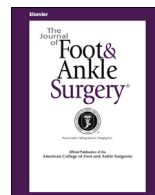


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Value of Early Postoperative Computed Tomography Assessment in Ankle Fractures Defining Joint Congruity and Criticizing the Need for Early Revision Surgery



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ABSTRACT

Previous investigators have questioned the reliability of plain radiographs in assessing the accuracy of ankle fracture reduction when these were compared with the computed tomography (CT) evaluation in the preoperative setting, in particular, in fractures with syndesmosis injuries or trimalleolar fragments. The role of CT assessment, however, has not been investigated in the early postoperative setting. In the early postoperative setting, reduction still relies most commonly on fluoroscopy and plain radiographs alone. In the present study, we hypothesized that early postoperative CT assessment of ankle fractures with syndesmotic injuries and posterior malleolar fragments can add valuable information about the joint congruity compared with plain radiographs alone and that this information could affect the decisions regarding the need for early revision surgery. A total of 352 consecutive operated ankle fractures were reviewed. Of these, 68 (19%) underwent early postoperative CT assessment and were studied further to identify the causes that prompted revision surgery. Of the 68 cases, despite acceptable reduction found on the plain radiographs, 20 (29%) underwent early (within 1 week) revision surgery after studying the CT scans, which revealed malreduction of the syndesmosis, malreduction of the posterior lip fragment, and intra-articular fragments. We concluded that in ankle fractures involving disruptions of the syndesmosis or posterior malleolar fragments, early postoperative CT assessment could be justified, because it will reveal malreduction and prompt early revision intervention for a substantial proportion of these patients.

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Ankle fractures are the most common fractures treated by orthopedic surgeons (1). The incidence is approximately 187 cases per 100,000 people annually (2). Of all ankle fractures, 60% to 70% will be unimalleolar, 15% to 20% will be bimalleolar, and 7% to 12% will be trimalleolar (3,4). The primary goal of treating ankle fractures is to restore joint congruity and to obtain a stable construct throughout the rehabilitation phase. When joint congruity and construct stability cannot be obtained by closed methods, surgery is indicated to achieve this goal (1). When anatomic reduction is not obtained with surgery, arthritic changes can develop within 2 years (5–7). Therefore, after the fragments have been reduced and stabilized, joint congruity

should be carefully assessed. This is commonly determined during surgery using fluoroscopy or, after surgery, with plain radiographs. Plain radiographs can provide valuable information about syndesmotic congruency and stability and assist in decision making regarding the need for operative fixation in specific patterns of ankle fractures (8,9). However, several investigators have demonstrated that this imaging modality is limited in assessing the accuracy of reduction compared with computed tomography (CT) evaluation in the preoperative setting and, in particular, in fractures that involved syndesmosis disruption and in trimalleolar fractures (10–12). This concept about the value of CT assessment in complex ankle fractures was adopted in our department but implemented specifically for the early postoperative phase. Accordingly, since January 2010, we began obtaining CT scans early after surgery (within 1 week) for all patients with syndesmosis injuries or that involved posterior malleolar lip fragments. The CT images were subsequently evaluated by foot and ankle specialists, and decisions about the accuracy of reduction and whether early revision surgery was required were made. The purpose of the present study was to review all cases of ankle fractures with

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Distribution of Fracture Type after CT Scan

