Type III Open Tibia Fractures: Immediate Antibiotics and Earliest Possible Wound Coverage Minimize Infections

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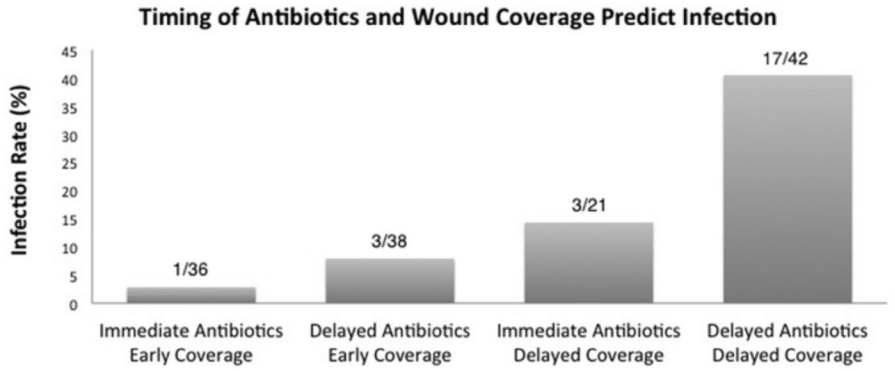
Purpose: Antibiotic prophylaxis is the standard of care after an open fracture. However, evidence regarding antibiotic timing is limited. Our purpose was to examine the association between antibiotic timing and deep infection of type III open tibia fractures.

Methods: We retrospectively studied 162 consecutive type III open tibia fractures at a Level I trauma center. The final population consisted of 137 patients after exclusions for missing data (13), nonreconstructible limbs (9), and/or absence of 90-day outcome (3). Deep infection within 90 days was the primary outcome defined by criteria from the Centers for Disease Control and Prevention. We analyzed days to wound coverage, time to antibiotics, open fracture subclassification (type IIIA vs. IIIB/C), ISS, antibiotic agent, age, smoking, and diabetes.

Results: Age, smoking, diabetes, ISS, type IIIA versus IIIB/C injury, and time to surgical debridement were not associated with infection on univariate analysis. Greater than 5 days to wound coverage ($P < 0.001$) and greater than 66 minutes to antibiotics ($P < 0.01$) were univariate predictors of infection. Multivariate analysis found wound coverage beyond 5 days (odds ratio 7.39, 95% confidence interval [CI] 2.33-23.45, $P < 0.001$) and antibiotics beyond an hour from injury (odds ratio 3.78, 95% CI 1.16-12.31, $P = 0.03$) independently predicted infection. Immediate antibiotics and early coverage limited the infection rate (1 of 36, 2.8%) relative to delay in either factor (6 of 59, 10.2%) or delay in both factors (17 of 42, 40.5%).

Conclusion: Time from injury to antibiotics and to wound coverage independently predict infection of type III open tibia fractures. Both should be achieved as early as possible, with coverage being dependent on the condition of the wound. Given the relatively short therapeutic window for antibiotic prophylaxis (within an hour of injury), prehospital antibiotics may substantially improve outcomes for severe open fractures.



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