Debatable DAIR in PJI Associated to a Primary Complex TKR in a Patient with Known RA — Discussion

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Background

Management of early periprosthetic joint infection (PJI) after total knee arthroplasty complicated by soft-tissue defects remains challenging — particularly the role of flap coverage after debridement. While a gastrocnemius flap may improve soft-tissue healing and offer blood supply to the periosteal bone, increasing the chance to get rid of infection, its influence on infection eradication and its potential to mask persistent infection, are not well established.

Case Presentation

- 66-year-old female with rheumatoid arthritis (RA), treated with hydroxychloroquine (Plaquenil®), sulfasalazine (Salazopyrin®) and methotrexate (MTX)
- Primary TKA with a full-constrained (LCCK) prosthesis, indicated for a severe AORI III_B tibial bone defect in a genu varus Ahlbäck V knee osteoarthritis (secondary to RA)
- 6 weeks post-op: sinus tract with purulent discharge at the left knee, elevated inflammatory markers CRP, fibrinogen and ESR, w. normal WBC
- Symptom onset approximately 2 weeks prior to admission

Diagnosis

Early periprosthetic joint infection (PJI) of a fully constrained (LCCK) primary TKA, in a host with rheumatoid arthritis (RA) on immunosuppressive therapy.

Clinical Context

Rheumatoid arthritis (RA) and long-term immunosuppressive therapy are established risk factors for periprosthetic infection and can impair infection clearance — a relevant background factor throughout this case, particularly around the timing of hydroxychloroquine and sulfasalazine reinitiation (stopped MTX due to side effects).

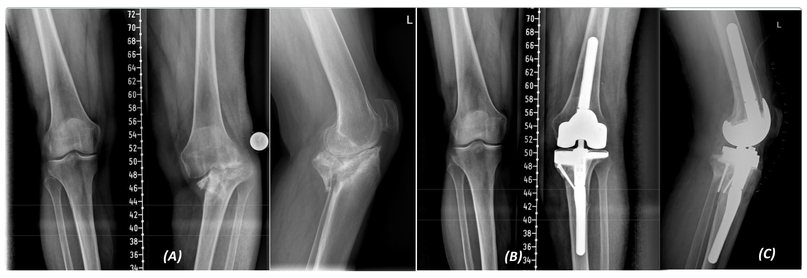


Fig. 1 Radiographs of the fully constrained (LCCK) reconstruction. (A) Preoperative AP view showing the severe tibial bone defect. (B) Postoperative AP view after LCCK reconstruction. (C) Postoperative lateral view.

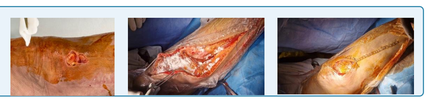
Implant Rationale

A full-constrained (LCCK) design was indicated for the severe tibial bone defect AORI III, providing constrained stability where bone loss precludes a primary condylar-constrained or posterior-stabilized implant — but such constrained constructs also carry a recognized higher infection burden in the literature.

Case Timeline

03.09.2025 — Index Surgery
Primary TKA — fully constrained (LCCK) prosthesis for severe tibial bone defect

~Late Oct 2025 — DAIR
Sinus tract, purulent discharge, elevated CRP/fibrinogen/ESR → DAIR + gastrocnemius flap; MRSA isolated



~Jan 2026 — Recurrence
Sinus tract recurrence after hydroxychloroquine reinitiation at 2 weeks post → persistent infection suspected



March 2026 — Revision
Prosthesis removal, antibiotic cement spacer, external fixator; recurrent MRSA isolated — antibiogram identical to Oct 2025, confirming persistence of the same strain

April 2026 — Recovery
Gradual clinical and biochemical normalization; discharged home in good condition on suppressive rifampicin + co-trimoxazole (≥6 months)

Extended Course Summary

The revision surgery (~5 months after DAIR) again isolated MRSA, with an antibiogram identical to the initial DAIR culture (Fig. 7) — confirming relapse of the same strain rather than a new infection and extending the total course to roughly 7.5 months before biochemical normalization.

