Malignancy Increases Risk of Postoperative Complications Following Total Knee Arthroplasty: A Retrospective National Database Study of 1,221,357 Patients

Introduction

Total knee arthroplasty (TKA) is increasingly performed in an aging and medically complex population, and malignancy may influence perioperative risk. However, the effect of malignancy on postoperative outcomes after TKA remains insufficiently characterized. Thus, this study aimed to evaluate differences in postoperative complications between patients undergoing TKA with and without malignancy.

Methods

Premier Healthcare Database (PHD), a 2016-2022 private deidentified inpatient dataset, allowed for identification of primary TKAs based on CPT codes. Patients were subdivided based on malignancy status using ICD-10 codes within 365 days prior to surgery. Postoperative outcomes, including readmission, reoperation, and complications such as PJI, DVT, and PE, were tracked. Adjusted odds ratios (aORs) were calculated using multivariable logistic regression controlling for age, sex, race, ethnicity, insurance status, and comorbidity burden. Further analysis compared solid-organ and non-solid-organ malignancy.

Results

This study found 1,221,357 TKA patients, 21,556 of whom had a malignancy diagnosis. While malignancy was not associated with increased risk of reoperation (aOR=1.04, p=0.494), it was associated with higher odds of readmission (aOR=1.37, p<0.001), PJI (aOR=1.23, p<0.001), DVT (aOR=1.72, p<0.001), and PE (aOR=1.77, p<0.001) (*Table 1*). In the sub-analysis of 16,240 solid-organ and 3,497 non-solid-organ malignancy patients, there were increased odds of myocardial infarction and pneumonia, but no significant difference in readmission, reoperation, PJI, DVT, or PE (*Table 2*).

Discussion

Malignancy was associated with increased postoperative risk following TKA, including readmission, PJI, venous thromboembolism, and selected medical complications. These findings support malignancy as a factor in preoperative risk assessment and postoperative surveillance. Patients with malignancy likely warrant more thorough preoperative optimization before TKA, given the potential contributions of anemia, immunosuppression, hypercoagulability, and physiologic frailty to worse outcomes. A multidisciplinary approach may help improve perioperative readiness in this population.

Table 1. Postoperative outcomes following TKA in Patients with and without malignancy

Outcome	Malignancy (N=21,556)	No Malignancy (N=1,199,801)	Adjusted OR (95% CI)	p-value
Readmission	1,587 (7.4%)	54,971 (4.6%)	**1.37** (1.30–1.45)	**<0.001**
Reoperation*	404 (1.9%)	21,377 (1.8%)	1.04 (0.94–1.14)	0.494
PJI	366 (1.7%)	16,039 (1.3%)	**1.23** (1.11–1.37)	**<0.001**
DVT	326 (1.5%)	9,130 (0.8%)	**1.72** (1.54–1.93)	**<0.001**
PE	128 (0.6%)	3,316 (0.3%)	**1.77** (1.48–2.12)	**<0.001**
Stroke	42 (0.2%)	1,085 (0.1%)	**1.38** (1.01–1.91)	**0.046**
Delirium	28 (0.1%)	472 (0.0%)	**1.76** (1.18–2.62)	**0.006**
Myocardial infarction	59 (0.3%)	1,540 (0.1%)	**1.34** (1.03–1.75)	**0.030**
Acute kidney injury	393 (1.8%)	9,395 (0.8%)	**1.45** (1.31–1.62)	**<0.001**
Urinary tract infection	524 (2.4%)	11,333 (0.9%)	**1.91** (1.74–2.09)	**<0.001**
Pneumonia	192 (0.9%)	3,818 (0.3%)	**1.83** (1.57–2.13)	**<0.001**
Anemia	1,304 (6.0%)	28,665 (2.4%)	**2.03** (1.92–2.16)	**<0.001**
Hypotension	233 (1.1%)	5,165 (0.4%)	**1.64** (1.43–1.88)	**<0.001**

*Indicates a 2-year postoperative follow-up. All other outcomes were assessed within a 90-day postoperative window.

Table 2. Postoperative outcomes following TKA in patients based on malignancy type

Outcome	Solid-Organ (N=16,240)	Non-Solid-Organ (N=3,497)	Adjusted OR (95% CI)	p-value
Readmission	1,192 (7.34%)	265 (7.58%)	1.01 (0.88–1.16)	0.875
Reoperation*	308 (1.90%)	66 (1.89%)	1.02 (0.78–1.33)	0.871
PJI	273 (1.68%)	70 (2.00%)	0.85 (0.66–1.10)	0.216
DVT	239 (1.47%)	61 (1.74%)	0.85 (0.64–1.12)	0.242
PE	101 (0.62%)	20 (0.57%)	1.07 (0.68–1.69)	0.771
Stroke	30 (0.18%)	7 (0.20%)	0.76 (0.38–1.54)	0.450
Delirium	19 (0.12%)	5 (0.14%)	0.62 (0.28–1.35)	0.225
Myocardial infarction	37 (0.23%)	16 (0.46%)	**0.50** (0.28–0.87)	**0.015**
Acute kidney injury	279 (1.72%)	71 (2.03%)	0.88 (0.68–1.13)	0.318
Urinary tract infection	395 (2.43%)	73 (2.09%)	1.19 (0.93–1.52)	0.163
Pneumonia	127 (0.78%)	48 (1.37%)	**0.60** (0.43–0.83)	**0.002**
Anemia	961 (5.92%)	234 (6.69%)	0.92 (0.79–1.06)	0.237
Hypotension	166 (1.02%)	38 (1.09%)	1.00 (0.71–1.40)	0.979

*Indicates a 2-year postoperative follow-up. All other outcomes were assessed within a 90-day postoperative window.