Delays in Debridement of Open Femoral and Tibial Fractures Increase Risk of Infection

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Purpose: Infection remains a costly, devastating complication following treatment of open fractures. The appropriate timing of debridement is controversial, and available evidence is conflicting.

Methods: This study is a retrospective analysis of the SIGN Online Surgical Database (SOSD), a prospective registry of fracture cases in predominantly low-resource settings. Skeletally mature patients (age ≥16 years) who returned for follow-up after medullary nailing of an open femoral (OTA 32) or tibial (OTA 42) fracture were included. Patients were excluded if they had delays in debridement exceeding 7 days from injury. The primary outcome was infection. The exposure variable was early debridement, defined as a delay from initial injury to wound debridement of 24 hours or less. Confounders including patient demographics, injury details, and country resource availability were adjusted for with propensity scores. Interaction by bone and injury severity were analyzed using the Mantel-Haenszel test for heterogeneity.

Results: 28% of patients met the eligibility criteria and returned for follow-up, with a total of 10,791 fractures from 61 countries included. Overall, the propensity score-adjusted relative risk of early versus late treatment was 0.65, 95% confidence interval (CI) 0.49-0.86. Stratified analysis demonstrated a greater relative risk reduction associated with high-grade open fractures (Gustilo-Anderson [GA] III 0.57 [CI 0.45-0.73] vs GAI/II 0.76 [CI 0.58-0.99]; *P* value for heterogeneity = 0.11) and femoral shaft fractures (femur 0.47 [CI 0.33-0.65] vs tibia 0.72 [CI 0.59-0.89]; *P* value for heterogeneity = 0.03).

Conclusion: Delays in debridement of >24 hours increase risk of infection in open femoral and tibial fractures. This effect is stronger for more severe injuries and femoral fractures. The size and international nature of this cohort make these findings uniquely generalizable to nearly all environments where such injuries are treated.

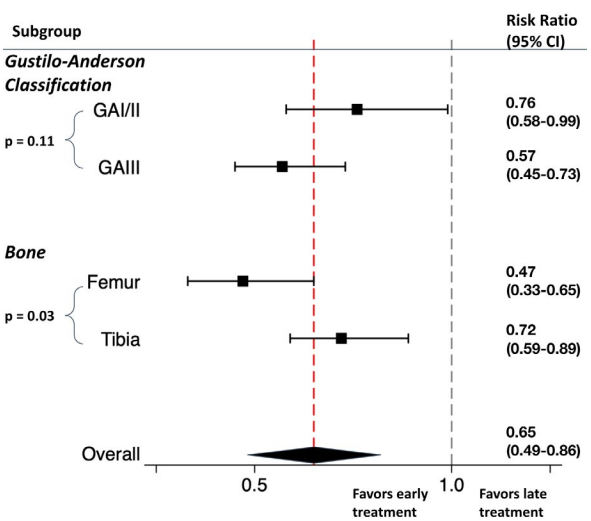

Figure 1: Propensity-adjusted Relative Risk of Developing Infection with Early Debridement, stratified by injury severity and bone. M-H p-value is the Mantel-Haenszel test for heterogeneity.