

Fractures and Macroscopic Osteochondral Injuries of the Talar Dome Associated with Pilon Fractures

Kevin Tetsworth, MD; Nicholas Green, BS; Gregory Barlow, MD; Miran Stubican, MD; Frode Vindenes, MD; Vaida Glatt, PhD
Royal Brisbane and Women's Hospital, Brisbane, Australia

Purpose: When tibial pilon fractures occur, the dome of the talus is exposed to the identical forces and also at risk of sustaining injuries. There are no studies examining the nature or extent of injuries to the talar dome associated with fractures of the tibial plafond. We present here a study that prospectively evaluated these potential injuries in a large series of pilon fractures.

Methods: Comprehensive visual inspection of the talar dome was performed in a series of 104 tibial plafond fractures (AO/OTA 43B/C) in adults, to document the presence of any acute macroscopic injuries. Associated injuries of the talar dome were detected in 58 cases (56%). Injuries were graded Type 1 if purely chondral, Type 2 if osteochondral, and Type 3 if an overt fracture was present. Detailed maps were created of the injuries, and transposed onto digital reconstructions of an idealized talus (male and female specific). Injuries were mapped onto 1 × 1-mm locations on the talar dome, digitally superimposed to create files suitable for data analysis. The talar dome was arbitrarily divided into 9 regions: lateral, central, and medial, and posterior, superior, and anterior. Routine statistical analysis was conducted using the χ^2 test.

Results: The study cohort included 58 cases where an injury to the talar dome was documented intraoperatively; 41 men and 16 women were affected (one bilateral). The mean age was 43.2 years (range, 20-76), with 33 right and 25 left. The most frequent mechanism of injury was a motorbike accident or motor vehicle accident (62%), or a fall from a height (34%). Risk of injury to the talar dome was greater with a B-type fracture (53.5%) than a C-type fracture (31.5%) ($P = 0.011644$). There were 3 complete fractures through the talar body, and 10 osteochondral fractures stabilized with screws. 11 pure chondral injuries were extensive in nature ($>200 \text{ mm}^2$), and the remaining 34 cases were considered minor chondral injuries of varying degree. There was no difference in the distribution of injuries when comparing right to left ($P = 0.598645$). Associated talar dome injuries were more common in men than in women; the extent of injury was also greater in men than women, perhaps reflecting higher-energy injuries. There was no correlation of any specific distribution of injuries with a particular mechanism of injury, but the distribution differed between men and women ($P = 0.03206$). These injuries were principally concentrated on the lateral third of the talar dome in men; in women the injuries were spread more evenly across the dome of the talus, although the bulk of the injuries were still on the lateral aspect.

Conclusion: Concomitant injuries to the articular surface of the dome of the talus are relatively common, observed in over 50% of the pilon fractures subjected to careful scrutiny. Inspection of the dome of the talus should be considered in selected cases to assess the possibility of associated osteochondral injuries of the talar dome, and to provide care as indicated when identified.