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illuminating the Complex Biology of Syndesmotic Injury During Ankle Fracture: The Downfall of Strong Bones

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Abstract

Background

Injury to the syndesmotic ligaments can lead to prolonged functional limitations if not diagnosed and treated appropriately. Obesity has been studied in relation to syndesmotic instability but there is a paucity of literature investigating syndesmotic risk associated with other bone fragility characteristics. Additionally, ankle injury complexity associated with risk of Charcot in patients with syndesmotic injury remains unstudied.

Methods

This large retrospective, database study queried a national insurance claims database (PearlDiver Technologies) for patients treated with ankle ORIF from 2015-2020 identified by ICD-10 codes. Multivariable logistic regression analyzed characteristics associated with sustaining syndesmotic injury with ankle fracture. Likelihood of developing Charcot was analyzed using univariable logistic regression.

Results

Our query yielded 168,359 patients who underwent ankle fixation; 32,502 (23.9%) were treated for syndesmotic injury. Patients with syndesmotic injury were younger (49 versus 54 years; $P < 0.001$). Obese and male patients had a higher probability of syndesmotic injury (OR 1.39 [95% CI, 1.36-1.43] and OR 1.55 [95% CI, 1.52-1.59], respectively; $P < 0.001$); osteoporotic patients had lower probability (OR 0.64 [95% CI, 0.62-0.67]; $P < 0.001$). Diabetic patients ($n = 13,275$) with the additional syndesmotic injury ($n = 2,822$; 21.3%) had increased probability of developing Charcot (OR 1.54 [95% CI, 1.19-2.00]; $P = 0.001$) than those without. Of 36,883 patients treated with ankle and syndesmotic fixation, patients undergoing bimalleolar ORIF had higher probability of developing Charcot (OR 1.42 [95% CI, 1.01-1.98]; $P = 0.04$) compared to those treated with isolated fibular ORIF; this probability was higher in patients undergoing trimalleolar ORIF (OR 1.76 [95% CI, 1.24-2.49]; $P = 0.001$).

Conclusions

Among this population derived from a large all-claims database, syndesmotic injury risk was higher for younger, male, or obese patients; this risk was lower for osteoporotic patients. Additionally, syndesmotic instability increases the risk of developing Charcot in diabetic patients. Increasing ankle injury complexity also demonstrates a gradient in Charcot risk in patients with syndesmotic instability.