

Recurrent polymicrobial and fungal fracture-related infection with delayed pathological femoral fracture: staged management in an immunocompromised host

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Introduction & Aim:

Chronic osteomyelitis following fracture fixation may evolve silently after implant removal and later present as a pathological fracture. Management is particularly challenging in immunocompromised patients, requiring infection control and restoration of mechanical stability. We present a case of delayed femoral fracture secondary to recurrent polymicrobial fracture-related infection (FRI) in a patient with rheumatoid arthritis, highlighting a staged surgical strategy with temporary external fixation followed by definitive intramedullary reconstruction.

Methods

A 66-year-old woman with rheumatoid arthritis on methotrexate and a previously treated subtrochanteric femoral fracture developed late FRI four years after intramedullary nail fixation, requiring implant removal and debridement without immediate restabilization. One year later, she sustained a pathological fracture at the same site. FRI diagnosis was established per international consensus criteria based on positive intraoperative cultures (≥ 2 deep tissue samples) and clinical signs. A staged approach was used: debridement, sampling, local antibiotic delivery, and temporary monoplanar external fixation in compression mode during the septic phase, followed by definitive antibiotic cement-coated cephalomedullary nailing after infection control.

Results

Initial debridement yielded polymicrobial growth (*Corynebacterium amycolatum*, *Cutibacterium acnes*, *Staphylococcus epidermidis*). Monoplanar external fixation was applied in compression mode with local antibiotic delivery, followed by 6 weeks IV vancomycin/piperacillin-tazobactam then 10 weeks oral linezolid. Recurrent infection four months later grew *Pseudomonas aeruginosa*, *Staphylococcus hominis*, and *Candida parapsilosis*, requiring repeat debridement with 2 weeks IV meropenem/rifampicin/fluconazole then 10 weeks oral therapy. External fixation was maintained 3 months until inflammatory markers normalized.

Definitive fixation was achieved with an antibiotic cement-coated cephalomedullary nail (vancomycin, flucloxacillin, gentamicin). At 22-month follow-up, infection remained controlled with no clinical signs, normalized inflammatory markers, and radiographic union at 7 months. The patient achieved independent ambulation with preserved limb function.

Conclusions

Delayed pathological fracture following implant removal for infection represents a challenging scenario, particularly in immunocompromised hosts. This case highlights the complexity of recurrent polymicrobial FRI in rheumatoid arthritis, including rare fungal osteomyelitis. The staged management approach with temporary external fixation in compression mode enabled infection control prior to definitive fixation. The use of antibiotic cement-coated intramedullary nailing provides controlled local antibiotic release over several weeks while simultaneously promoting bone union at the infected nonunion site—two critical advantages in this setting. Without adequate osteomyelitis control, outcomes may include limb amputation or death. This case demonstrates that successful limb salvage is achievable with individualized, multidisciplinary management in complex immunocompromised hosts.

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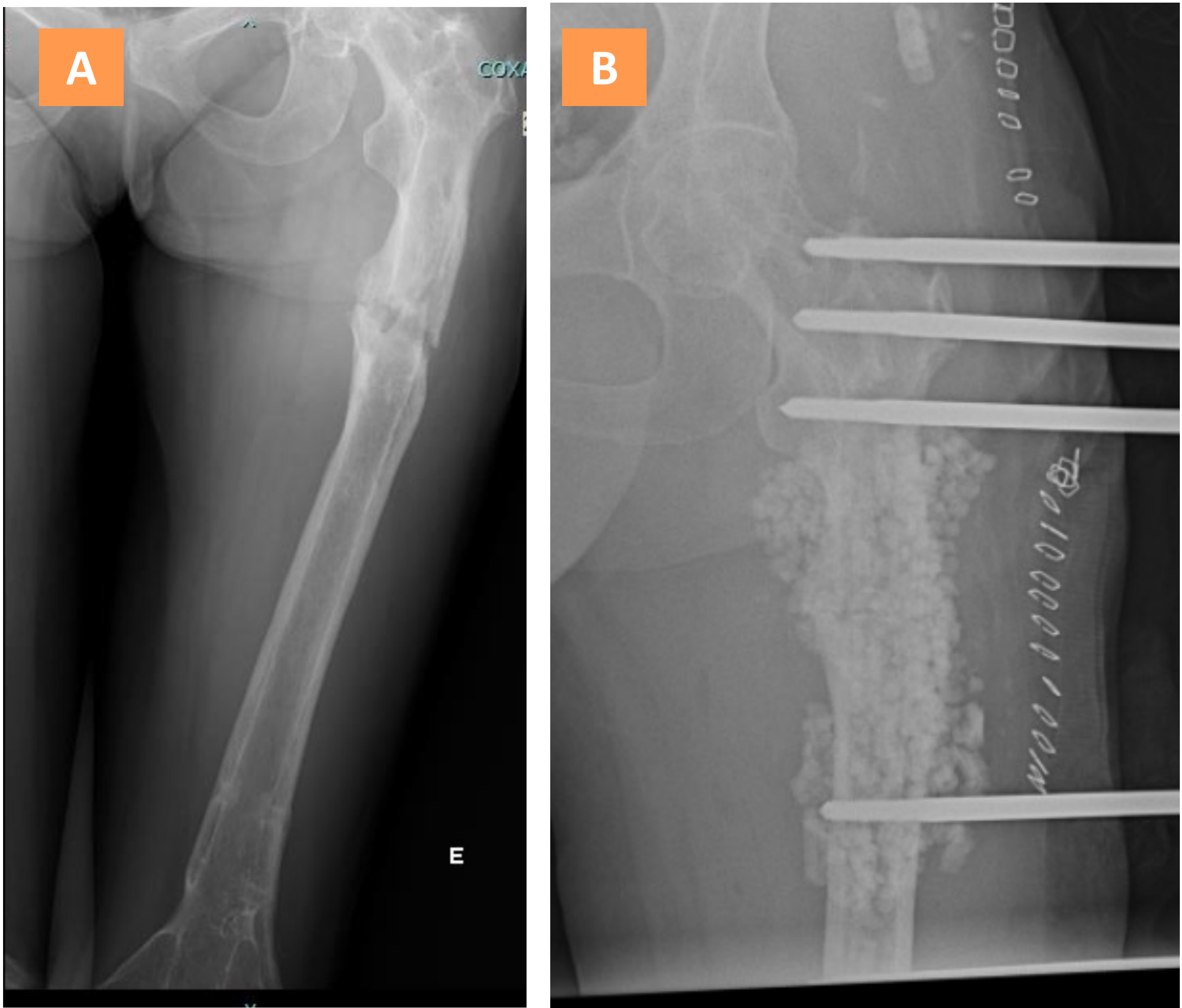


