Postoperative Complications in Patients with Sleep Apnea Undergoing Unicompartmental Knee Arthroplasty: A Nationwide Analysis

Kevin L Mekkawy, Hugo Cesar Rodriguez, Gabriel A Delgado, Raul G Gosthe, Arturo Corces[1], Martin William Roche[2]
[1]Miami Institute For Joint Reconstruction, [2]HSS Florida

INTRODUCTION: Sleep apnea (SA) has been shown to negatively affect cognition, immunity, and bone mineralization. The effects of SA on unicompartmental knee arthroplasty (UKA) outcomes is not well defined. The purpose of this study is to assess postoperative medical and implant-related complications, and healthcare utilization in patients with and without SA undergoing UKA.

METHODS: A retrospective review of a private insurance claims database was conducted from 2010 to 2021. All cases of UKA and those with a prior diagnosis of SA were identified using their corresponding diagnosis and procedural codes. Patients undergoing UKA with a diagnosis of SA were matched to control patients 1:2 based on demographic and comorbidity profiles. Outcomes assessed were 90-day medical complications, 2-year implant complications, cost of care, length of stay, and 90-day readmission rates.

RESULTS: A total of 16,080 SA patients were matched to 31,684 control patients. The SA group had significantly higher rates of all 90-day medical complications when compared to the control group (all p<0.01). SA patients also had significantly greater odds of falls (OR, 3.04; CI, 2.71-3.41, p<0.001). Likewise, the SA group had significantly greater odds of prosthetic joint infection, dislocation, mechanical loosening, and periprosthetic fracture than the control group (all p<0.01). There were no significant differences in odds of arthrofibrosis (p=0.186). Additionally, mean cost ($3,141 vs. $2,895, p<0.001) and mean length of stay (3.9 vs. 1.9 days, p<0.001) were significantly greater in the SA group.

DISCUSSION AND CONCLUSION: Sleep apnea in patients undergoing UKA is associated with significant risk of medical and implant-related complications, especially pneumonia, thromboembolic complications, and falls. It is prudent for orthopaedic surgeons to identify those with SA, with possible early intervention prior to surgery to improve outcomes.

Table 2. 90-day medical complications between UKA patients with sleep apnea and a matched-control cohort

Complication	Sleep Apnea (%)	Control (%)	OR	95% CI	p-Value
Pneumonia	2.27	0.34	6.79	5.47 - 8.42	< 0.001
CVA	0.48	0.08	5.86	3.75 - 9.14	< 0.001
MI	0.71	0.15	4.61	3.30 - 6.45	< 0.001
UTI	4.15	0.93	4.59	4.00 - 5.27	< 0.001
Sepsis	0.90	0.23	3.94	1.97 - 5.22	< 0.001
AKI	1.60	0.44	3.66	2.98 - 4.50	< 0.001
PE	0.45	0.16	2.83	1.98 - 4.05	< 0.001
DVT	2.20	0.97	2.29	1.97 - 2.67	< 0.001
Transfusion	0.36	0.16	2.20	1.51 - 3.20	< 0.001
Wound	0.98	0.58	1.69	1.37 - 2.09	< 0.001

UKA, unicompartmental knee arthroplasty; OR, odds ratio; CI, confidence interval; MI, myocardial infarction; CVA, cerebrovascular accident; DVT, deep vein thrombosis; PE, pulmonary embolism; UTI, urinary tract infection; AKI, acute kidney injury

Table 3. Two-year falls and implant related complications between UKA patients with sleep apnea and a matched-control cohort

Complication	Sleep Apnea (%)	Control (%)	OR	95% CI	p-Value
Falls	4.65	1.58	3.04	2.71 - 3.41	< 0.001
PFx	0.30	0.18	1.69	1.15 - 2.49	0.008
DL	0.84	0.55	1.52	1.22 - 1.91	< 0.001
PJI	2.50	1.74	1.45	1.27 - 1.65	< 0.001
ML	1.75	1.31	1.35	1.16 - 1.57	< 0.001
Fibrosis	0.27	0.21	1.27	0.86 - 1.86	0.229

UKA, unicompartmental knee arthroplasty; OR, odds ratio; CI, confidence interval; PJI, periprosthetic joint infection; DL, dislocation; ML, mechanical loosening; PFx, periprosthetic fracture

Figure 1. Two-year falls implant-related complication rate following unicompartmental knee arthroplasty between patients with sleep apnea and matched-control patients
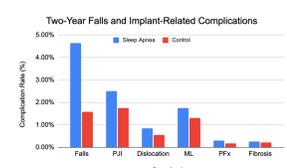

Two-Year Falls and Implant-Related Complications

Table 4. Medical and healthcare utilization between UKA patients with sleep apnea and a matched-control cohort

Utilization	Sleep Apnea	Control	OR	95% CI	p-Value
Cost of Care ($)*	3,141 ± 5,349	2,895 ± 4,852			< 0.001
Readmission	2.83%	2.75%	1.01	0.90 - 1.13	0.877
Length of Stay (d)*	3.9 ± 5.9	1.9 ± 1.9			< 0.001

* given as mean ± standard deviation
UKA, unicompartmental knee arthroplasty; OR, odds ratio; CI, confidence interval