

Fracture-Related Infection in Open Long-bone Fractures: A Bicenter Case-control Study in a Limited Resource Country

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INTRODUCTION:

Fracture-related infections (FRI) are estimated to complicate approximately 1% of closed fractures and 30% of open fractures globally. These statistics, however, can vary significantly by region, with low- and middle-income countries experiencing a disproportionately high burden. The studies in these regions are often underpowered to evaluate the local prevalence and contributing factors of FRI. The objectives of this study are: 1. to assess the prevalence of FRI in open long bone injuries and 2. investigate the association between FRI and various risk factors identified in previous research.

METHODS:

A 5-year age- and sex-matched case-control study was conducted at two high-volume trauma centers in a limited-resource country. Independent variables included demographics (age and sex), anatomical region, injury mechanism, Gustilo-Anderson grade (GA II or higher), smoking status, history of blood transfusion, and timing of antibiotic administration, debridement, and soft tissue coverage. The primary outcome was the presence of FRI, as defined by Metsemakers et al., which required direct observation of pus during surgery or additional confirmatory criteria. Data analysis was conducted using the R package vcd.

RESULTS:

706 cases were reviewed, showing a 13.2% prevalence of FRI. The 84 infected cases and 168 matched controls were analyzed. Most patients experienced delays in antibiotics (77.4%) and debridement (76.6%) beyond 3 hours and 24 hours, respectively. Multivariate logistic regression revealed statistical significance only for a delay in antibiotic administration exceeding 12 hours ($p = 0.007$), the presence of polytrauma ($p = 0.008$) and non-IMN mode of fixation ($p < 0.001$). Delays in debridement (>24 hours), soft tissue coverage (>7 days), and antibiotic administration (3–12 hours) did not show statistically significant associations with an increased risk of infection.

DISCUSSION AND CONCLUSION:

Our study highlights the critical importance of prompt antibiotic administration, especially for high-energy wounds such as polytrauma, in reducing infection risk.

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