Figure 1. Initial staged management. (A) Pathological femoral fracture at the site of previous fracture-related infection. (B) Postoperative radiograph following debridement, local antibiotic delivery, and temporary monoplanar external fixation in compression mode

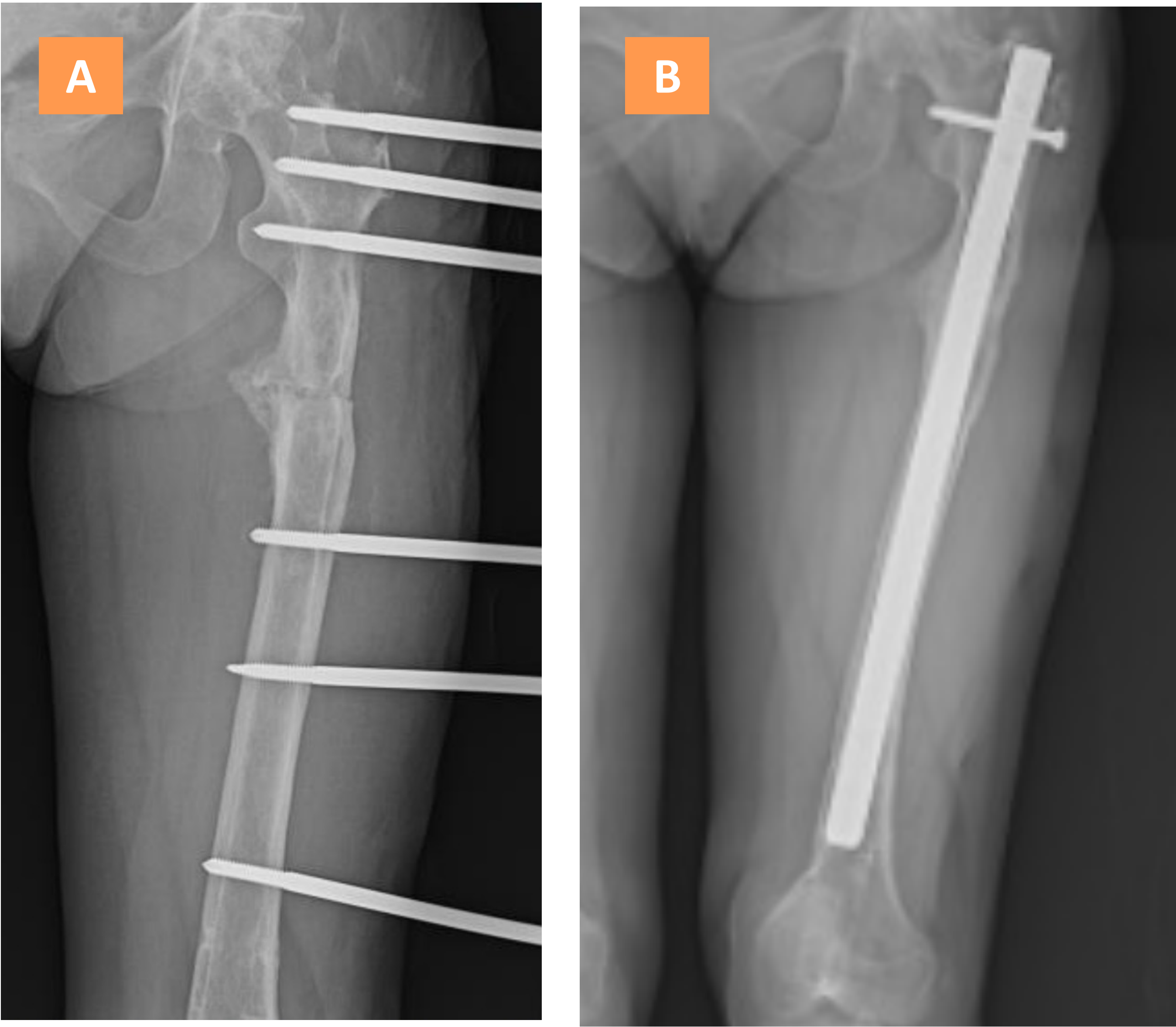


Figure 2. Recurrence and definitive reconstruction. (A) Recurrent fracture-related infection requiring repeat debridement. (B) Radiograph at 22-month follow-up after definitive fixation with an antibiotic cement-coated cephalomedullary nail