HARnT2: Multi-Centre Assessment of Hindfoot Nail or Fibula Pro-Tibial Screw Fixation in Complex Ankle Fractures

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Purpose: We conducted a multicenter retrospective cohort series to assess utilization, clinical and radiological outcomes of hindfoot intramedullary nail fixation (HFN) or fibula pro-tibial screw fixation (PTS) in complex ankle fractures.

Methods: From January 2020 to June 2021, demographic data and comorbidities were collected on all patients undergoing HFN or PTS for an AO44 ankle fracture. Outcomes of interest including postoperative complications, Charlson Comorbidity Index Score (CCIS), weightbearing status, perioperative information, soft-tissue management, and postoperative complications were recorded, Radiographs were assessed for metalwork breakage and anatomical reduction (Pettrone Criteria).

Results: 57 patients were identified; 39 patients underwent HFN (8 short hindfoot nails, 31 long femoral nails), 18 had PTS fixation at 2 major trauma centers. The mean ages differed (78 years [HFN] vs 66 years [PTS]) ($P = 0.007$). The mean CCIS and estimated 10-year survival was 5.2 and 29.5% in the HFN group and 3.6 and 54.8% in the PTS group ($P = 0.002$ and $P = 0.01$). 27 open fractures had HFN (69.2%) (6 combined with shortening and primary wound closure), 8 open fractures had PTS fixation (44%). 14 patients (35%) had diabetes in the HFN group compared with 7 (39%) in the PTS group. 10 patients with open fractures (29%) had postoperative complications, compared with 3 (14%) closed fracture, with deep infection being commoner in open fractures managed with HFN fixation ($P = 0.03$). Complication rates between open and closed fracture (PTS 2 [25%] vs 1 [13%]) were similar. Four patients in the HFN group (24%) had a venous thromboembolism postoperatively. Postoperative blood transfusion in the HFN group was greater than in the PTS group (25% vs 0%; $P<0.001$). Mean Pettrone score for the HFN group was 1.4 ± 1.7 compared with 3.7 ± 0.6 in the PTS group; subgroup analysis suggested it worsened in open fractures treated with an HFN (1 vs 2.3)($P = 0.02$). 89% and 86% of patients who were independently weightbearing prior to surgery maintained their independence after HFN and PTS surgery. However, time to full weightbearing was reduced in HFN (1.6 ± 2.6 vs 7.9 ± 5.0 weeks) ($P<0.001$) with a similar trend in patients with diabetes (1.3 ± 2.6 and 5.7 ± 3.8 weeks; $P = 0.001$). Mean follow-up was 179 days (range, 154-228).

Conclusion: HFN is performed in frailer patients, with comorbidities where early weightbearing may be beneficial, accepting limited functionality and higher complication rates. PTS provides stable fixation and a lower complication rate, with better radiological outcomes and expected survival. Even though PTS is designed for early mobility in the appropriate person this is not always realized. Further studies are required to identify which patients benefit most from each surgical technique.