

Infected tibial and fibular fracture with implant exposure and osteomyelitis: staged surgical management and outcome

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Introduction & Aim:

Fractures of the tibia are associated with high complication rates due to limited soft tissue coverage. Fracture-related infection (FRI) following osteosynthesis remains a challenging complication requiring multidisciplinary management. This study presents a complex case of tibia and fibula fracture complicated by delayed infection, implant exposure, and osteomyelitis, managed with a two-stage approach including hardware removal and antibiotic therapy.

Methods

A 59-year-old male sustained a tibia and fibula fracture with tibial plafond extension following a motorcycle accident. Initial management consisted of open reduction and internal fixation (ORIF) using anatomical plates. At 6 weeks postoperatively, the patient developed wound dehiscence with implant exposure and signs of infection, requiring surgical debridement and lavage with hardware retention. At 10 months post-injury, recurrent infection with osteomyelitis necessitated repeat debridement, hardware removal, microbiological tissue sampling, and local antibiotic therapy using gentamicin-loaded cement. Empiric broad-spectrum therapy (intravenous vancomycin and piperacillin-tazobactam) was initiated for 1 week pending culture results. Microbiological analysis identified polymicrobial infection with methicillin-susceptible *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Targeted antibiotic therapy was administered according to susceptibility testing: 1 week intravenous flucloxacillin, rifampicin, and piperacillin-tazobactam, followed by 10 weeks oral flucloxacillin, rifampicin, and ciprofloxacin (total 11 weeks). The infection was classified as ICS Type 1 (infection with callus progression and stable hardware prior to removal), with hardware removal performed after evidence of fracture consolidation.

Results

Following staged surgical management with debridement, hardware removal, local antibiotic therapy, and prolonged systemic antibiotics, the patient achieved complete infection eradication confirmed by normalized inflammatory markers (CRP, ESR), negative clinical signs, and radiographic evidence of fracture healing. At 12-month follow-up, the patient demonstrated excellent functional recovery with complete absence of pain, return to daily activities without limitation, normal gait without limp, and no signs of infection recurrence. Fracture union was maintained following hardware removal without need for additional surgical interventions.

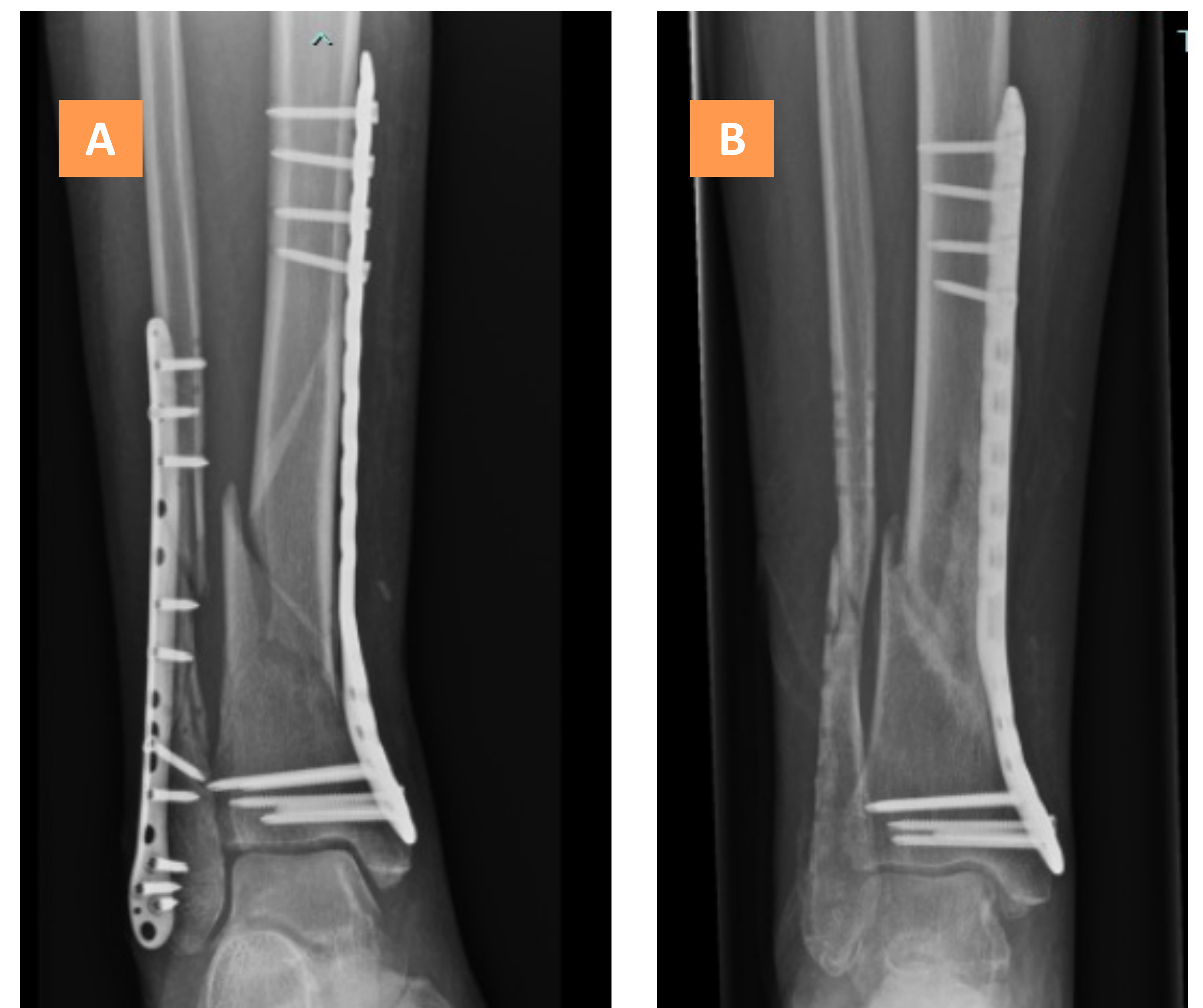


Figure 1. Radiographic evolution. (A) Postoperative radiograph following initial internal fixation of the tibial and fibular fractures. (B) Follow-up radiograph after implant removal

Conclusions

This case demonstrates successful management of delayed FRI using a staged approach with hardware removal after fracture consolidation. The ICS classification guided treatment decisions, with hardware removal performed once callus progression indicated sufficient stability. Thorough debridement, local antibiotic delivery with gentamicin-loaded cement, and prolonged pathogen-directed systemic antibiotics (11 weeks) achieved infection control while preserving fracture union. Early recognition, appropriate classification, multidisciplinary management, and extended antibiotic therapy are essential to achieve infection eradication, maintain fracture healing, and restore function. This approach demonstrates that hardware removal after consolidation can achieve excellent clinical and functional outcomes in delayed FRI.

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