Association between Social Determinants of Health and Postoperative Outcomes in Patients Undergoing Total Hip Arthroplasty

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INTRODUCTION:

Environmental conditions in which patients live can affect their health greatly. Disparities in these conditions can lead to what is called social determinants of health disparities (SDHD), which have been shown to result in negative patient outcomes. Patients with SDHD undergoing surgery may have more postoperative complications, worse outcomes, and higher costs for treatment. In this study, we investigate the 90-day medical and 2-year surgical complications among patients with a history of diagnosed SDHD undergoing a total hip arthroplasty (THA).

METHODS: A retrospective cohort analysis was performed using an insurance claims database. Patients who underwent primary THA were identified using Current Procedural Terminology (CPT) and International Classification of Diseases (ICD) 9 and ICD-10 codes between 2010-2018 with 2-years of follow up. SDHD were categorized as economic, educational, social, healthcare, or environmental disparities and were identified using ICD-9 and ICD-10 codes. Patient cohorts were stratified into whether or not they had one or more diagnoses of SDHD prior to THA. Demographic, Elixhauser comorbidity, and complication data after THA were analyzed using bivariate analysis. Significant complications were further analyzed using multivariable logistical regression controlling for significant demographic and comorbidity data. Findings were considered significant for p-value<0.05.

RESULTS: A total of 698,658 patents underwent primary THA between 2010-2018 and had 2 years of follow-up. Of these, 39,650 (5.68%) patients had a previously diagnosed SDHD and 659,008 (94.32%) did not. Patients with an SDHD diagnosis prior to THA were also associated with a longer average length of stay in the hospital (mean +/- SD: 3.97 +/- 9.27 days) when compared to those without an SDHD diagnosis (mean +/- SD: 2.86 +/- 2.05 days); p<0.001. Nearly all Elixhauser comorbidities were more common among patients with a diagnosed SDHD except hypertension, metastatic cancer, and non-metastatic cancer. Patients with a diagnosis of an SDHD prior to THA were shown in univariate analysis to have higher rates of all complications analyzed. Multivariate analysis demonstrated that patients with a prior diagnosis of SDHD had higher risk of medical complications within 90-days; among the highest risks included: renal failure, sepsis, heart failure, urinary tract infection, and pneumonia. Patients with an SDHD were twice as likely to die within 90 days of THA (Odds Ratio: 2.09; 95% Confidence Interval: 1.86 - 2.34). Similarly, 2-year surgical complications were increased in patients with a SDHD, with higher risks of joint instability, aseptic loosening, periprosthetic joint infection, prosthetic dislocation, periprosthetic fracture, and prosthetic failure (**Table 1**).

DISCUSSION AND CONCLUSION: This study highlights the adverse medical and surgical outcomes for patients with SDHD undergoing THA. Patients with a diagnosed history of SDHD undergoing THA are more likely to have higher number of comorbidities and more likely to have 90-day medical and 2-year surgical complications when compared to patients without a medical history of SDHD. Patients with an SDHD were twice as likely to die in the 90-day postoperative period. Additionally, patients with a history of SDHD were more likely to have increased length of stay postoperatively. Our study quantifies the comorbidities and complication rates for THA patients with a history of SDHD, which may be beneficial for optimizing patient care.

Table 1. Multivariate analysis of complications after total hip arthroplasty for patients with social determinants of health disparities diagnosed prior to surgery. P-values bolded if p<0.05.

	p-value	Odds Ratio	95% Confidence Interval
90-Day Medical Complications			
Anemia	**<0.001**	2.24	2.20 - 2.28
Atrial Fibrillation	**<0.001**	1.65	1.61 - 1.69
Bleeding Complication	0.500	0.98	0.92 - 1.04
Death	**<0.001**	2.09	1.86 - 2.34
Deep Vein Thrombosis	**<0.001**	1.84	1.77 - 1.90
Heart Failure	**<0.001**	3.39	3.29 - 3.50
Other Arrhythmia	**<0.001**	2.39	2.33 - 2.46
Pulmonary Embolism	**<0.001**	1.98	1.89 - 2.09
Pneumonia	**<0.001**	3.21	3.11 - 3.32
Readmission	**0.029**	1.20	1.02 - 1.41
Renal Failure	**<0.001**	3.45	3.35 - 3.55
Respiratory Complication	**<0.001**	2.35	2.23 - 2.48
Sepsis	**<0.001**	3.44	3.31 - 3.57
Surgical Site Infection	**<0.001**	1.33	1.29 - 1.38
Stroke	**<0.001**	2.41	2.30 - 2.53
Transfusion	**<0.001**	1.10	1.07 - 1.13
Urinary Tract Infection	**<0.001**	3.26	3.20 - 3.33
2-year Surgical Complications			
Aseptic Loosening	**<0.001**	2.13	2.03 - 2.24
Instability	**<0.001**	2.53	2.32 - 2.75
Periprosthetic Joint Infection	**<0.001**	1.89	1.74 - 2.05
Periprosthetic Fracture	**<0.001**	1.69	1.61 - 1.78
Prosthetic Dislocation	**<0.001**	1.73	1.66 - 1.79
Prosthetic Failure	**<0.001**	1.69	1.62 - 1.76