

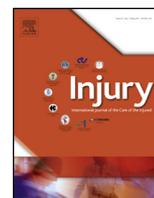


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Fragility fractures of the ankle in the elderly: Open reduction and internal fixation versus tibio-talo-calcaneal nailing: Short-term results of a prospective randomized-controlled study

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ABSTRACT

Introduction: The management of ankle fractures in the elderly remains unpredictable, secondary to their various co-morbidities. Although tibiotalo-calcaneal (TTC) nailing has been an effective option for ankle arthrodesis due to ankle arthritis or Charcot arthropathy there are few reports regarding the use of TTC nail for the treatment of ankle fractures.

Purpose: Aim of this study was to compare the results of ORIF versus TTC nailing for the treatment of unstable ankle fractures in the elderly. We hypothesized that the elderly may benefit from TTC nailing, as it allows the patient to be mobilized immediately after surgery and minimizes the risk of wound or bone problems.

Patients and methods: This was a prospective, randomized-controlled, comparative study. Between 2009 and 2015, 43 patients were treated with a TTC nail (Group A) and 44 with ORIF (Group B). The Olerud-Molander ankle score was obtained and intraoperative-postoperative complications, length of hospital stay, mobility status and reoperation rate were recorded. The nail fixation was performed with the TrigenR hindfoot nail after closed reduction. ORIF was performed, using a 1/3 tubular plate and 3.5 mm screws for the lateral malleolus and two 4.0 mm cannulated screws for the medial.

Results: Mortality rate at one year was 13.9% for Group A and 18.1% for Group B. Mean follow-up was 14 months (12–18 m). There were no intraoperative complications. Three complications in Group A (8.1%) and twelve (33.3%) in Group B were encountered postoperatively ($p < 0.05$). There was significant shorter hospital stay in Group A (5.2 ± 3.1 d) than in Group B (8.4 ± 5.2 d). In Group A, 28 patients returned to their pre-injury mobility status (75.6%) while 9 declined one level of the mobility scale (24.3%). In Group B, 26 patients remained at the same mobility level (72.2%) and 10 declined one level (27.7%). There was no significant difference between the postoperative OMAS scores in the two Groups (56.9 ± 9.85 and 56.6 ± 9.3 respectively).

Conclusions: We believe that TTC nailing is a safe and effective method of treatment of unstable ankle fractures in the elderly because it has a low risk of complications and restores function and mobility allowing an immediate return to full weight-bearing.

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Introduction

A significant increase in the incidence and severity of ankle fractures in the elderly population has been identified by clinical reports during the last decades, together with an increase in the more severe supination-external rotation Lauge-Hansen stage 4 fractures [1].

Open reduction and internal fixation (ORIF) for unstable ankle fracture in young patients is relatively predictable with excellent outcome. However the management of ankle fractures in the elderly remains less predictable, secondary to the various co-morbidities associated with elderly patients such as osteoporosis, diabetes, cardiovascular and peripheral vascular disease [2]. Various fixation methods have been proposed, such as internal fixation with plate and screws [3–5], intramedullary fixation of distal fibula [6,7], transarticular Steinmann pin fixation [8], tibio-talo-calcaneal (TTC) nailing [9,10]. Controversy still exists regarding the best treatment option. Although TTC nailing has been an established and very effective treatment option for ankle

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arthrodesis due to severe tibio-talar and/or subtalar joint arthritis or Charcot arthropathy [11,12] there are only few reports in the literature regarding the use of TTC nail for the treatment of ankle fractures [9,10,13].

The purpose of this study was to compare the results of ORIF versus TTC nailing for the treatment of unstable ankle fractures in the elderly. We hypothesized that frail elderly patients may benefit from TTC nailing, as it allows the patient to be mobilized immediately after surgery and minimizes the risk of wound or bone problems. To our knowledge this is the only study in the literature that directly compares the two surgical methods.

Patients and methods

This was a prospective, randomized-controlled, single centre, comparative study. Institutional Review Board approval was obtained prior to beginning of the study by the Hospital Ethical Committee (Reg No 14836).

Patients

Between 2009 and 2015, eighty seven consecutive patients with unstable ankle fracture were enrolled for this study. Inclusion criteria were: patients over 70 years of age, closed bimalleolar or trimalleolar ankle fractures, fracture-dislocations of the ankle joint. Exclusion criteria were: open fractures, high energy mechanism of injury, cognitive impairment according to the

abbreviated mental test score (AMTS), pathological fractures, and severe peripheral vascular disease and diabetic angiopathy.

