

**Antibiotics Selection for Open Fractures: Is the Current Regimen Still Applicable?**

James Moss, MD<sup>1</sup>; **Patrick Bergin, MD<sup>2</sup>**; Matthew Graves, MD<sup>2</sup>; William Replogle, PhD<sup>2</sup>; Vuong-Iam Pham, MD<sup>2</sup>; James Brown, BS<sup>2</sup>; Clay Spitler, MD<sup>2</sup>

<sup>1</sup>Mississippi Sports Medicine and Orthopaedic Center, Jackson, Mississippi, USA;

<sup>2</sup>University of Mississippi Medical Center, Jackson, Mississippi, USA

**Background/Purpose:** Open fractures have proven to be a difficult problem to treat and have an increased risk of infection and other healing complications. They usually occur from a high-energy mechanism and can be associated with differing degrees of soft-tissue injury, bony injury, and contamination. The purpose of this study is to analyze the efficacy of our present open, long bone fracture antibiotic regimens, identify a preferred antibiotic combination for gram-positive/gram-negative coverage, and analyze risk factors for infection after open fractures.

**Methods:** 622 patients were identified as having open, long bone fractures between January 2008 and December 2012. Infections were defined as positive cultures during surgical debridement after definitive wound closure. Efficacy profiles were calculated for cefazolin and gentamicin (our current regimen) as well as any antibiotic tested at least 20% of the time. Antibiotic sensitivities for each organism were collected and analyzed. Patient factors, injury characteristics, and treatment options were analyzed to determine risk factors for infection.

**Results:** 90 patients (15%) had positive intraoperative cultures at surgical debridement. 170 organisms were identified. Cefazolin was 50% effective, but it was only tested in 5% of gram-positive infections. We therefore assessed all beta-lactam or cephalosporin antibiotics as a surrogate for class efficacy. These were effective 59% of the time. Gentamicin was tested 94% of the time for gram-negative infections with 94% sensitivity. Vancomycin was the most effective antibiotic for gram-positive organisms (96% sensitivity). Gentamicin was most effective for gram-negative infections (94% sensitivity). Male gender, Gustilo-Anderson type, diabetes, and days to closure were independently predictive of infection in a multivariate model.

**Conclusion:** Based on this analysis, our present antibiotic regimen may be insufficient for treatment of open, long bone fractures. A modification of our current regimen may be necessary. A regimen of vancomycin/gentamicin should be considered.