Increased Revision Rates Among Patients Undergoing Unicompartmental and Bicompartmental Knee Arthroplasties when Compared to Total Knee Arthroplasty

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INTRODUCTION: With recent advances in partial knee arthroplasty, there is conflicting data regarding the outcomes and revision rates for bicompartmental knee arthroplasty (BKA) and unicompartamental knee arthroplasty (UKA) compared to total knee arthroplasty (TKA). This study uses national data to compare the surgical and medical complications of UKA, BKA, and TKA to aid surgical decision making.

METHODS: A retrospective cohort analysis was done using the Mariner dataset of the PearlDiver patient records database from 2010-2019. Current Procedural Terminology (CPT) codes were used to identify patients who underwent UKA, BKA, and TKA for a primary indication of osteoarthritis (OA). Univariate and multivariable analyses were performed to determine 1-year and 2-year revision, prosthetic joint infection (PJI), and loosening, 1-year manipulation under anesthesia (MUA), and 90-day postoperative medical complications.

RESULTS: The BKA cohort was found to have higher odds of one and two-year revision compared to the UKA and TKA cohorts. Additionally, the UKA cohort had higher odds of one and two-year revision but lower odds of 1-year MUA than the TKA cohort. However, both the BKA and UKA cohorts had lower odds of any 90-day postoperative complications when compared to the TKA cohort.

DISCUSSION AND CONCLUSION:

Even with modern implants and approaches, our study found that revision rates are highest for BKA followed by UKA and TKA at two years postoperatively. Notably, medical complications were much less common after all partial knee replacement types when compared to TKA. These findings may be used to guide patients in selecting the appropriate surgery to meet their goals and expectations.

	BKA (compared to UKA)				BKA (compared to TKA)				UKA (compared to TKA)			
	Odds Ratio	25%	75%	P-value	Odds Ratio	25%	75%	P-value	Odds Ratio	25%	75%	P-value
2-Year Revision	1.614	1.271	2.021	<0.001	2.097	1.547	2.775	<0.001	1.585	1.512	1.660	<0.001
2-Year MUA	3.097	2.378	3.974	<0.001					0.359	0.337	0.381	<0.001
2-Year PJI									0.868	0.777	0.966	0.011
2-Year Loosening					1.628	0.741	3.052	0.171	1.662	1.500	1.837	<0.001
1-Year Revision	1.407	1.010	1.906	0.035	1.761	1.150	2.568	0.006	1.595	1.503	1.691	<0.001
1-Year MUA	3.271	2.491	4.228	<0.001					0.344	0.323	0.367	<0.001
1-Year PJI					0.192	0.011	0.846	0.097	0.897	0.791	1.013	0.085
All Complications					0.483	0.397	0.584	<0.001	0.481	0.469	0.493	<0.001
Major Complications					0.515	0.303	0.812	0.008	0.571	0.539	0.605	<0.001
SSI									0.796	0.734	0.861	<0.001
Renal Failure					0.224	0.055	0.588	0.010	0.480	0.435	0.528	<0.001
Anemia	0.421	0.236	0.688	0.001	0.267	0.183	0.374	0.001	0.268	0.256	0.280	<0.001
Arrhythmia w/ afib					0.884	0.645	1.191	0.428	0.717	0.690	0.746	<0.001
Arrhythmia w/o afib					1.019	0.716	1.415	0.913	0.711	0.677	0.746	<0.001
Bleeding complication									0.641	0.556	0.734	<0.001
Blood Transfusion					0.473	0.259	0.787	0.008	0.158	0.140	0.178	<0.001
Pneumonia	0.231	0.038	0.721	0.039	0.122	0.007	0.539	0.034	0.723	0.652	0.798	<0.001
Stroke									0.758	0.668	0.855	<0.001
Death									0.457	0.330	0.614	<0.001
DVT	1.719	1.103	2.551	0.011	0.787	0.440	1.286	0.377	0.595	0.550	0.644	<0.001
Heart Failure	0.671	0.333	1.193	0.215	0.292	0.102	0.653	0.008	0.724	0.669	0.782	<0.001
Pulmonary embolism					0.932	0.419	1.777	0.846	0.555	0.494	0.621	<0.001
Respiratory Complication									0.662	0.570	0.764	<0.001
Sepsis									0.648	0.557	0.749	<0.001
UTI					0.652	0.421	0.960	0.041	0.755	0.720	0.791	<0.001
Readmission									0.712	0.622	0.810	<0.001

SSI: surgical site infection; w/ afib: with atrial fibrillation; w/o afib: without atrial fibrillation; DVT: Deep Vein Thrombosis; UTI: Urinary Tract Infection; Bolding indicates significance of p<0.05.