Clinical Outcomes and Economic Implications of Hypoallergenic versus Standard Implants in Total Knee Arthroplasty: A Retrospective Cohort Study

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INTRODUCTION: Metal hypersensitivity has emerged as a significant concern in the context of total knee arthroplasty (TKA), leading to the development of hypoallergenic implants. Current studies assessing hypoallergenic TKA implants suggest a decrease in quality of life and patient-reported outcome measures when compared to TKA with standard implants. This study seeks to compare clinical outcomes, including readmissions and medical complications, among patients undergoing TKA with either hypoallergenic or standard implants.

METHODS: A retrospective review of our institution's prospective joint registry was conducted to identify all patients aged 18 and older who underwent unilateral TKA between January 2019 and August 2022 using either hypoallergenic or standard implants. Cohorts were compared based on factors such as age, heart disease, diabetes, alcohol use, smoking use, body mass index (BMI), allergies, and American Society of Anesthesiologists (ASA) classification. Clinical outcomes included 30-day readmissions, emergency department (ED) visits < 72 hours, and ED visits < 7 days, ED visits < 30 days, and medical complications. Statistical analysis was performed using multiple logistic regression, chi-square, and paired t-tests.

RESULTS: 6954 TKAs (6626 standard and 320 hypoallergenic) were identified through retrospective review. Hypoallergenic implant recipients had significantly higher 30-day readmission rates (2.19% vs. 0.74%, $p<0.001$, 95% CI [1.052,1.132]). No significant association was found between hypoallergenic TKA and BMI, ASA, heart disease, diabetes, alcohol, smoking incidence, ED visits, or medical complications (all $p>0.05$).

DISCUSSION AND CONCLUSION: There is a notable difference in 30-day readmission rates between patients undergoing TKA with hypoallergenic implants and those with standard implants, underscoring the need for heightened vigilance in this patient population. Understanding the clinical implications of metal hypersensitivity and hypoallergenic implants will contribute to improved health and financial outcomes.

Table 2. Outcomes Table

	Standard Implant, n (%)	Hypoallergenic Implant, n (%)	p-value
Readmission			
ED visits < 72 hours	108 (1.63)	8 (2.5)	p=0.154
ED visits < 7 days	116 (1.75)	8 (2.5)	p=0.296
ED visits < 30 days	108 (1.63)	9 (2.81)	p=0.127
30-day readmission	49 (0.74)	7 (2.19)	**p=0.005**
Surgical Site Infection (SSI)			
Superficial SSI	6 (0.09)	0 (0)	p=0.223
Complex SSI	8 (0.12)	0 (0)	p=0.860