

## Does Early Administration of Antibiotics After Open Tibia Fractures Really Decrease Infection Rates?

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**Purpose:** A recent report has indicated that patients who received antibiotics within 66 minutes of injury were at decreased risk for surgical site infection. Our goal was to confirm this finding and evaluate the effect of time from injury to prophylactic antibiotic delivery and other potentially modifiable treatment parameters on deep infection with open tibia fractures. Our hypothesis is that earlier delivery of antibiotics would be associated with lower infection rates.

**Methods:** Our IRB-approved study was a retrospective prognostic study performed at an urban Level I trauma center. The study group was 289 patients with Gustilo-Anderson type I-III open tibia fractures with at least 3 months follow-up. The primary outcome measure was deep surgical site infection treated with surgical debridement. 58 patients (20%) developed a deep infection. The infected (n = 58) and uninfected (n = 231) patients were comparable with regard to injury severity, comorbidities, age, ISS, tobacco use, diabetes mellitus, body mass index, and cefazolin as primary antibiotic ( $P \geq 0.10$ ).

**Results:** Univariate and multivariate analysis of time to antibiotic administration within 66 minutes was associated with increased infection risk (25% vs 15%,  $P = 0.04$ ) but those patients arriving within 66 minutes were more likely to have type IIIB/C fractures (26% vs 14%,  $P = 0.01$ ). Further subgroup analysis excluding type IIIB/C fractures found no statistically significant association of antibiotic timing and infection ( $P = 0.10$ ). Multivariate analysis demonstrated type IIIB/C fractures ( $P = 0.003$ ) and patients with delayed arrival to the definitive trauma center >6 hours ( $P = 0.02$ ) was predictive of increased risk of deep surgical site infection.

**Conclusion:** In contrast to a recent publication and perhaps developing dogma, we did not find that early antibiotic administration decreased the risk of infection in patients with open tibia fractures. The reason for the differences between our findings and those of the previous authors are unclear, but there are several other reports confirming our findings. Clinicians and emergency medical services providers should be aware that there is some controversy regarding the likely efficacy of moving antibiotic delivery into the pre-hospital setting as has been proposed. Further, even with urgent patient resuscitation, early antibiotic administration, timely flap coverage when needed, and urgent surgical debridement, infections still occur at a relatively high rate for type I-III open tibia fractures.