Surgical Management — DAIR

- DAIR (Debridement, Antibiotics, and Implant Retention) performed in an attempt to preserve the prosthesis – liner exchange (mobile parts exchange), 6 l Lavasurge® lavage
- Complete excision of the sinus tract and large soft-tissue debridement, replacing mobile prosthetic parts –inlay/ liner
- Medial gastrocnemius flap with split-thickness skin graft (STSG) for soft-tissue reconstruction

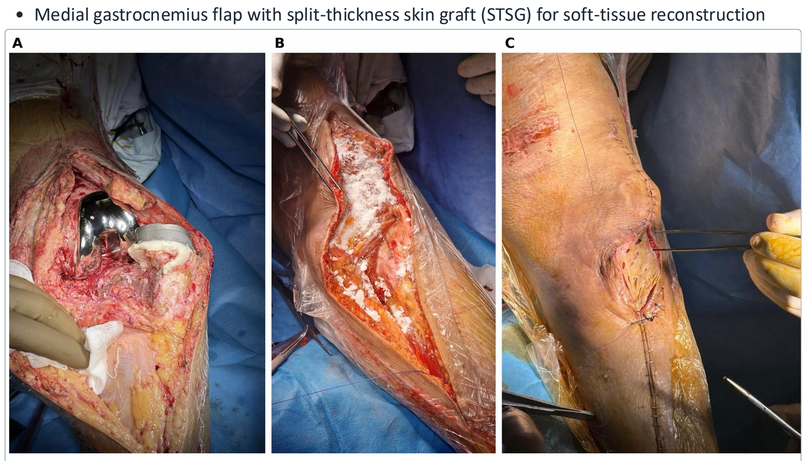


Fig. 2 Debridement and soft-tissue management. (A) Intraoperative debridement with the implant retained (DAIR). (B) Local vancomycin powder applied to the wound bed. (C) Wound closure following soft-tissue reconstruction.

Microbiology & Antibiotic Therapy

Pathogens Identified

Methicillin-resistant Staphylococcus aureus (MRSA) at both the initial DAIR (Oct 2025) and the March 2026 revision — identical antibiogram at both timepoints (Fig. 7), and a molecular panel (Sepsis Flow Chip) at revision confirmed S. aureus + mecA only, negative for other pathogens.

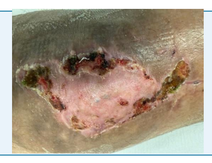
Weeks 1–3
IV vancomycin + amikacin



Weeks 4–6
IV linezolid + amikacin
(vancomycin switched — renal considerations)



Post-discharge
Oral suppressive therapy:
rifampicin + co-trimoxazole



Post-Discharge

Oral suppressive therapy (rifampicin + co-trimoxazole) — reinstituted after the March 2026 revision and planned for a minimum of 6 months.

Laboratory Trend (CRP / Fibrinogen / ESR)

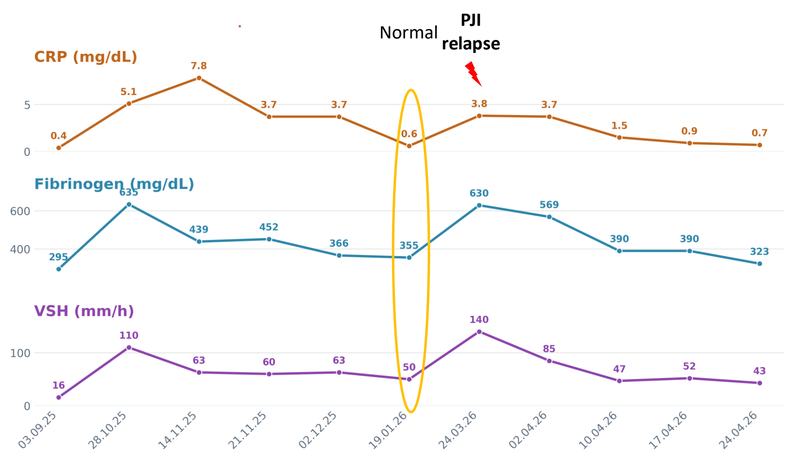


Fig. 6 CRP, fibrinogen, and VSH evolution (Sep 2025 – Apr 2026), each on an independent auto-scaled axis: initial post-DAIR peak, partial normalization, and a second, higher peak (VSH 140 mm/h) coinciding with the March 2026 same-strain MRSA relapse.

