Differential Outcomes of Total Knee Arthroplasty in Patients with Personality Disorders vs. no Personality Disorders

Peter Chebi, BS[1], Majd Mzeihem, MD[1], John Alvarez, BS[1], Albert Rechenmacher, MD[1], Alfonso Mejia, MD[1], Mark Gonzalez, MD[1]
[1]University of Illinois Chicago, Chicago, IL
Pchebi@uic.edu

Disclosures: None.

INTRODUCTION: In the USA, the prevalence of personality disorders in the adult population is approximately 7%. Total Knee Arthroplasty (TKA) is an increasingly performed procedure, and patients with psychiatric comorbidities are over-represented among those undergoing TKA, with studies estimating the prevalence of psychiatric comorbidities in this cohort up to 30%. Patients with psychiatric comorbidities have a higher risk of medical and surgical complications following TKA, and they demonstrate poorer function and report higher pain levels following TKA regardless of surgical outcome. Certain personality traits, such as high neuroticism, low emotional stability, and somatization, as well as overall psychological distress and psychopathology, are particularly predictive of dissatisfaction and persistent pain. Personality disorders (PDs) may also be independent predictors of surgical outcomes, but there is a gap in the literature describing specific post-operative complications and their relation to PDs. We evaluated whether a PD diagnosis independently associates with medical, infectious, wound, orthopedic, and opioid-related outcomes following total knee arthroplasty (TKA).

METHODS: The PearlDiver database was searched for patients who underwent TKA, and populations were divided based on PD (n=2,691) or No PD (n=695,079). The PD group was 79.68% female (n=2,144) and 20.33% male (n=547), compared to the No PD group, which was 62.30% female (n=433,038) and 37.70% male (n=262,038). Populations were matched based on age, gender, Elixhauser Comorbidity Index (ECI), obesity, diabetes mellitus, hypertension, and tobacco use. Demographic continuous variables were analyzed using independent t-tests, and categorical post-operative complications were compared using chi-square tests and multivariable logistic regression. Medical complications were Transfusion, Aspiration Pneumonitis, Shock, Nausea or Vomiting, Cardiac Arrest, Deep Vein Thrombosis, Pulmonary Embolism, Urinary Tract Infection, Acute Kidney Injury, and Pneumonia. Opioid-Related complications were Opioid Abuse and Opioid Use Milliliters of Morphine Equivalence (MME). Wound complications were Wound Disruption, Hematoma, Superficial Site Infection (SSI), and Deep Site Infection (DSI). Infectious complications were SSI, DSI, and Prosthetic Joint Infection (PJI). Orthopedic complications were Osteolysis, Loosening, Periprosthetic fracture, Other Mechanical Complications, Knee Instability, Knee Dislocation, Broken Implant, Surface Wear, PJI, Patella Instability, Extensor Mechanism Rupture, Ankylosis, Stiffness, Manipulation Under Anesthesia, and revision TKA.

RESULTS: Before matching, PD patients had higher incidence of each pooled outcome (P<0.001; Table 1). After matching, PD patients continued to have higher incidence of developing opioid abuse (P<0.001; Table 1). Multivariate logistic regression analysis failed to show a significant difference (Table 2).

DISCUSSION: After matching, PD did not increase pooled medical, infectious, wound, or orthopedic complications after TKA. Limitations include a retrospective design which limits causal inference, and the use of an administrative database may introduce selection bias. Our analysis depends on the accuracy of diagnosis codes provided by physicians. While our study population is large, it may not represent the general population or show substantial rates of each complication, and unmeasured variables such as socioeconomic status could also influence results. Nevertheless, PD was associated with elevated opioid abuse risk, which is consistent with previously published literature. This may be associated with the phenomena of central pain sensitization and pain catastrophizing, which are associated with worse patient-reported outcomes in PD. Future studies may compare objective complications with patient-reported outcomes to better understand the impact of pain on post-operative complication rate.

CLINICAL RELEVANCE: Surgeons should be informed about the greater risk of pain and opioid abuse in this population but should be encouraged that other outcomes following TKA are comparable between the groups. This plays a role in determining the risk-benefit profile and efficacy of performing elective TKA in patients with PD, which may influence surgeons' decision-making capacity in selecting PD patients as surgical candidates, and which may direct approaches on post-operative analgesia to improve patient-reported outcomes without contributing to opioid abuse.

	Unmatched				Matched			
Complication, n (%)	**No PD (n=695,079)**	**PD (n=2,691)**	**PD OR (95% CI)**	**P-value**	**No PD (n=2,657)**	**PD (n=2,657)**	**PD OR (95% CI)**	**P-value**
Medical	73,464 (10.57%)	475 (17.65%)	**1.81 (1.64-2.00)**	**<0.001**	442 (16.64%)	460 (17.31%)	1.05 (0.91-1.21)	0.53
Opioid Abuse	19,269 (2.77%)	389 (14.46%)	**5.93 (5.32-6.61)**	**<0.001**	260 (9.79%)	375 (14.11%)	**1.51 (1.28-1.79)**	**<0.001**
Opioid Use MME (Mean ± SD)	1,684.68 ± 3,604.50	3,082.50 ± 5,664.03	N/A	**<0.001**	3,234.14 ± 7,013.16	3,078.16 ± 5,651.20	N/A	0.46
Wound	10,155 (1.46%)	98 (3.64%)	**2.55 (2.08-3.12)**	**<0.001**	89 (3.35%)	94 (3.54%)	1.06 (0.79-1.42)	0.76
Infectious	25,558 (3.68%)	199 (7.40%)	**2.09 (1.81-2.42)**	**<0.001**	208 (7.83%)	193 (7.26%)	0.92 (0.75-1.13)	0.47
Orthopedic	12,6704 (18.23%)	692 (25.72%)	**1.55 (1.42-1.69)**	**<0.001**	681 (25.63%)	681 (25.63%)	1.00 (0.88-1.13)	1.00
Total	191,113 (27.50%)	1,056 (39.24%)	**1.70 (1.58-1.84)**	**<0.001**	1,014 (38.16%)	1,035 (38.95%)	1.03 (0.93-1.15)	0.57

Table 1: Incidence of Complications. *OR: Odds Ratio, CI: Confidence Interval, SD: Standard Deviation

	Unmatched		Matched	
Outcome	**OR (Wald 95% CI)**	**P-value**	**OR (Wald 95% CI)**	**P-value**
Medical	1.01 (0.91-1.12)	0.85	1.05 (0.91-1.22)	0.50
Wound	1.12 (0.91-1.38)	0.27	1.06 (0.78-1.42)	0.72
Infectious	0.87 (0.75-1.01)	0.06	0.92 (0.74-1.13)	0.41
All Orthopedic Complications	1.10 (0.93-1.11)	0.76	0.99 (0.88-1.12)	0.92
All Complications	1.00 (0.93-1.09)	0.94	1.03 (0.92-1.15)	0.60

Table 2: Multivariate Logistic Regression Analyzing the Odds of Developing Pooled Complications