Cementless Total Knee Arthroplasty Benefits Obese Patients: A Nationwide Analysis

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INTRODUCTION: Although cementless total knee arthroplasty (TKA) has been increasingly utilized recently, selection criteria remain controversial. Obesity was previously viewed as a relative contraindication due to concerns about implant stability. However, emerging evidence suggests that patients who have an elevated body mass index (BMI) may benefit from cementless constructs. This study aims to compare outcomes following cementless versus cemented TKA in patients who have a BMI > 35, including 1) mechanical complications (periprosthetic fracture, aseptic loosening, aseptic revision), and 2) infectious and thromboembolic complications (surgical site infection (SSI), prosthetic joint infection (PJI), and venous thromboembolism (VTE) at 90 days, one, two, and five years.

METHODS: A national all-payer database was queried for patients who had a BMI > 35 and underwent a cemented or cementless TKA for osteoarthritis from 2010 to 2021. Exclusion criteria included trauma, malignancy, and rheumatoid arthritis. Propensity-score matching was performed based on differing patient characteristics, yielding two cohorts: cementless (n = 5,416) and cemented (n = 18,525). Complication rates were analyzed using Chi-square tests, and odds ratios (ORs) with 95% confidence intervals (CIs) were calculated.

RESULTS: Cementless TKA was associated with lower odds of aseptic loosening at 90 days (OR 0.39, 95% CI 0.54 to 0.96), one year (OR 0.65, 95% CI 0.45 to 0.96), two years (OR 0.72, 95% CI 0.54 to 0.96), and five years (OR 0.68, 95% CI 0.54 to 0.87). Similarly, there was a lower risk of PJI at five years (4.7 versus 5.8%, P < 0.05). No significant differences were observed for SSI, VTE, or periprosthetic fracture.

DISCUSSION AND CONCLUSION: Among patients who had a BMI of 35 or greater, cementless TKA is associated with lower rates of aseptic loosening and PJI compared to cemented fixation. These findings support the use of cementless fixation in obese patients, challenging historical concerns regarding implant stability in this population.

TKA Demographics in Patients with a BMI of 35+

	Cementless (n = 5,417)	Cemented (n = 85,804)	
	n(%)	*n*(%)	*p-value*
Age (SD)	60 (8.8)	62 (8.7)	0.895
CCI (SD)	1.44 (1.6)	1.57 (1.8)	0.392
Sex			
Female	3,291(60.8)	57,487 (67.0)	<0.001
Male	2,125 (39.2)	28,317 (33.0)	
AA	295 (5.4)	3,929 (4.6)	0.004
Diabetes (Complicated)	1,680 (31.0)	28,657 (33.4)	<0.001
TU	2,475 (45.7)	36,996 (43.1)	<0.001

TKA: Total Knee Arthroplasty; BMI: Body Mass Index; SD: Standard Deviation; CCI: Charlson Comorbidity Index; AA: Alcohol Abuse; TU: Tobacco Use.

Incidence of TKA Complications in Patients with a BMI of 35+

	Cementless (n = 5,416)	Cemented (n = 18,525)	
	n(%)	*n(%)*	*p-value*
PPFX			
90 Days	*	*	1.000
One Year	*	20 (0.1)	0.650
Two Years	*	27 (0.1)	0.462
Five Years	*	45 (0.2)	0.377
PJI			
90 Days	171 (3.2)	634 (3.4)	0.363
One Year	209 (3.9)	798 (4.3)	0.159
Two Years	237 (4.4)	918 (5.0)	0.086
Five Years	254 (4.7)	1,077 (5.8)	0.002
SSI			
90 Days	80 (1.5)	232 (1.3)	0.225
Aseptic Revision			
90 Days	30 (0.6)	90 (0.5)	0.607
One Year	73 (1.3)	246 (1.3)	0.964
Two Years	112 (2.1)	406 (2.2)	0.619
Five years	146 (2.7)	570 (3.1)	0.161
VTE			
90 Days	62 (11.4)	263 (1.4)	0.141
Aseptic Loosening			
90 Days	11 (0.2)	95 (0.5)	0.004
One Year	32 (0.6)	167 (0.9)	0.033
Two Years	57 (1.1)	269 (1.5)	0.030
Five Years	81 (15.0)	402 (21.7)	0.002
MUA			
90 Days	150 (2.8)	420 (2.3)	0.037
One Year	204 (3.8)	551 (3.0)	0.004
Two Years	214 (4.0)	569 (3.1)	0.002
Five Years	217 (4.0)	578 (3.1)	0.002

TKA: Total Knee Arthroplasty; BMI: Body Mass Index; PPFX: Periprosthetic Fracture; PJI: Prosthetic Joint Infection; SSI: Surgical Site Infection; VTE: Venous Thromboembolism; MUA: Manipulation Under Anesthesia.

Odds Ratio of Complications

	Cementless TKA	
	OR	95% CI
PPFX		
90 Days	0.68	0.08 – 5.86
One Year	0.68	0.23 – 2.00
Two Years	0.63	0.24 – 1.64
Five Years	0.68	0.33 – 1.40
PJI		
90 Days	0.92	0.77 – 1.09
One Year	0.89	0.76 – 1.04
Two Years	0.88	0.75 – 1.02
Five Years	0.80	0.69 – 0.92
SSI		
90 Days	1.18	0.92 – 1.53
Aseptic Revision		
90 Days	1.14	0.75 – 1.73
One Year	1.02	0.78 – 1.32
Two Years	0.94	0.76 – 1.16
Five Years	0.87	0.73 – 1.05
VTE		
90 Days	0.80	0.61 – 1.06
Aseptic Loosening		
90 Days	0.39	0.21 – 0.74
One Year	0.65	0.45 – 0.96
Two Years	0.72	0.54 – 0.96
Five Years	0.68	0.54 – 0.87
MUA		
90 Days	1.23	1.02 – 1.48
One Year	1.28	1.08 – 1.50
Two Years	1.30	1.11 – 1.52
Five Years	1.30	1.10 – 1.50

TKA: Total Knee Arthroplasty; PPFX: Periprosthetic Fracture; OR: Odds Ratio; CI: Confidence Interval; PJI: Prosthetic Joint Infection; SSI: Surgical Site Infection; VTE: Venous Thromboembolism; MUA: Manipulation Under Anesthesia.