What Are the Risk Factors for Deep Infection in 43C Tibial Pilon Fractures?

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Purpose: Pilon fracture care remains technically challenging and avoiding soft-tissue complications is of the utmost concern in their management. While staged management has decreased the rates of complication, not all risk factors for deep infection are clearly defined. The purpose of this study is to determine what patient factors, injury characteristics, and surgical choices are associated with deep infection in AO/OTA 43C type fractures.

Methods: A retrospective review was performed of all 43C fractures treated at a single Level I trauma center over a 5-year period. Patient demographics, fracture characteristics, associated soft-tissue injuries, and surgical treatment decisions were analyzed to evaluate their relationship with deep infection, which was the primary outcome. Deep infection was defined as the need for antibiotics and surgical debridement after definitive fixation. Chi-square test, Student’s t-test, and descriptive statistics were used for analysis.

Results: A total of 169 43C pilon fractures were identified, and 15 were excluded due to inadequate follow-up. Average follow-up was 404 days. Average age was 42.8 years, 57% were male, and 37% of fractures were open. Overall incidence of deep infection was 13.8%. Age (P = 0.19), sex (P = 0.18), BMI (body mass index) (P = 0.54), smoking (P = 0.49), and diabetes (P = 0.72) were not significantly associated with deep infection. Diaphyseal fracture extension (P = 0.48), and lateral open fracture wound (P = 0.07) were not significantly associated with deep infection. When assessing all fractures, medial (P = 0.026) and anterior (P = 0.02) open fracture wounds, the need for flap coverage (P <0.001), segmental bone loss (P <0.001), and placement of fixation through a traumatic wound (P = 0.016) were significantly more commonly associated with deep infection. Choice of surgical approach (anterolateral P = 0.20, anteromedial P = 0.12) and a “prepped in” external fixator (P = 0.39) were not significantly associated with deep infection. Assessing only open injuries, using the traumatic wound to place fixation led to a 35% infection rate compared to 15% when it was avoided (P = 0.098).

Conclusion: The risk factors for deep infection following fixation of 43C pilon fractures include medial or anterior open fracture wound, segmental bone loss, the need for flap coverage, and placement of fixation through an open fracture wound. Unfortunately most of these risk factors are not modifiable. However, placement of fixation through a traumatic wound is a potentially modifiable factor, and we recommend using caution when using traumatic wounds for placement of fixation in open pilon fractures.