Nickel-Free Primary Total Knee Arthroplasty Implants Do Not Improve Clinical Outcomes for Patients with Nickel Allergy

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INTRODUCTION: The impact of nickel allergy on total knee arthroplasty (TKA) outcomes is debated. The purpose of this study was to describe the impact of nickel-free implants on patient-reported outcome measurements (PROMs) after primary TKA among patients with preoperative nickel allergy.

METHODS: We retrospectively identified 282 patients with documented preoperative nickel allergy undergoing primary TKA at our institution from 2/2016 through 12/2020. Thirty-nine patients received nickel-containing implants and 243 received nickel-free implants. On average, the cohorts had similar body mass index (p=0.056) and number of females (p=0.605), but the nickel implant cohort was older (p=0.002). We collected preoperative, 6-week, and 1-year PROMs including Visual Analog Scale (VAS), Knee Osteoarthritis Outcome Score Joint Replacement (KOOS JR.), Lower Extremity Activity Scale (LEAS), Patient-Reported Outcomes Measurement Information System (PROMIS), and Veterans Rands-12 (VR-12). Kaplan Meier analysis to assess survivorship free from all-cause revision.

RESULTS: Preoperative PROMs were similar between groups. All PROMs were similar between nickel and nickel-free groups at 1-year follow up. In both, KOOS JR ($p<0.001$), LEAS (p=0.001), and VR-12 mental (MCS) (p=0.008) and physical (PCS) (p=0.001) component scores improved at 1-year follow up. However, PROMIS MCS in both groups ($p>0.05$) and the PROMIS PCS in the nickel group (p=0.5) did not show significant improvement. Revision rates between nickel (3%) and nickel-free (1%) cohorts were similar (p=0.451). Revision indications were instability (n=2) and patellar clunk (n=1) in the nickel group and prosthetic joint infection in the nickel-free group. There were no revisions for allergy in either group. At 2 years, survivorship free of any revision was 94% in the nickel implant group and 98% in the nickel-free group (p=0.965).

DISCUSSION AND CONCLUSION: In this retrospective study of patients with preoperative nickel allergy, there was little difference in revision rates or PROMs between those receiving nickel-containing versus nickel-free implants in primary TKA.