The outcomes comparison between open reduction and internal fixation versus primary tibiotalocalcaneal hindfoot nailing for ankle fractures in elderly patients: A systematic review and meta-analysis

Wonyong Lee, John Patrick McDonald, Michael Oravic, William Wardell

INTRODUCTION:

Ankle fractures are the third most common fractures in elderly patients, after hip and distal radius fractures, with an incidence ranging from 42.2-159.2 per 100,000 person-years. Open reduction and internal fixation (ORIF) is the standard treatment to alleviate symptoms and restore mobility. However, in elderly patients, ORIF may pose risks, including reduced mobility and quality of life at follow-up. Tibiotalocalcaneal (TTC) nailing has been suggested as an alternative to ORIF, particularly for those with poor bone quality or compromised soft tissue. Current literature lacks a comprehensive analysis of the outcomes of ORIF and TTC nailing for ankle fractures in the elderly. This systematic review and meta-analysis aim to evaluate and compare clinical outcomes of ORIF and TTC nailing for treating ankle fractures in elderly patients.

METHODS:

This systematic review adhered to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. An extensive search was conducted across four electronic databases, including PubMed, Embase, Web of Science, and Cochrane. The inclusion criteria for articles in this study were: (1) Patients with ankle fractures, including lateral malleolar, bimalleolar, trimalleolar, or ankle fracture dislocation; (2) Studies focusing on patients aged 50 years or older; (3) Studies comparing clinical outcomes in TTC nailing and ORIF, reporting at least one of these final postoperative outcomes: infection, nonunion, hardware problems, reoperation, return to preoperative mobility levels, length of stay (LOS), functional scores including Foot and Ankle Ability Measure (FAAM) or Olerud-Molander Ankle Score (OMAS), surgical time, and mortality. Exclusion criteria were: (1) Revision cases; (2) High-energy mechanism of injury; (3) Oncologic pathological fractures; (4) Articles not published in English; and (5) Case reports, systematic reviews, comments, editorials, surveys, or cadaver studies.

RESULTS:

A total of five studies were included in this meta-analysis. In aggregate, 127/296 (42.9%) patients underwent TTC nailing, while 169/296 (57.1%) patients underwent ORIF. A significantly lower rate of superficial infection was found in TTC nailing: 2.1% (2/95) in TTC nailing versus 10.2% (14/137) in ORIF, with a relative ratio of 0.26 (95% CI, 0.08 to 0.85). The other outcome measures were not significant, although there were trends of lower rates of total infection, nonunion, and reoperation rates, higher rates of return to preoperative mobility, and shorter length of stay in TTC nailing. In contrast, outcomes such as deep infection and hardware problems showed less favorable trends in TTC nailing, with a higher incidence of these complications compared to ORIF.

DISCUSSION AND CONCLUSION:

Our systematic review and meta-analysis demonstrated that when compared to the ORIF group, the TTC nailing group had statistically significantly lower rates of superficial infection. Our data also showed several favorable outcome trends in the TTC nailing including lower rates of total infection, nonunion, and reoperation, as well as a shorter length of stay and a greater likelihood of returning to preoperative mobility levels. Based on our review, primary TTC nailing may be a viable alternative to ORIF for ankle fracture fixation in the elderly population. However, these findings should be interpreted cautiously due to heterogeneity across the included studies. Further high-quality randomized controlled trials are needed to establish more definitive conclusions.

Figure 1: PRISMA [Preferred Reporting Items for Systematic Reviews and Meta-Analyses] flow diagram

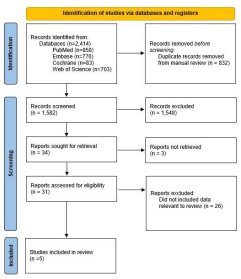

Figure 2A. Forest plot of total infection

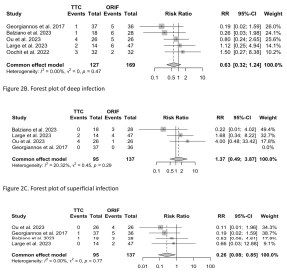

Figure 2B. Forest plot of deep infection

Figure 2C. Forest plot of superficial infection

Figure 3A. Forest plot of any hardware problems

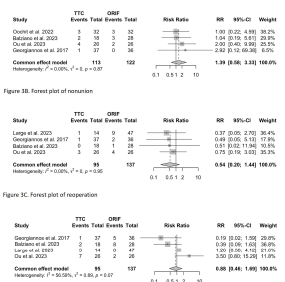

Figure 3B. Forest plot of nonunion

Figure 3C. Forest plot of reoperation

Figure 4A. Forest plot of length of stay

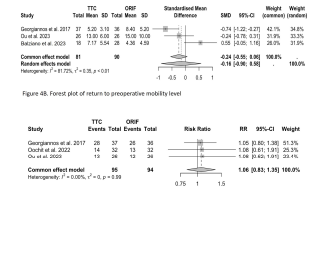

Figure 4B. Forest plot of return to preoperative mobility level