The Role of Prolonged Operative Time, Gender, and Other Risk Factors in Total Knee Arthroplasty Complications

Ayobami S. Ogunsola[1], Marcel G. Brown[1], Leslie Granados[1], Xue Ma[1]
[1]Wake Forest University School of Medicine, Winston-Salem, NC
Disclosures: There are no author disclosures

Introduction: Osteoarthritis (OA) is a leading cause of disability in the United States, affecting 32.5 million adults and accounting for $16.5 billion in healthcare spending. This study aims to identify risk factors that increase the risk of complications among patients with knee OA who have undergone arthroplasty procedures.

Methods: A total of 187 patients who underwent total knee arthroplasty (TKA) had their charts reviewed retrospectively. Postoperative complications, including superficial wound infection, deep wound infection, wound dehiscence, prolonged postoperative pain, and deep vein thrombosis, were grouped together as 'any complication'. Predictor variables considered in this study included age, gender, smoking history, diabetes, hypertension, chronic kidney disease, as well as Staphylococcus aureus and MRSA (Methicillin-Resistant Staphylococcus aureus) positive nasal swab results. The study employed a Lasso logistic regression model with cross-validation to determine the optimal model. Table 1 presents the descriptive statistics and coefficients of the optimal model for predicting the occurrence of any complication.

Results: Among all the patients who had TKA, 18 (10.2%) developed postoperative complications. The results revealed that males have lower log-odds (coefficient of -0.29652) of experiencing any complication compared to females. A positive preoperative nasal swab prior to TKA is associated with lower log-odds (coefficient of -0.8961) of experiencing any complication post TKA, compared to those who tested negative. Non-white individuals have higher log-odds (0.7696) of developing any complication post TKA compared to White individuals. Additionally, an increase in operative time is associated with an increase in the log-odds (coefficient of 1.6209) of developing any complication post TKA. Hypertension and other cardiovascular diseases are factors that increase the log-odds of developing any complication after TKA.

Discussion: Prolonged operative time, female gender, racial identity as non-white, hypertension, and a previous diagnosis of any other cardiovascular disease may increase the risk of developing any complication following TKA. Positive preoperative nasal swab test was shown to decrease the risk of developing any complication post TKA. This may be due to the use of prophylactic antibiotics prior to surgery. Limitations include low sample size, and missing data. In spite of this, the greatest difference in missing data between variables is limited to 5%. Efforts are ongoing to increase the study's sample size. Further studies are necessary to elucidate the mechanisms of these associations.

Clinical Relevance: Understanding the risk factors associated with developing complications post TKA can assist healthcare providers in post operative risk management and improving patients' outcomes.

Table 1: Key coefficients in the Logistic Regression Model (Lasso Selection)

Variable	N (%)	Coefficients
Intercept		-3.470
Gender		-0.297
Females (Ref)	103 (55.1)	
Males	84 (44.9)	
Race		0.769
Whites (Ref)	150 (84.3)	
Non-Whites	28 (15.7)	
Preop nasal swab test		-0.896
Negative (Ref)	131 (70.4)	
Positive for Staph aureus	41 (22.0)	
Positive for MRSA	14 (7.5)	
Operative time*	127 (27.3)	1.621
Cardiovascular Disease		0.235
No (Ref)	55 (31.3)	
Yes	121 (68.8)	
Hypertension		0.227
No (Ref)	51 (29.1)	
Yes	124 (70.3)	

*Continuous variable (Mean and SD)