The Quality and Utility of Routine Immediate Postoperative Radiographs Following Ankle Fracture Surgery

Presenting:
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Summary:
Routine postoperative ankle radiographs are an added cost and often provide limited visualization of the bony anatomy and fixation construct. We sought to determine whether routine postoperative radiographs are of comparable quality to intraoperative fluoroscopic images, and whether they routinely provide additional information that changes management.

Introduction:
Patients who undergo open reduction and internal fixation of ankle fractures commonly undergo routine postoperative ankle imaging. As these patients are typically immobilized in splints or casts, postoperative ankle radiographs often provide limited visualization due to casting material and patient positioning. These radiographs confer additional radiation exposure to the patient and are a direct cost to the hospital and patient. The purpose of this study is to evaluate the utility and quality of routine immediate postoperative radiographs following ankle fracture surgery.

Methods:
All ankle fractures undergoing open reduction and internal fixation at a single institution from 01/01/2011 – 01/01/2013 were reviewed. Immediate postoperative radiographs were evaluated using defined parameters to determine if three quality views (anteroposterior, lateral and mortise) were obtained. The quality of the postoperative images was compared to that of saved intraoperative fluoroscopic images. Postoperative complications were evaluated in terms of fracture displacement, hardware malpositioning and need for return to the operative room. A cost analysis was performed to determine the overall cost of postoperative radiographs.

Results:
A total of 411 patients with 413 ankle fractures underwent operative fixation, with 271 patients undergoing routine postoperative radiographs. Only 28 (10.3%) patients had three quality postoperative views of the ankle with the mortise (58.7%) and lateral (64.8%) views commonly performed with poor technique. The number of quality intraoperative films was significantly higher than the number of quality postoperative films (721 images, 80.3% vs. 400 images, 50.1%; p<0.001). The greatest difference was seen with the mortise (88.4% vs. 41.3%, p <0.001) and lateral (69.4% vs. 35.2%, p<0.001) views. No postoperative series offered improved visualization of the fracture compared with saved intraoperative fluoroscopic images. Intraobserver reliability of our grading system was 0.780 (95% confidence interval [CI] 0.718-0.841) and interobserver reliability was 0.770 (CI 0.709-0.832); both considered to be substantial agreement. None of the patients without radiographs had a complication that could have
been detected earlier using postoperative radiographs. Only one patient (0.24%) had displacement identified on postoperative films not seen on intraoperative images. This patient experienced increasing pain following marginal fixation and did not require return to the operating room. No fracture malalignment or hardware malposition was seen that was not visualized retrospectively on fluoroscopic images. No patients required return to the operating room based on immediate postoperative films. Postoperative radiographs increased the total cost by $191.00 per patient in our institution.

**Conclusion:**
The routine use of immediate postoperative radiographs following ankle fracture surgery does not provide additional value to the patient or orthopaedic surgeon. The quality of these images is generally inferior to those obtained and saved intraoperatively due to malrotation and overlying cast material. To reduce cost and radiation exposure, immediate postoperative radiographs should only be obtained following intraoperative fluoroscopy in specific circumstances, such as increasing postoperative pain, marginal fixation or instability.