

# Outpatient Management of Ankle Fractures



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## KEYWORDS

• Ankle fractures • Outpatient management • ORIF • Complications • Costs

## KEY POINTS

- Outpatient management of ankle fractures in both nonoperative and operative settings is an understudied topic that deserves greater attention given the increasing importance of cost-savings in health care.
- Although direct cost comparisons between outpatient and inpatient open reduction internal fixation (ORIF) of ankle fracture have yet to be published, the slightly lower complication profile and reduced hospital stay associated with outpatient ORIF may lead to cost-savings seen in other domains of outpatient orthopedic surgery, including total joint replacement and spine surgery.
- Further investigation into reasons for admission for ankle fractures, including fear of surgical delay, patient and surgeon convenience, and access to outpatient follow-up, is warranted to consider and improve ankle fracture management in the outpatient setting.

## INCIDENCE OF ANKLE FRACTURES

Ankle fractures are a common injury in adults, comprising 10% of all fractures and more than half of all fractures of the foot and ankle seen at major trauma centers in the United States.<sup>1</sup> In the last decade, there has been a steady increase in the incidence as well as severity of ankle fractures, most notably in the elderly and those with osteoporosis.<sup>2,3</sup> Falls from standing height and sports-related injuries are the most common cause of ankle fracture.<sup>4,5</sup>

A significant proportion of these injuries will require open reduction and internal fixation (ORIF), a procedure not without risk.<sup>6–9</sup> National

initiatives, such as bundled payments of care, combined with efforts to deliver cost-effective quality care, have led to interest in reducing unnecessary hospitalizations. Closer evaluation of the viability of outpatient surgery in the field of orthopedics has extended to joint replacement, cervical and lumbar spine surgery, and most recently, ankle fracture surgery. However, the epidemiology of outpatient ankle fracture ORIF is relatively unknown. A retrospective study of 476 patients undergoing ORIF for ankle fracture at a level 1 academic center in the United States identified 256 (53.8%) patients that were treated as outpatients.<sup>10</sup> Schepers and colleagues<sup>3</sup> assessed the impact of surgical delay on

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postoperative outcomes and found that 54 of 88 (61.4%) patients with a closed bimalleolar or trimalleolar ankle fracture were treated on the second day following injury or later. Trends in the management of setting of ankle fracture patients who require surgery warrant additional investigation given the focus on cost-savings and quality of care in the delivery of health care.

## ROLE OF NONOPERATIVE MANAGEMENT

Traditional cast immobilization is a viable option for the management of stable ankle fractures, but for those that are deemed unstable, it has been associated with poor fracture alignment and healing as well as skin breakdown.<sup>11</sup> Given the lack of relevant blinded prospective studies, a *Cochrane Review* comparing surgery to casting for ankle fractures was overall inconclusive.<sup>12</sup> In the Ankle Injury Management Trial, 620 adults with unstable ankle fractures were randomized to casting or ORIF. Casting was associated with a significantly higher rate of malunion (15% vs 3%) and a 19% radiographic loss of reduction requiring conversion to ORIF. Although no differences in quality of life, ankle motion and pain, or patient satisfaction were detected at 6 weeks and 6 months, longer follow-up is needed to determine the incidence of symptomatic posttraumatic arthritis.<sup>11</sup>

## COST OF OUTPATIENT ORTHOPEDIC ANKLE FRACTURE CARE

Lessons on the cost-savings of the outpatient model can be learned in the field of ankle, hip, and knee arthroplasty, where the cost differential between outpatient and inpatient surgery has been reported to be as high as 30%.<sup>13–15</sup> However, there is a paucity of literature describing the cost of outpatient ankle fracture ORIF. Logically, early operative fixation of inpatient ankle fractures has been shown to reduce length of hospital stay, leading to significant cost-savings.<sup>3,16,17</sup> Interestingly, early fixation was also associated with a decrease in complications. Of note, all patients in these studies were admitted under the anecdotal concept that inpatient monitoring may lead to a decreased complication rate.<sup>10</sup>

Murray and colleagues<sup>18</sup> evaluated the costs associated with ORIF and external fixation of unstable ankle fractures in the United Kingdom. All patients were inpatients with an average cost of \$4730.28 for the episode of care. The cost of care for patients with preexisting systemic disease (eg, diabetes) was significantly greater at

\$5982.65 versus patients who had no medical comorbidities at \$4375.00 ( $P < .001$ ). It should be noted that costs in different health care models are difficult to extrapolate to that of the United States. A cost analysis of more than 58,000 patients undergoing ORIF of the ankle identified through a statewide database in the United States sought to report the costs associated with diabetic patients given the implications to value-based health care reimbursements.<sup>19</sup> Complicated diabetes, which was described as previous admission for ketoacidosis, systemic manifestations of the disease, or peripheral circulatory disorders, was associated with \$6895 increase in total hospital charges relative to nondiabetic patients.

The cost of outpatient reconstructive surgery of the ankle and hindfoot has also been examined and offers useful information regarding cost-savings from outpatient surgery. In a recent single-surgeon series, the cost of 218 patients who underwent hindfoot osteotomy, arthrodesis, or multiple ligament repair was retrospectively evaluated.<sup>20</sup> A total of 20 outpatients were 1:1 matched with an inpatient cohort for demographics, American Society of Anesthesia class, anesthesia type, and procedure. Cost data were only available for 19 outpatients and 17 inpatients, and cost data regarding perioperative complications in the outpatient group, which may have been detected outside of the hospital, were unavailable, which may bias the study results. The investigators found that outpatient management reduced perioperative and intraoperative costs by 54% (\$3507 vs \$7573,  $P < .001$ ). As expected, the largest cost difference was related to the shorter hospital stay. This difference is difficult to interpret because patients were not matched for preoperative medical comorbidities, nor did the investigators list admission criteria or reason for admission for each patient.

## ACCESS TO OUTPATIENT ORTHOPEDIC CARE

Although outpatient ankle ORIF is an attractive option given the potential for cost-savings, perioperative admission is often elected to accommodate the operating room schedule, patient convenience, or other social factors, including safety of preinjury environment, social support, and access to outpatient follow-up and care. Medford-Davis and colleagues<sup>21</sup> used simulated patient methodology to evaluate access to outpatient orthopedic follow-up for ankle fractures discharged from the emergency

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