

Early Routine Radiographic Follow-up at 2-3 Weeks for Operatively Treated Tibia or Fibula Fractures Does Not Contribute to Identification of Complications: A Two Center Case Series of 628 Patients.

Derek Van Duuren¹, Robert Wagner², Jacob Samuel Wolf Borgida, Maaz Muhammad³, Carlos Rafael Sierra, Austin T Gregg³, Adam Nathanael Musick³, Thuan V Ly³, Arun Aneja

¹Leiden University Medical Center, ²Amsterdam UMC, ³Massachusetts General Hospital

INTRODUCTION:

Many institutions perform routine radiographic follow-up at 2-3 weeks after operative treatment of lower extremity fractures to identify complications. These radiographs contribute to healthcare costs and place a burden on patients and providers, whilst their added value is unclear. The objectives of the present study were to determine: (1) if routine radiographic follow-up at 2-3 weeks contributes to identification of complications (i.e., identification of complications not accompanied by symptoms in history taking or clinical examination) and (2) if these complications are clinically relevant (i.e., lead to treatment change).

METHODS:

All adult patients who underwent operative treatment for a tibia and/or fibula fracture between January 2021 and January 2023 at two level 1 trauma centers and who received routine radiographic follow-up between 10 and 30 days postoperatively were retrospectively identified from an institutional database. Routine radiographs were defined as radiographs that were scheduled and obtained as part of the institutions' standardized follow-up protocol. Patients who received plain radiographs or who were diagnosed with a complication before routine radiographic follow-up were excluded. The primary outcome was the rate of complications detected on the routine radiograph, stratified by the presence of associated symptoms based on history taking and/or findings on physical examination. The secondary outcome was any documented treatment change for complications.

RESULTS:

Six hundred and twenty-eight patients (median age of 47 years, 42% male) were included. The distribution of fracture types and the fixation constructs within the cohort are shown in Table 1. Routine radiographs were performed at a median of 15 days (IQR: 14 – 18) following operative treatment. A total of 5 complications in 5/628 patients (0.8%) were seen on radiographs; of which 3 complications in 3/628 patients (0.5%) were exclusively identified on radiographs (i.e., not associated with symptoms; Figure 1). These complications were: failure of syndesmotic screws, a new sclerotic lesion in the fibula, and persistent displacement of a medial malleolus fracture. None of these 3 complications led to a change in treatment strategy. In 2 other patients, 2 complications were visible on radiographs, but these were accompanied by symptoms on history taking and/or physical examination. Overall, 23 new complications in 22 patients were identified at the routine follow-up.

DISCUSSION AND CONCLUSION:

In this study of 628 patients who received routine radiographic follow-up at 2-3 weeks after operative treatment for a lower extremity fracture, only 3 patients (0.5%) were diagnosed with a new complication that was exclusively identified on radiographs, and none of these complications led to a treatment change. Other complications were associated with symptoms from history taking and/or clinical examination. This suggests that obtaining routine radiographs at 2-3 weeks postoperatively may not be necessary and that it is feasible to obtain radiographs based on clinical indication. These results can help to decrease the burden on outpatient clinics.

Figure 1: Venn diagram showing complications stratified by source of identification

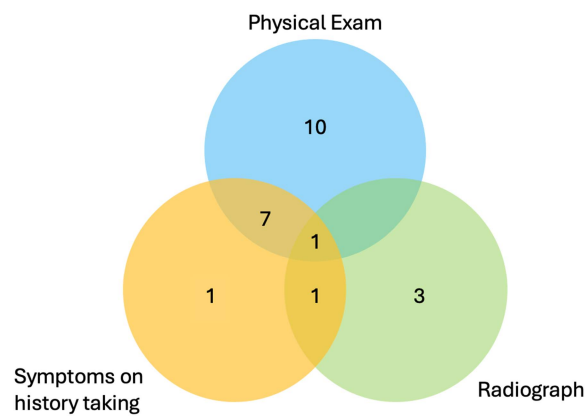


Table 1: Injury and Treatment Characteristics

	Total Cohort (n = 628)
Fracture type, n (%)	Total = 718
Proximal tibia	116 (16%)
Associated fibula	21 (2.9%*)
Tibial shaft	68 (9.5%)
Associated fibula	59 (8.2%*)
Distal tibia	73 (10%)
Associated fibula	7 (1.0%*)
Ankle	374 (52%)
Fixation construct, n (%)	
Plate ^a	164 (26%)
Screws ^b	17 (2.7%)
IMN	40 (6.4%)
Plate + screws ^c	369 (59%)
Plate + IMN	3 (0.5%)
Screws + IMN	28 (4.5%)
Plate + screws + IMN	7 (1.1%)

IMN = Intramedullary Nail;

a: Plate, incl. screws through plate; b: Screw(s) only; c: plate (incl. screws) + separate screw(s);

*Percentage from total fractures.