Evaluating the Utility of Methicillin-Resistant *Staphylococcus Aureus* Nasal Screening in Preventing Surgical Site Infections in Elective Orthopedic Surgery

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INTRODUCTION: Standardized preoperative Methicillin-Resistant Staphylococcus Aureus (MRSA) nasal screening aims to reduce surgical site infection (SSI) rates by targeting MRSA nasal colonization, which is hypothesized to increase the risk of SSI. Within orthopedic surgery, the effectiveness of MRSA screening for the prevention of SSIs varies greatly. Additionally, screening and decolonization programs form a financial burden to medical centers and pose a risk for increased MRSA antibiotic resistance. Notably, although the implementation of MRSA screening programs has increased over the past few years, SSI rates have not declined. Given the inconclusive nature of prior research conducted on small patient populations and with a limited number of outcomes, this study aims to investigate the impact of MRSA screening on SSI rates within a substantial cohort. Furthermore, we aim to assess the utility of the screening program for the broader elective orthopedic surgery population.

METHODS:

Patients over the age of 18 undergoing elective orthopedic surgery between June 2015 and March 2024 were assessed for the primary predictor, MRSA screening status <90 days preoperatively, deep SSI as primary outcome, and superficial SSI as secondary outcome. Deep SSI was defined as return to the operating room (OR) for incision and drainage (I&D) <90 days following surgery. Superficial SSI was defined as an antibiotic prescription 7-30 days postoperatively. Clinical and demographic factors like age, BMI, CCI score and length of surgery were included as covariates. Propensity score matching was done to adjust for a number of covariates, after which logistic regression analysis was performed.

RESULTS: 65,864 patients were included. After matching, two equally sized cohorts of 25,506 patients were analyzed. In the tested cohort, 100 patients (0.39%) developed a deep SSI, compared to 122 patients (0.48%) in the non-tested group. After adjusted analysis, MRSA test status showed no significant association with postoperative deep SSI risk (P>0.05). Furthermore, 1,992 (7.81%) in the tested group developed superficial SSI, compared to 1,745 (6.84%) patients in the non tested group. Here, MRSA test status was significantly associated with superficial SSI (P<0.05). In total, 405 out of 25,506 (1.59%) patients were found to be MRSA positive, and 4,557 MSSA positive (17.87%). 5 out of 100 (5%) tested patients with a deep SSI were tested positive for MRSA and 27 (27%) patients were MSSA positive.

DISCUSSION AND CONCLUSION: No association was found between MRSA nasal screening and deep SSI in elective orthopedic surgery. Moreover, even with a large cohort, deep SSI was a relatively rare outcome and the group of MRSA positive patients was small. Considering the high financial burden screening, a low number of deep SSI cases and a dubious relationship between deep SSI rates and MRSA testing, further research should explore optimizing MRSA screening programs in orthopedic surgery, with a particular focus on higher-risk populations.