Regional Decolonization Minimizes Surgical Site Infection in Orthopaedic Trauma

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Background/Purpose: *Staphylococcus aureus* (SA) colonization is of particular importance in orthopaedics due to the use of implants, as it is the most common etiology of surgical site infection (SSI). Specifically, methicillin-resistant SA (MRSA) colonization has been associated with high rates of SSI after surgeries utilizing metal implants. Preoperative decolonization protocols such as chlorhexidine gluconate showers are recommended prior to joint arthroplasty procedures for decolonization of SA and other skin flora, but these protocols can be impractical in the orthopaedic trauma patient. Our aim was to determine if SSI could be minimized through the use of a regional decolonization procedure prior to orthopaedic trauma surgery.

Methods: We conducted a prospective observational study of adults undergoing open orthopaedic trauma surgery over 1 year at an urban academic Level I trauma center. Exclusion criteria were preexisting infection, age <18 years, percutaneous procedures, nontraumatologist surgeon, insufficient follow-up, and unknown MRSA status. All patients underwent regional decolonization consisting of chlorhexidine and alcohol mechanical scrub of the operative extremity prior to prep and drape. Patient, injury, and surgical characteristics were recorded and patients were followed for diagnosis of deep SSI. Data were analyzed using X^2 test with significance for P values <0.05.

Results: Inclusion criteria were satisfied for 468 trauma cases, for 13 of which the patient was positive for MRSA nasal carriage (2.8%). Deep SSI was identified in 4/468 cases (0.85%). Of the four infections, one returned positive cultures for MRSA, one returned positive cultures for methicillin-sensitive SA, one returned positive cultures for *Serratia marcescens*, and one returned cultures positive for multiple non-Staphylococcus species. One of 13 MRSA positive patients (7.7%) and 3/454 MRSA negative patients (0.66%) had a postoperative deep SSI. Notably, 9 of 13 patients (69.2%) who were MRSA positive did not receive antibiotic prophylaxis adequately covering MRSA. Of the 468 trauma cases for which inclusion criteria were met, there were 51 open fractures consisting of 6 Type I fractures, 8 Type II fractures, 22 Type IIIA fractures, 13 Type IIIB fractures, and 2 Type IIIC fractures. One of 13 Type IIIB fractures and 1 of 2 Type IIIC fractures were complicated by deep SSI. Additionally, there were 24 revision cases for nonunion as well as one revision for malunion, none of which were complicated by deep SSI.

Conclusion: We report a low rate of deep SSI (0.85%) in open orthopaedic trauma procedures, including open fracture and revision cases. This is in contrast to previous reports of SSI rates ranging from 2.5% to 4.2% in orthopaedic trauma. Causality cannot be proven in this observational cohort study; however, the practice of preoperative regional decolonization deserves further study. We recommend consideration of this low-risk, efficient process as part of a multimodal effort to minimize SSI in orthopaedic trauma patients.