Antibiotic Nails Reduce Recurrent Infection After Intramedullary Fixation of Tibial Shaft Fractures

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Objectives: To compare infection recurrence rates between patients treated with antibiotic nail versus implant retention for open tibial shaft fractures initially treated with an intramedullary (IM) nail.

Methods:

Design: Retrospective cohort study.

Setting: Level I trauma center.

Patient Selection Criteria: Adults with tibial shaft fractures (42A-C) treated with an IM nail between 2007 and 2023 who developed deep surgical site infections.

Outcome Measures and Comparisons: The primary outcome was treatment failure within 2 years, defined as infection recurrence requiring reoperation and antibiotics. Secondary outcomes included amputation rate, all-cause mortality rate, days in hospital within 1 year of index infection surgery, time to failure, and number of surgeries needed after failure. The association between treatment and the study outcomes was estimated using Cox proportional hazards models, controlling for potential confounders.

Results: Of 96 total patients, 75 (78%) [62 males; age 47 years (median, 31 to 53)] were treated with conversion to antibiotic nail and 21 (22%) [18 males; age 36 years (median, 27 to 48)] with implant retention. The antibiotic nail group was more likely to have chronic infections (65% vs. 38%, P = 0.03). The 2-year failure rate was significantly lower with implant removal and antibiotic nail (33%) than with implant retention (54%) (HR, 0.43; 95% CI, 0.20 to 0.92; P = 0.03). For the secondary outcomes collected, only the average number of surgeries required after failure differed significantly between the two groups, with 3.9 for antibiotic nail and 3.0 for implant retention (IRR, 1.39; 95% CI, 1.01 to 1.91; P = 0.04).

Conclusion: The findings suggest that conversion to antibiotic nail is associated with lower rates of infection recurrence compared with implant retention. An overall infection failure rate of 33%

is consistent with previous literature and emphasizes the high failure rate after tibial nail infections.