

The Role of Preoperative CT Scans in Operative Planning and Fixation of Malleolar Ankle Fractures

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Purpose: The purpose of this study was to determine the role of preoperative CT scans on surgical planning in malleolar ankle fractures. We hypothesized that CT would play an increasing role in surgical planning with fractures of higher energy and with lesser-quality preoperative radiographs.

Methods: A retrospective analysis was performed on the records of 100 consecutive patients treated at our institution between 2006 and 2010 for malleolar ankle fractures (AO Type 44) who had both preoperative radiographs as well as CT scans. Three fellowship-trained orthopaedic attending surgeons and three orthopaedic residents reviewed available preoperative radiographs and formulated an operative (or nonoperative) plan including patient positioning, surgical approach, and fixation methods for all applicable components of the fracture. The six reviewers then analyzed CT scans of the same fractures and decided whether or not and how they would alter their operative strategy based on the CT scan. Fracture characteristics including number of involved malleoli, AO classification, quality and nature of preoperative radiographs, and presence of dislocation on hospital presentation were noted and correlated with changes in operative strategy.

Results: Operative strategy was significantly changed in 24% of cases after review of the CT scan. There was strong intraclass correlation between all reviewers (0.733), and no significant difference based on level of training ($P = 0.57$). The most common changes in operative strategy involved fixation of the medial malleolus (21%), posterior malleolus (15%), and fixation of an occult anterolateral plafond fracture (9%). Predictors of changes in operative strategy included trimalleolar over unimalleolar fractures (29% vs 10% rate of change), preoperative dislocation over no dislocation (31% vs 20%), the presence of only radiographs with overlying plaster versus fractures with at least one set of radiographs without plaster (25% vs 14%), and suprasyndesmotic fractures vs. trans- and infrasymdesmotic fractures (40% vs 20% and 4%, respectively).

Conclusions: CT scans may be useful adjuncts in preoperative planning for malleolar ankle fractures, most notably in fracture dislocations, poor-quality preoperative radiographs, trimalleolar fracture patterns, and suprasyndesmotic (AO 44-C) ankle fractures.

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