Can MRSA Screening Swabs Help Predict Risk of Postoperative Infection Following Open Fracture Treatment?

Cassandra Cardarelli, MD[1]*; Matt Vasquez, MD*[1]*; Jacob Glaser, MD*[2]*; Sarah Murthi, MD*[2]*; Michelle Romero, BS*[3]*; Kerry Campbell, BS*[3]*; Michael McCusker, BS*[3]*; Marcus Sciadini, MD*[4]*; Robert O'Toole, MD*[4]*; Manjari Joshi, MD*[5]*;*
[1]Walter Reed National Military Medical Center, Bethesda, Maryland, USA;
[2]Department of Surgery and Surgical Critical Care, UMMS, Baltimore, Maryland, USA;
[3]University of Maryland School of Medicine, Baltimore, Maryland, USA;
[4]Department of Orthopaedics, RA Cowley STC, University of Maryland, School of Medicine, Baltimore, Maryland, USA; [5]Division of Infectious Diseases, RA Cowley STC, University of Maryland, School of Medicine, Baltimore, Maryland, USA

Background/Purpose: Postoperative infection following open fracture of an extremity can result in significant morbidity including further surgical intervention, increased length of stay, extended use of antibiotic therapy, and even limb loss. Standard antiSbiotic prophylaxis for open fractures (cefazolin) covers Staphylococcus species, but does not offer prophylaxis against methicillin-resistant Staphylococcus aureus (MRSA). Our hypotheses were: (1) open fractures in patients with MRSA positive nasal swabs will have higher overall infection rates; (2) in patients colonized with MRSA, there would be higher rates of MRSA infections.

Methods: We conducted a retrospective review of all patients undergoing surgical treatment of open fractures between 2008 and 2012 at single urban academic medical center. Data collected included: age, demographics, mechanism of injury, type of fracture, time to operation, perioperative antibiotics, outcomes, and intraoperative cultures (in cases of infection). Results of preoperative screening exams, including nasal swabs for MRSA, were also collected. At this center cefazolin was routinely used as prophylaxis at the time of surgery as well as on initial presentation to the center. Clindamycin was utilized in penicillin-allergic patients. No patients received perioperative MRSA coverage (vancomycin) regardless of nasal swab result. Patients without an available admission swab were excluded. Surgical site infection was defined as an infection that was treated with operative debridement. Data were analyzed using Fisher exact test.

Results: 1327 open fractures were screened; 193 developed postoperative infections (21%). Of these, 907 open fractures had available MRSA screening swabs comprising our study group. Fractures that did not have MRSA swab data were excluded (420) accounting for 16 infections (3.8% infection rate). Of the study group (n = 907) a total of 864 were MRSA swab negative and 43 MRSA swab positive. Postoperative infections were identified in 193 (21% of fractures) of the 907 for whom screening swabs were available. MRSA positive nasal swabs had a higher rate of postoperative infection (35% [15 of 43] vs 21% [178 of 864]; P = 0.0344). Of those with MRSA-positive swabs, MRSA infection was identified 6/15 versus 29/178 in those who were MRSA swab negative (40% vs 16.2%, P = 0.03). Of the MRSA swab positive group, 60% (9/15) developed a postoperative infection with Staphyloccus species, 67% (6/9) of which were MRSA.

Conclusion: In our data set, a positive MRSA nasal swab on admission was associated with an increased risk of developing a postoperative infection (P <0.05). Previous work

See pages 47 - 108 for financial disclosure information.

has identified positive MRSA swabs as a risk factor for surgical site infection, but to our knowledge this is the first analysis that has demonstrated a similar risk for infection after open fractures. The etiology of this increase is not currently known, in light of the fact that most patients with MRSA positive swabs become infected with an organism other than MRSA (60%). It raises the question whether MRSA positivity is a marker for increased risk of infection. Prospective studies are warranted to investigate if changes in antibiotic prophylaxis or decolonization methods can affect infection rates.