

The Impact Of Social Determinants Of Health On The Risk Of Avascular Necrosis Following Talar Neck Fractures: A State And County Decile Analysis

Orthopaedics / Foot & Ankle / Epidemiology, Prevention & Diagnosis

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Background

Talar neck fractures are rare but clinically significant injuries due to the talus's unique vascular supply, which makes it highly susceptible to avascular necrosis (AVN). The complex nature of talar fractures, especially in relation to their high-energy mechanisms, increases the risk for complications, including AVN, non-union, venous thromboembolism (VTE), and surgical site infection (SSI). Social determinants of health (SDOH), encompassing socioeconomic status, housing, and education, are increasingly recognized as critical factors influencing outcomes in orthopedic care. This study aims to investigate the impact of SDOH on the development of AVN and other complications after talar neck fractures requiring surgical intervention.

Objectives

Our objective was to evaluate the correlation between SDOH factors, as assessed by the Area Deprivation Index (ADI) and Social Vulnerability Index (SVI), and the incidence of AVN, SSI, non-union, and venous thromboembolism (VTE) in patients treated surgically for talar neck fractures.

Study Design & Methods

A retrospective analysis was conducted on 168 patients who sustained talar neck fractures and underwent surgical treatment between 2018 and 2023. ADI and SVI values were collected based on patients' residential areas, and the occurrence of complications such as AVN, SSI, VTE, and non-union was recorded. Independent T-tests were performed to assess differences between patient groups, with a significance threshold of $p < 0.05$.

Results

AVN developed in 39.3% of patients, with no significant differences in ADI or SVI scores between those with and without AVN ($p > 0.05$). Additionally, no significant associations were found between ADI/SVI values and the occurrence of SSI, VTE, or non-union. The number of surgeries was significantly higher in the AVN group ($p < 0.001$), indicating that increased surgical interventions were related to AVN. Importantly, Hawkins fracture classification showed a strong correlation with AVN, particularly for types III and IV fractures ($p < 0.001$), reinforcing the prognostic value of fracture severity.

Conclusions

While AVN is significantly associated with higher Hawkins fracture types and multiple surgical interventions, no significant correlation was found between SDOH factors and the development of AVN, SSI, or other complications. These findings suggest that injury severity, rather than socioeconomic factors, plays a more critical role in AVN risk. Further research is warranted to explore how individual-level social factors may influence complication rates.