Increased BMI as a Risk Factor for 30-Day Postoperative Complications Following Total Knee Arthroplasty for Periarticular Fractures Among Geriatric Patients

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INTRODUCTION:

Due to the frequent failure of osteosynthesis after fracture fixation among the elderly, total knee arthroplasty (TKA) is emerging as a viable alternative for periarticular fracture patterns. Outcomes for TKA show better clinical results, but there are limited studies assessing preoperative risk for complications. Our purpose was to determine incidence rates and risk factors for early postoperative adverse events following TKA for periarticular knee fractures among a sizeable, national geriatric population.

METHODS:

Query of the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database yielded 154 geriatric patients (>65 years) who were managed operatively with TKA for periarticular knee fractures between 2010-2019. We collected patient demographics, comorbidities, and 30-day complications. Univariate analysis and subsequent multivariable logistic regression analysis was conducted to determine preoperative risk factors for major and minor postoperative complications.

RESULTS:

The majority of patients were female (n=141, 92%). The mean ± standard deviation BMI was 30.5 ± 9.5 kg/m² and age 78 ± 7.6 years. Distal femoral fractures numbered 101 (65%), outnumbering tibial plateau fractures (n=50, 32%). Fractures involving both the tibia and fibula (n=2, 1.3%) and proximal fibular fractures (n=1, 0.6%) were less common. Overall, the rate of early adverse events was 19%. Major complications occurred in 9 patients (5.8%) and minor complications occurred in 18 patients (11.7%). The most common adverse events were readmissions (n=13, 8.4%), pulmonary embolisms (n=5, 3.2%), urinary tract infections (n=4, 2.6%), deep vein thromboses (n=4, 2.6%), return to the operating room (n=4, 2.6%), pneumonia (n=3, 1.9%), death (n=3, 1.9%), reintubation (n=3, 1.9%) and surgical site infections (n=3, 1.9%). Multivariate analysis revealed that only increased BMI (odds ratio [OR], 1.07; 95% CI, 1.02-1.13; p=0.017) was an independent risk factor of major and minor postoperative complications combined.

DISCUSSION AND CONCLUSION:

Increased BMI plays a significant role in predicting short-term outcomes among the geriatric population after TKA for periarticular knee fractures. Given that the rates of geriatric patients with obesity and geriatric patients presenting with periarticular fractures have steadily risen over the years, surgeons must monitor weight management and counsel patients appropriately before TKA to ensure both successful patient outcomes and cost-effective resource allocation.

Figure 1. Annual Number of Primary Total Knee Arthroplasties Performed for Periarticular Fractures in Geriatric Patients, 2010-2019.

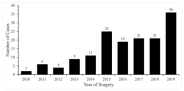

Table 1. Demographics and Preoperative Risk Factors of Geriatric Patients with Periarticular Fractures Undergoing Primary TKA, 2010-2019.

Parameter	N (%)
Age (mean ± SD), years	77.77 ± 7.58
Female	141 (92%)
BMI (mean ± SD), kg/m²	30.50 ± 9.52
Race	
White	129 (83.8%)
Black or African American	10 (6.5%)
Asian	3 (1.9%)
Unknown/Not Reported	12 (7.8%)
Functional Status	
Independent	121 (78.6%)
Partially/totally dependent	33 (21.4%)
Anemia	114 (74.0%)
Dyspnea	8 (5.2%)
Chronic pulmonary obstructive disease	13 (8.4%)
Insulin-dependent diabetes	16 (10.4%)
Congestive heart failure	5 (3.2%)
End-stage renal failure	4 (2.6%)

SD, standard deviation

Table 2. Breakdown of Fracture Patterns Sustained by Geriatric Patients with Periarticular Fractures Undergoing Primary TKA, 2010-2019.

Fracture Site	N (%)
Distal femur	101 (65.6%)
Tibial plateau	50 (32.4%)
Proximal tibia-fibula	2 (1.3%)
Proximal fibula	1 (0.6%)

Table 3. Breakdown of Postoperative Complications Following Primary TKA in Geriatric Patients with Periarticular Fractures, 2010-2019.

Complications	N (%)
Readmission	13 (8.4%)
Pulmonary Embolism	5 (3.2%)
Reoperation	4 (2.6%)
Deep Vein Thrombosis	4 (2.6%)
Urinary Tract Infection	4 (2.6%)
Death	3 (1.9%)
Pneumonia	3 (1.9%)
Surgical Site Infection	3 (1.9%)
Reintubation	3 (1.9%)
Failure to wean off mechanical ventilation	2 (1.3%)
Myocardial infarction	2 (1.3%)
Cardiac arrest	1 (0.6%)

Table 4. Breakdown of Multivariate Analysis of Preoperative Risk Factors on Postoperative Adverse Events, 2010-2019.

Preoperative Risk Factor	Odds Ratio	Std. err.	Z	P-value	95% Conf. Interval
Age	1.00	0.03	0.06	0.95	[0.94, 1.07]
Female	1.50	1.40	0.43	0.66	[0.24, 9.34]
BMI	1.06	0.03	2.40	0.02	[1.01, 1.11]
Functionally dependent	1.62	0.83	0.94	0.35	[0.59, 4.43]
COPD	0.86	0.69	-0.19	0.85	[0.18, 4.09]
Insulin-dependent diabetes*	NA	NA	NA	NA	NA
Anemia	2.65	1.59	1.62	0.11	[0.81, 8.62]
CHF	1.55	1.75	0.39	0.70	[0.17, 14.12]
Dyspnea	4.22	3.93	1.55	0.12	[0.68, 26.14]
ESRD*	NA	NA	NA	NA	NA

*Insulin-dependent diabetes and ESRD status were omitted from the multivariate analysis due to predicting failure perfectly.