The Impact of Thyrotoxicosis on Outcomes and Complications Following Total Knee Arthroplasty with Minimum 2-Year Surveillance

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INTRODUCTION: There is limited literature evaluating the impact of thyrotoxicosis on long-term outcomes after Total Knee Arthroplasty (TKA) surgery.

METHODS: Using New York State's Statewide Planning and Research Cooperation System, patients admitted from 2009 to 2011 with diagnoses of thyrotoxicosis who underwent TKA with a minimum 2-year follow-up surveillance were retrospectively reviewed. A 1:1 propensity score-match (PSM) by age, sex, and obesity status was performed before analyzing data. Univariate analyses evaluated demographics, complications, and subsequent revision. Multivariate binary logistic regression models were also conducted to identify correlations between thyrotoxicosis and postoperative outcomes, controlling for sex, age, and obesity status.

RESULTS: A total of 380 propensity score-matched patients were identified (thyrotoxicosis: n=190; non-thyrotoxicosis: n=190). Both cohorts were identical in age (both 67.47 years, p=1.00), sex (both 80.0% female, p=0.100), and obesity status (both 17.9%, p=1.00). The thyrotoxicosis cohort, compared to the non-thyrotoxicosis cohort, had a lower Deyo score (0.67 vs. 0.88, p=0.037), fewer white patients (68.6% vs. 87.8%, p<0.001), higher surgical charges ($43,055.83 vs. $33,316.40, p<0.001), and longer length of stay (3.80 days vs. 3.35 days, p=0.022). Compared to non-thyrotoxicosis, patients with thyrotoxicosis had lower rates of surgical complications, blood transfusions, medical complications, acute renal failure, and readmission (all, p<0.05) (Table 1). With a 1:1 PSM, patients with thyrotoxicosis, compared to non-thyrotoxicosis patients, had lower risk for surgical complications (OR: 0.427 [0.271 – 0.672], p<0.001), blood transfusion (OR: 0.411 [0.258 – 0.656], p<0.001), medical complications (OR: 0.428 [0.250 – 0.733], p=0.002) and readmissions (OR: 0.621 [0.405 – 0.954], p=0.030) (Table 2).

DISCUSSION AND CONCLUSION: Patients with thyrotoxicosis had higher surgical charges and length of stay, but lower surgical and medical complications, blood transfusion, and readmission rates than a propensity score matched patient cohort without thyrotoxicosis from the general population undergoing total knee arthroplasty. These results can support management of postoperative expectations and concerns in this patient cohort.

Postoperative Outcome	No Thyrotoxicosis N (%)	Yes Thyrotoxicosis N (%)	P -Value
Surgical Complications	83 (43.7%)	47 (24.7%)	<0.001
Wound	11 (5.8%)	8 (4.2%)	0.480
CNS	0 (0.0%)	0 (0.0%)	-
Malunion of Fracture	1 (0.5%)	0 (0.0%)	0.317
Nonunion of Fracture	3 (1.6%)	0 (0.0%)	0.082
Prosthetic Implant Joint	8 (4.2%)	5 (2.6%)	0.397
Transfusion of Blood	77 (40.5%)	41 (21.6%)	<0.001
Medical Complications	58 (30.5%)	28 (14.7%)	<0.001
Altered Mental Status	4 (2.1%)	1 (0.5%)	0.177
Acute Myocardial Infarction	4 (2.1%)	6 (3.2%)	0.522
Pulmonary	2 (1.1%)	1 (0.5%)	0.562
Pneumonia	15 (7.9%)	8 (4.2%)	0.132
Gastrointestinal	1 (0.5%)	0 (0.0%)	0.317
Urinary Tract Infection	3 (1.6%)	2 (1.1%)	0.653
Acute Renal Failure	22 (11.6%)	10 (5.3%)	0.027
Sepsis	8 (4.2%)	2 (1.1%)	0.055
Pulmonary Embolism	3 (1.6%)	3 (1.6%)	1.000
Deep Venous Thrombosis	6 (3.2%)	1 (0.5%)	0.056
Cerebrovascular Event	6 (4.7%)	2 (1.6%)	0.151
Reoperation	25 (13.2%)	24 (12.6%)	0.878
Readmission	7 (3.7%)	7 (3.7%)	1.000
Mortality (Hospitalization)	123 (64.7%)	101 (53.2%)	0.022
Surgical Complications	4 (2.1%)	2 (1.1%)	0.410

Table 1: Impact of Thyrotoxicosis on Rate of Postoperative Outcomes in Patients Undergoing Total Knee Arthroplasty.

Postoperative Outcomes	OR [95%CI] (Univariate)	P -Value	OR [95%CI] (Multivariate)	P - Value
Surgical Complications	0.4 [0.3 – 0.7]	<0.001	0.4 [0.3 – 0.7]	<0.001
Wound	0.7 [0.3 – 1.8]	0.482	0.8 [0.3 – 2.1]	0.630
CNS	-	-	-	-
Malunion of Fracture	-	-	-	-
Nonunion of Fracture	-	-	-	-
Prosthetic Implant Joint	0.6 [0.2 – 1.9]	0.401	0.5 [0.1 – 1.8]	0.291
Transfusion of Blood	0.4 [0.3 – 0.6]	<0.001	0.4 [0.3 – 0.7]	<0.001
Medical Complications	0.4 [0.2 – 0.7]	<0.001	0.4 [0.3 – 0.7]	0.002
Altered Mental Status	0.2 [0.0 – 2.2]	0.212	0.3 [0.0 – 2.7]	0.279
Acute Myocardial Infarction	1.5 [0.4 – 5.5]	0.524	1.6 [0.4– 6.0]	0.479
Pulmonary	0.5 [0.0 – 5.5]	0.570	0.6 [0.0 – 6.3]	0.634
Pneumonia	0.5 [0.2 – 1.2]	0.138	0.6 [0.2 – 1.6]	0.321
Gastrointestinal	-	-	-	-
Urinary Tract Infection	0.7 [0.1 – 4.0]	0.655	1.1 [0.2 – 7.7]	0.895
Acute Renal Failure	0.4 [0.2 – 0.9]	0.030	0.6 [0.2 – 1.3]	0.185
Sepsis	0.2 [0.1 – 1.2]	0.075	0.3 [0.1 – 1.3]	0.101
Pulmonary Embolism	1.0 [0.2 – 5.0]	1.000	1.0 [0.2 – 5.3]	0.992
Deep Venous Thrombosis	0.2 [0.0 – 1.4]	0.094	0.12 [0.0 – 1.6]	0.131
Cerebrovascular Event	0.6 [0.2 – 1.9]	0.401	0.9 [0.3 – 2.9]	0.832
Reoperation	1.0 [0.5 – 1.7]	0.878	0.8 [0.4 – 1.5]	0.447
Readmission	1.0 [0.3 – 2.9]	1.000	0.9 [0.3 – 2.8]	0.881
Mortality (Hospitalization)	0.6 [0.4 – 0.9]	0.022	0.6 [0.4 – 1.0]	0.030
Surgical Complications	0.5 [0.1 – 2.7]	0.420	0.6 [0.1 – 3.4]	0.561

Table 2: Impact of Thyrotoxicosis on Risk of Postoperative Outcomes in Patients Undergoing Total Knee Arthroplasty.