery. **Results:** Thirty minor and major complications occurred within 90 days (5.3%). There was no difference in the overall complication rate between groups (ASC 12, 4.2%; HOP 18, 6.4%) ($P = .26$). Day of surgery admission occurred once in the HOP group (0.4%) and did not occur in the ASC group ($P = .49$). There was 1 visit to the emergency department (ED) <24 hours from surgery in each group (ASC 0.3%, HOP 0.4%) ($P = 1.0$). ED visits occurred within 7 days in 3 ASC cases (1.0%) and 4 HOP cases (1.4%) ($P = .72$). Re-admissions in the first 90 days occurred in 5 ASC cases (1.7%) and 8 HOP cases (2.8%) ($P = .41$).

Conclusion: UKA at an ASC has a low early postoperative complication rate without increased risk of re-admission or ED evaluation when compared to UKAs performed at a HOP.

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Unicompartmental knee arthroplasty (UKA) has been established as an alternative to total knee arthroplasty in selected patients with predominantly isolated compartment osteoarthritis [1–5]. The less invasive nature and more rapid early recovery of UKA lend itself to performance in the outpatient setting. Previous

literature has demonstrated a low rate of readmission and post-operative complications when performed in a hospital outpatient setting (HOP) [6,7]. To our knowledge, there is a paucity of literature evaluating 90-day complications, including readmissions, of UKA performed at an ambulatory surgery center (ASC) setting; a practice that is becoming increasingly more commonplace in the United States due to a desire to increase efficiency and decrease healthcare costs [8,9]. The ASC setting provides some unique advantages compared to the HOP setting in terms of overall cost reduction by improved flow, improved throughput, and shorter procedure times [10,11], but elevation of care needs, readmission, and emergency department (ED) visits post-operatively remain concerns for surgeons. This series evaluates a 4-year surgical experience with UKA performed at an ASC, specifically identifying 90-day complications and readmissions compared to a similar patient cohort performed in a HOP setting. We hypothesized that this series would find no difference in 90-day complication rates

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Table 1
Demographics.

Summary Table	No. of Outpatient UKAs = 569		Single Surgeon
Location of Surgery	ASC 288	HOP 281	
	Mean (SD)		P-Value
Age (y)	63 ± 9	63 ± 9	.82
Weight (pounds)	189 ± 41	195 ± 42	.10
Height (inches)	67 ± 4	67 ± 4	.28
Body mass index (kg/m ²)	29.4 ± 5.4	30.2 ± 5.6	.04
Gender			
Men	128	136	.36
Women	160	145	
Location of UKA			
Medial	238	245	.16
Lateral	50	36	

Note: Continuous data are summarized as mean ± standard deviation. Statistically significant differences between the ASC and HOP groups are designated by bold *P*-values.

SD, standard deviation.

between the 2 surgical settings, to include ED visits and unplanned hospital admissions.

Materials and Methods

After obtaining Institutional Review Board approval, we retrospectively reviewed prospectively collected data on all patients who underwent outpatient UKA by a single surgeon from March 2012 until March 2016. All patients were enrolled in an institutional database prior to surgery. Only patients initially scheduled for outpatient day of surgery discharge from either the HOP or ASC were included for review. It is important to note that the senior surgeon performs all UKAs as outpatient procedures and only rarely schedules patients for overnight admissions when severe medical comorbidities are present or the patients request overnight stay for social reasons. We included both medial and lateral unicompartmental arthroplasty. Patients who had undergone additional procedures at the time of UKA were not included (ie, concomitant patellofemoral arthroplasty or anterior cruciate ligament reconstruction). Patients were scheduled at either the HOP or ASC solely based on surgical date preference, availability of operating room time, and insurance coverage, as not all private insurances will cover UKA at an ASC. All patients had the same anesthetic protocol of lidocaine spinal anesthesia with an adductor canal peripheral nerve block. They received pre-operative acetaminophen, celecoxib, and oxycontin with multi-modal post-operative pain control. Intra-operatively, patients received a 30 cc peri-articular injection of 30 cc liposomal bupivacaine or when not available 30 cc of 0.5% plain bupivacaine. We compared the 2 groups with regard to all complications within the first 90 days after surgery, including readmissions and ED visits. Results for each group were analyzed individually to establish percentages for each complication, then the results of each group were compared and *P*-values were obtained using Fisher's exact test.

Results

During the study period, there were 600 total UKAs performed by the senior author. For those scheduled as outpatient surgery, we identified 288 UKAs performed at the ASC and 281 UKAs performed in a HOP setting for a total of 569 procedures, an outpatient rate of just under 95%. There were no statistically significant demographic differences between the groups, with the exception of a slightly

higher body mass index in the HOP group (30.2 vs 29.4) ($P = .04$). The 2 groups were comparable with regard to age, gender, and location of osteoarthritis (medial or lateral compartment) (Table 1). We identified 30 total (major and minor) complications within 90 days of surgery across the 2 groups, for a rate of 5.3% (Table 2). We did not identify a difference in the overall 90-day complication rate between the groups (ASC 4.2%, HOP 6.4%) ($P = .26$). There were 2 early deep infections requiring operative treatment, both in the HOP group, which underwent irrigation, debridement, and component retention (0.7%, $P = .24$). Neither patient required further surgery. We identified 7 total ED visits in the first week after surgery: 3 ASC cases (1.0%) and 4 HOP cases (1.4%) ($P = .72$). Of these ED visits, only 1 ED visit from each group occurred <24 hours after surgery (ASC 0.3%, HOP 0.4%) ($P = 1.0$). There was only 1 unplanned day-of-surgery admission in the cohort, which occurred in the HOP group (0.4%). This was a case later in the day with a prolonged spinal block and the patient and family requested to stay overnight due to social reasons. There were 13 readmissions within the first 90 days after surgery: 5 in the ASC group (1.7%) and 8 in the HOP group (2.8%) ($P = .41$) (Table 2). We found no difference between the groups with regard to infection, post-operative medical complications, readmissions, or ED visits (Table 3). A post hoc power analysis was performed, and it was determined that 245 cases would be needed in each group (yielding a total of 490 cases) for 80% power assuming a 6% difference (3% vs 9%) using a 2-tailed test with a criterion for significance (α) set at 0.05.

Discussion

Outpatient UKA is safe and reproducible whether performed in a stand-alone ASC or a hospital-based outpatient setting. In the largest comparative study of its kind, we were unable to find a statistically significant difference in complication rates, unplanned post-operative admissions, or ED visits in patients undergoing UKA at either of these settings. We found a low rate of early complications, including wound complications, infection, unplanned admissions, readmissions, and ED visits post-operatively across both groups (5.3%), which is in keeping with prior literature on UKA [11]. Brown et al reported an overall rate of complication of 4.3% in their

Table 2
Complications.

Surgery Location	ASC	HOP	P-Value
No. of UKAs	288	281	
Complication within 90 d	12	18	.26
No complication	276	263	
Mean days to complication	14 ± 13	18 ± 18	.42
Complication type			
Deep infection: operative treatment required	0	2	.24
ER visit within 1 wk	3 (1.0%)	4 (1.4%)	.72
ER visit <24 h after UKA	1 (0.3%)	1 (0.4%)	1.0
Readmit within 90 d of UKA	5 (1.7%)	8 (2.8%)	.41
Location of UKA and Complication			
	Medial	Lateral	
Complication within 90 d	25	5	.79
No complication	458	81	
Gender and complication			
	Men	Women	
Complication within 90 d	16	14	.46
No complication	248	291	

Overall complication rate = 5.3%; mean time to complication (30 complications) = 16 d (15.7).

ER, emergency room.

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