

**Identifying Risk Factors for Osteonecrosis After Talar Fracture**, Alley MC, Vallier HA, Tornetta P 3rd; Orthopaedic Trauma Research Consortium. *J Orthop Trauma*. 2024;38(1):25-30.

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Level of Evidence: 3

**Reviewer:**

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Fracture of talus is not very common. Within the type of talus fracture, talar neck fracture is the most common talus fracture and followed by talar body. However, there has not been many studies that clearly defined contributing factors increasing risk of avascular necrosis (AVN) of the talus after either talar neck or body fracture. This study primarily attempted to determine incidence of AVN and which modifiable and nonmodifiable factors place patients at risk of post-traumatic AVN. Furthermore, this study also determined rate of post-traumatic arthritis superficial and deep infection, nonunion, and malunion after either talar neck or body fractures.

A level III retrospective study was conducted at 21 US trauma centers and 1 UK trauma center from 2008 to 2018. 798 patients (409 men; 389 women; age 18– 81 years) with minimum follow up of 12 months were selected in this study. Patient demographic, comorbidity, injury, treatment including time from injury to closed reduction and to ORIF (hours), and complication data were collected. Standard radiograph and advanced imaging (CT and MRI) were used to diagnose post-traumatic AVN. Primary outcomes were the rate of post-traumatic AVN and to determine associated factors increasing risk of post-traumatic AVN. Secondary outcomes were rate of post-traumatic arthritis superficial and deep infection, nonunion, and malunion.

The overall rate of AVN was 42.1% after a mean period of 26.2 months of follow-up (range 6–65 weeks). Post-traumatic AVN occurred in 12% of Hawkins I, 32% of Hawkins IIA, 48% of Hawkins IIB, 54% of Hawkins III, and 65% of Hawkins IV talar neck fractures and in 26% of isolated talar body fractures. Several associated factors increasing post-traumatic AVN were older age (40.4 vs. 37.2 years,  $P < 0.005$ ), higher BMI (30.5 vs. 28.9 kg/m<sup>2</sup>,  $P < 0.005$ ), tobacco smokers (48.9% vs. 38.8%,  $P = 0.006$ ), severe Hawkins class, open fractures, ipsilateral medial malleolus fractures ( $P < 0.05$ ) and dual surgical approaches ( $P < 0.005$ ). Mean time to reduction and fixation did not significantly affect the overall risk of developing post-traumatic AVN. In addition, the sensitivity and specificity of the Hawkins' sign was determined to be 16% and 48% respectively. On the other hand, at the final follow up averaging 26.2 months, 59.9% patients developed post-traumatic arthritis, 46% of patients with AVN developed subtalar arthritis, 2.5% patients with superficial infections, 5% patients with deep infections and 8.8% patients with non-union from their initial fracture fixation.

While the overall rate of post-traumatic AVN was 42.1%, the talar neck fracture (47%) had higher risk of developing AVN compared to talar body fracture (26%). Age, BMI, smoking status, severity of talar neck fracture (Hawkins' Classification), open fractures, ipsilateral medial malleolus fractures and combined anteromedial and anterolateral approaches were identified as contributing factors in increasing risks of developing AVN. Furthermore, six hours is commonly used as a golden period when it comes to treatment of urgent orthopedic injuries; however, in this study, the rate of developing AVN was shown to be not affected by the time to reduction or fixation. Most surprisingly, a positive Hawkins sign may not be a reliable predictor of preserved talar vascularity in all patients due to having low sensitivity and specificity. There were also several limitations in this study including no standardized post-operative protocol for all patients, lacking patient's medical comorbidity data. Overall, through the findings from this study, surgeons can discuss associated risks that may affect the outcome while counseling patients on the injury, treatment plans.



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