Decreased Rates of Avascular Necrosis in Displaced Talar Neck Fractures When Using Plate Fixation Versus Screw Fixation Alone

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Purpose: This study sought to compare the rates of complications in talar neck fractures treated with screw fixation compared to plate fixation, specifically avascular necrosis (AVN), arthritis, infection, and the need for secondary salvage procedures.

Methods: This retrospective chart review took place in a single academic Level I trauma center. Patient selection criteria included patients who underwent fixation of a vertical talar neck fracture over a 5-year period (2017 to 2022) and had at least 3 months of postoperative follow up. Patients were grouped based on the implant used: screws only or plate and screw fixation. Each group was subdivided based on Hawkins Classifications (I, II, III, and IV). The primary outcome measured was the rate of AVN between treatment groups. Secondary outcomes were posttraumatic hindfoot arthrosis, postoperative infections, and the need for secondary procedures.

Results: In this review, 70 patients were identified—37 in the plate fixation group and 33 in the screw fixation group. There were higher rates of all complications in the screw fixation group, with a significantly higher rate of AVN compared to the plate fixation group (52% vs 22%, $p<0.05$). When stratifying for fracture severity, there were significantly higher rates of AVN in the screw fixation group for type II fractures (47% vs 6%, $p<0.05$). There were also higher rates of AVN in type III and type IV fractures; however, this did not reach statistical significance. Rates of subtalar arthrosis were uniformly high in both groups. There was a greater difference in the rate of AVN between the screw fixation and plate fixation groups in smokers (68.8% vs 30%), which approached statistical significance ($p = 0.0536$). Open fractures had a high rate of AVN and posttraumatic arthritis, 83% and 75%, respectively. In open fracture patients, those treated with screws alone had higher rates of AVN compared to plate fixation, which trended toward statistical significance (89% vs 33%, $p = 0.05846$).

Conclusion: In agreement with previous biomechanical data, plate fixation appears to provide the most sufficient mechanical stability to control for comminution and prevent AVN when compared to screw fixation.