

Outcomes of Long-Term Antibiotic Spacer Retention in Knee PJI After Total Knee Arthroplasty

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INTRODUCTION & AIMS

Periprosthetic joint infection (PJI) after total knee arthroplasty (TKA) is a serious complication with major functional and economic consequences. Traditional two-stage exchange remains the gold standard for chronic PJI but requires multiple surgeries and prolonged rehabilitation.

Delayed or permanent retention of an articulating antibiotic loaded cement spacer, a “1.5-stage” revision, is increasingly recognized as a functional alternative in select patients, yet outcomes of long-term retention of high-dose spacers remain poorly defined.

AIM

To evaluate the clinical and functional outcomes of extended retention of high-dose antibiotic-loaded, cement spacers in patients with chronic PJI following TKA.

MATERIALS & METHODS

- 3 patients with chronic or recurrent PJI after TKA treated with an articulating, high-dose antibiotic-loaded cement spacer
- All underwent extensive debridement + systemic antibiotics tailored to intra-operative cultures, guided by Infectious Disease consultation
- Serum creatinine monitored peri-operatively and at post-operative follow-ups to screen for acute kidney injury (AKI)

SPACER COMPOSITION — PER 40 g PMMA BATCH

Vancomycin	3 g
Piperacillin-tazobactam	4–5 g
Gentamicin (pre-loaded in PMMA)	0.5 g
Base cement	40 g gentamicin-loaded PMMA

~19–21% total antibiotic concentration by weight — exceeding conventional spacer loading

STUDY DESIGN Retrospective, single-arm case series • N = 3

CITED LITERATURE

- Hernandez NM, Buchanan MW, Seyler TM, Wellman SS, Seidelman J, Jiranek WA. 1.5-Stage Exchange Arthroplasty for Total Knee Arthroplasty Periprosthetic Joint Infections. J Arthroplasty. 2021;36(3):1114–1119.
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- Kapadia BH, Berg RA, Daley JA, Fritz J, Bhave A, Mont MA. Periprosthetic joint infection. Lancet. 2016;387(10016):386–394.

RETENTION PROTOCOL

- Spacers intentionally retained indefinitely, well beyond the conventional 6-to-12-week exchange interval
- Functioned as a definitive/indefinite-stage construct rather than a bridge to reimplantation
- Immediate weight bearing and progressive rehabilitation permitted from the outset
- Functional outcomes, infection control, and complications assessed at follow-up

TRADITIONAL vs. EXTENDED (“1.5-STAGE”) RETENTION

Traditional two-stage exchange



Extended / “1.5-stage” retention (this study)



Avoids a planned second major surgery while preserving mobility and local antibiotic delivery.

RESULTS

All three patients demonstrated clinical resolution of infection, preserved range of motion, and independent ambulation without need for second-stage reimplantation. Patients reported minimal to no pain, and all constructs remained clinically stable on examination with continued functional ambulation at latest follow-up.



Infection resolved



Range of motion preserved



Independent ambulation

KEY OUTCOMES AT FOLLOW-UP

3 / 3

infection-free, ambulating independently

7–13

months of follow-up post-operatively

0

recurrent infections, spacer fractures, or loosening

0

cases of AKI or renal function decline

CONCLUSIONS

- Extended retention of high-dose antibiotic-loaded articulating spacers may be a viable short-term alternative to two-stage revision in select knee PJI patients with significant comorbidities or limited functional demand
- Enables sustained local antibiotic delivery, preserved mobility, and avoidance of additional major surgery with satisfactory short-term function
- Despite high antibiotic concentrations, no renal complications were observed in this small cohort

LIMITATIONS & NEXT STEPS

- Small cohort (n = 3) and short-term follow-up (7–13 months) limit generalizability
- No comparator arm against traditional two-stage exchange
- Larger, longitudinal cohorts are needed to evaluate long-term mechanical integrity, infection control, and appropriate patient selection criteria

TAKE-HOME MESSAGE

In carefully selected patients, long-term spacer retention can achieve infection control and functional recovery without a planned second-stage operation.