Comparison of Patient Reported Outcomes in Cemented and Cementless Unicompartmental Knee Arthroplasty: A Propensity Matched Analysis

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INTRODUCTION: Unicompartmental knee arthroplasty (UKA) is a bone- and ligament-sparing alternative to total knee arthroplasty for isolated compartmental osteoarthritis. While cemented fixation has been the standard in UKA, cementless designs have gained popularity due to potential advantages in operative efficiency, biological fixation, and long-term implant survivorship. Limited studies directly compared cemented and cementless UKA with respect to patient-reported outcome measures (PROMs). This study aims to evaluate whether fixation method impacts PROMs following UKA using a propensity-matched analysis.

METHODS: An institutional database was used to identify 681 UKA following IRB approval. A 1:4 propensity based on age, BMI, gender, diabetes, chronic kidney disease, osteoporosis, osteopenia, and compartment involvement was conducted. Physical Function Short Form Survey (SF-10a), Patient-reported Measurement Information Systems (PROMIS) Global Physical and Mental Survey, and Knee Injury and Osteoarthritis Outcome Score Physical Function Shortform (KOOS-PS) were extracted. Minimum clinically important difference (MCID) was calculated using the distribution-based method. Complication rates at 90 days, one year, and two years were recorded.

RESULTS: After propensity matching, 105 cementless and 420 cemented UKAs remained. There was no difference between cohorts in age, BMI, gender, compartment involvement, or comorbidities ($p>0.05$). A significantly higher proportion of cementless patients experienced no clinically significant change in PROMIS Mental (35% vs 22%, $p = 0.009$). There were no other differences in absolute scores, delta scores, or the proportion of patients who achieved clinically significant improvement or worsening. There was no significant difference between cohorts in 90-day medical complication rates or surgical complication rates at one and two years.

DISCUSSION: This study found no significant difference in postoperative PROMs between cemented and cementless UKA after propensity matching. These findings suggest that fixation method alone may not influence functional improvement or patient satisfaction in the short- to mid-term postoperative period. Prior studies comparing fixation methods in UKA have yielded mixed results, with some reporting improved outcomes in cementless cohorts and others demonstrating equivalence. Our results demonstrate cemented and cementless unicompartmental knee arthroplasty are associated with similar patient-perceived outcomes.

SIGNIFICANCE/CLINICAL RELEVANCE: Cemented and cementless unicompartmental knee arthroplasty yield similar patient-perceived outcomes.

Variable	Cemented (N = 420)	Cementless (N = 105)	P Value
Age	68.2 ± 8.7	68.3 ± 8.9	0.939
BMI	29.0 ± 4.4	29.0 ± 4.6	0.985
Female	176 (41.9%)	41 (39.0%)	0.674
Diabetes	54 (12.9%)	14 (13.3%)	0.931
Chronic kidney disease	17 (4.0%)	6 (5.7%)	0.631
Osteoporosis	49 (11.7%)	12 (11.4%)	0.658
Medial compartment	360 (85.7%)	91 (86.7%)	0.925

Table 1. Post propensity-matching demographics between cemented and cementless fixation unicompartmental knee arthroplasty patients.

	Cementless	Cemented	P Value
SF10-a	N = 93	N = 393	
Postop Score	46.29 ± 8.20	46.19 ± 7.44	0.946
Delta Score	7.02 ± 7.29	7.45 ± 6.95	0.5596
MCID-I	68 (73%)	290 (74%)	0.9987
No Change	20 (22%)	69 (18%)	0.4616
PROMIS Global Mental	N = 100	N = 407	
Postop Score	55.64 ± 8.79	54.36 ± 9.16	0.1871
Delta Score	1.85 ± 6.58	1.49 ± 6.25	0.9532
MCID-I	37 (37%)	193 (47%)	0.0779
No Change	35 (35%)	89 (22%)	**0.0091**
PROMIS Global Physical	N = 100	N = 408	
Postop Score	50.46 ± 8.94	49.90 ± 8.51	0.6893
Delta Score	5.36 ± 7.60	6.41 ± 6.97	0.3231
MCID-I	67 (67%)	280 (69%)	0.8465
No Change	16 (16%)	81 (20%)	0.4614
KOOS-PS	N = 55	N = 305	
Postop Score	76.24 ± 15.25	75.10 ± 14.34	0.5634
Delta Score	17.77 ± 15.63	16.98 ± 16.19	0.4114
MCID-I	44 (80%)	235 (77%)	0.7589
No Change	7 (13%)	37 (12%)	0.921

Table 2. Patient-Reported Outcome Measures of cemented and cementless unicompartmental knee arthroplasty propensity-matched patients.