All patients enrolled in the study signed an informed consent form. Each patient was assigned, using a computer-generated random number, to either the TTC group (group A) or the ORIF group (group B).

Methods of assessment

The primary outcome measures collected in the present study were: intraoperative and postoperative complications, length of hospital stay, mobility status pre- and postoperatively and reoperation rate.

The functional outcome was assessed using the Olerud-Molander ankle score (OMAS) preoperatively and twelve months postoperatively. The OMAS is a self-administered patient questionnaire with a functional rating scale from 0 (totally impaired) to 100 (completely unimpaired) [14].

Patients were followed-up 2 weeks postoperatively for wound check and in a 6 weeks, 3 and 12 months postoperative appointment for clinical and radiological assessment.

Surgical technique

All operations were performed by two senior trauma consultants or their trainees under direct supervision. Both techniques were performed with the patient in supine position and a sandbag

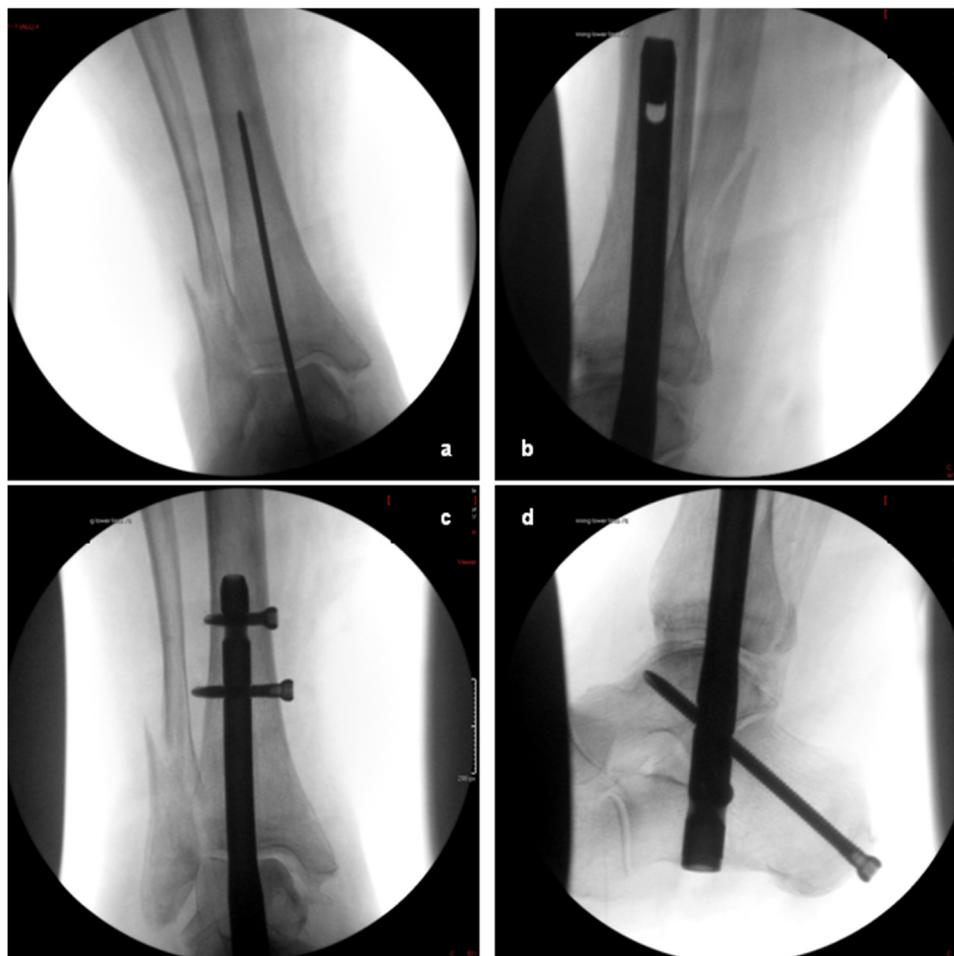


Fig. 1. TTC nailing technique under image intensifier. Insertion of the guide wire (a), followed by insertion of the nail (b). The TTC nail was locked proximally (c) and distally (d).

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