Recurrence (~Jan 2026)

- ~3 months after DAIR: hydroxychloroquine reinitiated for rheumatoid arthritis
- Recurrence of a sinus tract at the left knee, with elevated inflammatory markers
- Findings suggestive of persistent infection despite prior treatment



Fig. 3 (A) Healing of soft-tissue medial gastrocnemius cover flap after DAIR
(B) Recurrent sinus tract over the healed flap, ~3 months after DAIR, just below the distal margin of the flap.

Revision Surgery (March 2026)

- Prosthesis removal with extensive debridement
- Antibiotic-loaded cement spacer implanted — insufficient stability due to deficient bone stock after debridement
- External fixator applied to ensure limb stability
- Recurrent MRSA isolated — antibiogram identical to the initial DAIR culture (Fig. 7), confirming persistence of the same strain; molecular panel negative for other pathogens

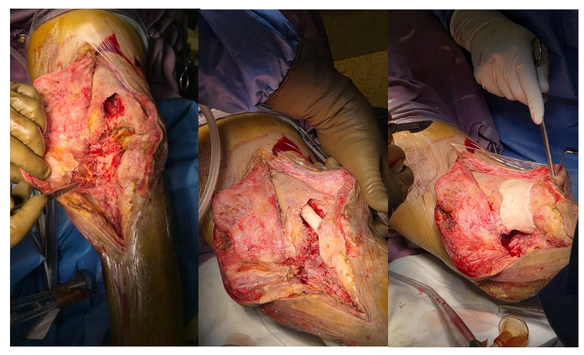


Fig. 4 Advanced debridment & Antibiotic cement spacer.



Fig. 5 External fixator for limb stability.

Outcome

Gradual clinical and biochemical normalization through April 2026 (see Fig. 6). Discharged home in good general condition on suppressive rifampicin + co-trimoxazole, planned for a minimum of 6 months.

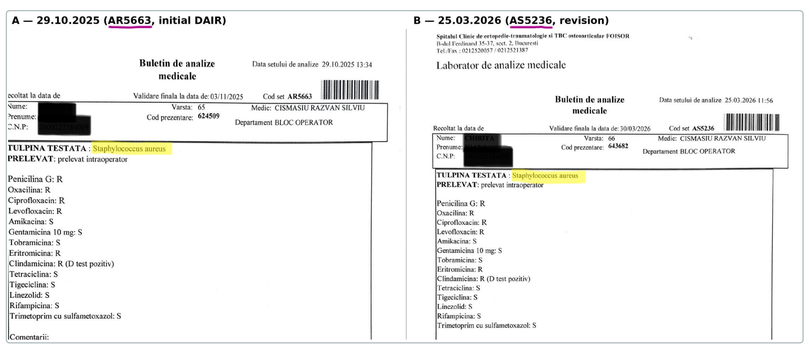


Fig. 7 Paired antibiograms, initial DAIR (A, 29.10.2025) vs. revision (B, 25.03.2026) — an identical MRSA susceptibility pattern at both timepoints, consistent with relapse of the same strain rather than a new infection.

Discussion

- Gastrocnemius flap may improve soft-tissue healing, but its effect on infection eradication is not well established
- Soft-tissue reconstruction may delay recognition of, or mask, persistent infection beneath healed coverage
- DAIR success is debatable in a complex host: rheumatoid arthritis, immunosuppressive therapy, fully constrained implant, and major bone defect
- Reinitiation of hydroxychloroquine preceded clinical recurrence — a possible contributing factor, not stated in literature
- Prolonged retained hardware (spacer, fixator) may not guarantee eradication of a resistant organism — the identical antibiogram at relapse raises the question of when eradication is achievable versus chronic suppression

Learning Points

1. Flap coverage can heal the wound while infection persists beneath it.
2. Immunosuppression timing should be closely coordinated with infection surveillance.
3. An identical antibiogram months apart indicates relapse of the same organism, not reinfection — arguing for long-term suppression once eradication has failed twice.

Conclusion / Take-Home Message

This case underscores the diagnostic and therapeutic dilemma of DAIR for PJI complicated by a soft-tissue defect requiring flap coverage, in an immunocompromised host. Flap coverage may obscure clinical signs of persistent infection, and — as this patient's course shows — apparent control can be followed months later by relapse of the very same MRSA strain, confirmed by an identical antibiogram. This supports vigilant, prolonged surveillance and a pragmatic shift toward long-term suppressive therapy once repeated eradication attempts fail.

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