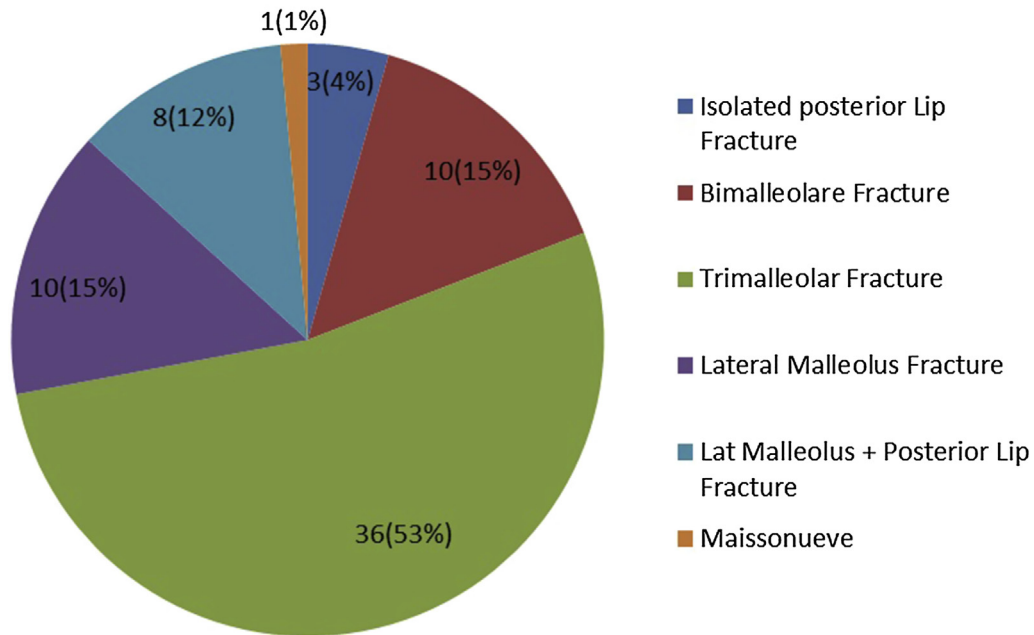


Fig. 1. Distribution of cases according to fracture type.

early postoperative CT scans available in our department from January 2010 to December 2012 and to define the causes that prompted revision surgery. We hypothesized that early postoperative CT assessment of ankle fractures with syndesmotic injuries and posterior malleolar fragments could add valuable information about joint congruity compared with plain radiographs only and that this information could affect the decisions regarding the need for early revision surgery.

Materials and Methods

The office registry was used to identify all cases of ankle fractures that had undergone open reduction, internal fixation at our department from January 2010 to December 2012. The inclusion criterion for the present study was a CT scan performed within 1 week after surgery for syndesmosis disruption, posterior malleolar lip fragments that had undergone reduction and internal fixation, or lateral and bimalleolar fractures that had undergone internal fixation, but syndesmosis congruity after surgery was inconclusive from the plain radiographs. The exclusion criteria were open physis, an open fracture, and a pilon fracture. All CT scans and office medical records were then

Number of revision operations in each fracture type

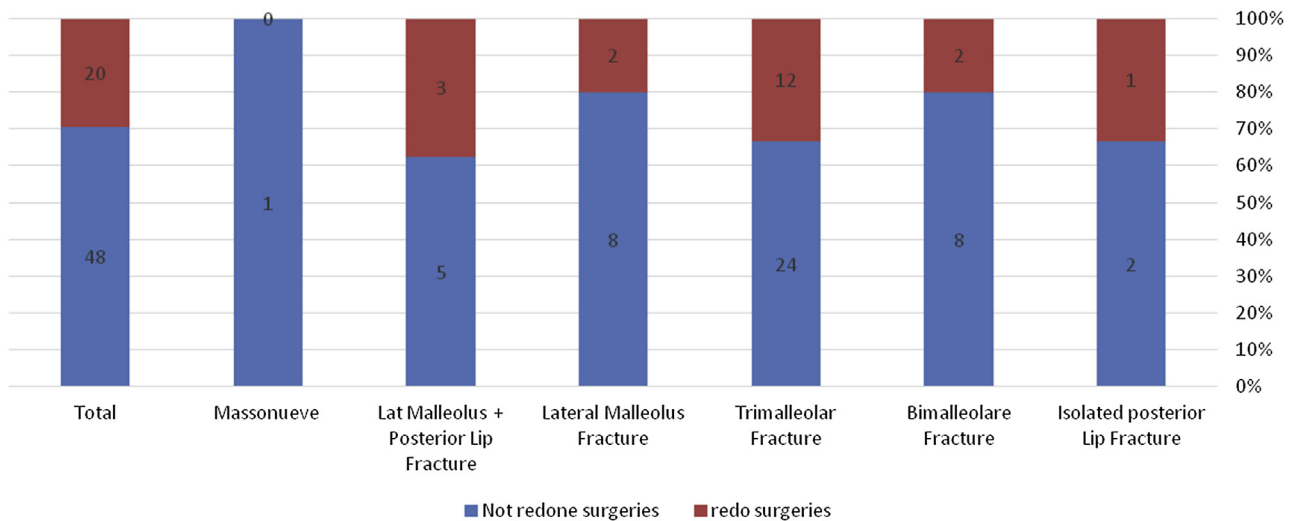


Fig. 2. Number of revision operations for each fracture type. Of 352 cases of ankle fracture, 68 (19%) cases had early postoperative computed tomography assessment. Of the 68 cases, 20 (29%) underwent early revision surgery.

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