

**A Comparison of Antibiotic Regimens for Type III Open Fracture Prophylaxis***Anthony Paterno, MS; Alysa Nash, MD; Patricia Kirkland Wellborn, MD;**Feng-Chang Lin, PhD; Robert F. Ostrum, MD**UNC Department of Orthopaedics, Chapel Hill, North Carolina, UNITED STATES*

**Purpose:** Prophylactic antibiotics for Gustilo-Anderson type III open fractures are cefazolin and gentamicin at many institutions. Adverse effects such as nephrotoxicity as well as dosing and duration make gentamicin a questionable drug particularly in trauma patients. The purpose of our study was to compare piperacillin/tazobactam, which has less reported toxicity, with cefazolin/gentamicin in preventing surgical-site infections (SSIs) in type III open fractures. We hypothesized that there is no significant difference in SSIs in patients receiving the piperacillin/tazobactam regimen compared to traditional regimens.

**Methods:** After IRB approval, we queried all type III open tibia, femur, ankle, and humerus fractures at our large academic Level I trauma center from 2008 to 2019. These patients were separated into 3 groups, those receiving cefazolin/gentamicin (CG), cefazolin/gentamicin/injected tobramycin (CGT), and piperacillin/tazobactam (PT). Primary outcomes were deep (requiring return to operating room) and superficial (antibiotics only) SSIs as well as nonunions during a postoperative period of 12 months.  $\chi^2$  test of homogeneity, analysis of variance, and Kruskal-Wallis tests were used for our statistical analysis.

**Results:** We identified 207 injuries. 53 were excluded as they did not receive appropriate antibiotics for their injuries. Final sample size was 154 injuries. There were no statistically significant differences between groups for patient demographics, risk factors, location of fracture, Gustilo-Anderson fracture subtype (IIIA, IIIB, IIIC), or method of fixation. 68 fractures were treated with piperacillin/tazobactam, 40 with cefazolin/gentamicin, and 46 were treated with cefazolin/gentamicin/injected tobramycin. The PT group had 13 (19%) deep SSIs compared to 6 (15%) deep SSIs in the CG group and 5 (11%) deep SSIs in the CGT group. The PT group had 5 (7%) superficial SSIs while 5 (12%) superficial SSIs were seen in the CG cohort and 4 (7%) in the CGT group. There was not a statistically significant difference in either deep or superficial SSIs among the 3 groups ( $P = 0.49$  and  $P = 0.66$ , respectively). Nonunion rates among the 2 groups also were not significantly different.

**Conclusion:** Results of this study demonstrate no significant difference in SSIs or nonunion rate between piperacillin/tazobactam, cefazolin/gentamicin, and cefazolin/gentamicin/injected tobramycin prophylactic antibiotics for infection prophylaxis in type III open fractures. Given the equivalency of these antibiotic regimens and a lower risk profile with piperacillin/tazobactam, we believe this may be a viable alternative for antibiotic prophylaxis in type III open fractures, particularly in polytraumatized patients.