

Durable Functional Antibiotic Laden Spacers for Infected Total Knee Arthroplasty has Fewer Operations and Similar Outcomes at 5 years

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INTRODUCTION:

Durable 1.5-stage revision arthroplasty is a method for treating subacute or chronic periprosthetic joint infection (PJI) using primary total knee arthroplasty (TKA) components and high-dose antibiotic-laden cement where the spacer is intended to be retained. While some have reported accelerated bone loss, a potential advantage of the 1.5-stage revision for PJI is a single operative event required to treat PJI, which may be attractive to patients. The purpose of this study was to compare 5-year outcomes between durable 1.5-stage articulating spacers and the gold standard 2-stage exchange arthroplasty using static cement spacers prior to revision TKA for PJI.

METHODS: After IRB approval, we retrospectively compared 25 knees after 1.5-stage and 30 knees after 2-stage revision for PJI with a minimum of 5-year follow-up. Clinical data was collected on demographics, functional outcome scores, as well as overall and infection-free survival. Mann-Whitney tests were used for statistical analysis and a Cox proportional-hazards model was used for revision-free survival.

RESULTS:

Patients who underwent a durable 1.5-stage spacer were significantly older (median: 72 years, range: 53-87) compared to those who underwent 2-stage revision (median: 64 years, range: 50-79, $p=0.002$) for PJI (Table 1). There was no difference between the cohorts with regards to body mass index, sex, type of infected implant, or McPherson classification (Table 2). Postoperative Knee Society Scores of the durable 1.5-stage spacers (median: 94, range 55-100) were similar to those of 2-stage revisions (median: 89, range 45-100; $p=0.307$). Patients undergoing a 2-stage revision underwent significantly more operations (median: 2, range: 2-6) when compared to the durable 1.5-stage spacers (median: 1, range 1-4, $p<0.001$, Table 3). There was no significant difference in infection-free survival between the durable 1.5-stage spacers (92%) and 2-stage revision (80%, $p=0.269$, Figure 1). There was no significant difference in revision-free survival between the durable 1.5-stage spacers and 2-stage revision in terms of absolute risk (68% v. 70%, $p>0.999$) with a number needed to harm of 50 or relative odds (HR: 1.25, CI: 0.47-3.33, $p=0.650$, Table 4, Table 5).

DISCUSSION AND CONCLUSION:

Although our series is small, our data suggests that durable 1.5-stage spacers for TKA-PJI are associated with fewer operations and no difference in infection or revision free-survival or functional outcome scores at 5 years. The failures of a durable 1.5-stage spacers become revision TKAs most commonly, while failures of a 2-stage revision result in additional surgery including the removal of well-fixed components and subsequent pseudofusion with elevated levels of soft tissue compromise. Durable 1.5-stage spacers should be considered a superior alternative to 2-stage treatment of TKA-PJI, especially for older and less active patients hoping to avoid additional surgery.

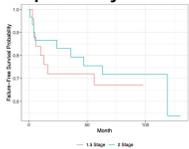


Table 1: Demographics

	1.5 Stage (n=25)	2 Stage (n=30)	p-value
Age (years)	72 (53-87)	64 (50-79)	0.002
Sex	15 (60%)	15 (50%)	0.487
Body Mass Index (BMI)	27.5 (20.5-35.5)	28.5 (20.5-35.5)	0.888
McPherson Classification	15 (60%)	15 (50%)	0.518

Table 2: Infection Data

	1.5 Stage (n=25)	2 Stage (n=30)	p-value
Number of Operations	1 (4%)	2 (7%)	0.553
Number of Revisions	1 (4%)	2 (7%)	0.553
Number of Total Knee Replacements	1 (4%)	2 (7%)	0.553
Number of Total Hip Replacements	1 (4%)	2 (7%)	0.553
Number of Hip Resurfacings	1 (4%)	2 (7%)	0.553
Number of Hip Arthroscopies	1 (4%)	2 (7%)	0.553
Number of Hip Osteotomies	1 (4%)	2 (7%)	0.553
Number of Hip Arthroplasties	1 (4%)	2 (7%)	0.553
Number of Hip Resections	1 (4%)	2 (7%)	0.553
Number of Hip Resections with Cement	1 (4%)	2 (7%)	0.553
Number of Hip Resections with Cement and Bone Graft	1 (4%)	2 (7%)	0.553
Number of Hip Resections with Cement and Bone Graft and Bone Cement	1 (4%)	2 (7%)	0.553
Number of Hip Resections with Cement and Bone Graft and Bone Cement and Bone Graft	1 (4%)	2 (7%)	0.553
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Table 3: Revision Data

	1.5 Stage (n=25)	2 Stage (n=30)	p-value
Number of Revisions	1 (4%)	2 (7%)	0.553
Number of Total Knee Replacements	1 (4%)	2 (7%)	0.553
Number of Total Hip Replacements	1 (4%)	2 (7%)	0.553
Number of Hip Resurfacings	1 (4%)	2 (7%)	0.553
Number of Hip Arthroscopies	1 (4%)	2 (7%)	0.553
Number of Hip Osteotomies	1 (4%)	2 (7%)	0.553
Number of Hip Arthroplasties	1 (4%)	2 (7%)	0.553
Number of Hip Resections	1 (4%)	2 (7%)	0.553
Number of Hip Resections with Cement	1 (4%)	2 (7%)	0.553
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Table 4: Survival Analysis

	HR	95% CI	p-value
2 Stage vs. 1.5 Stage	1.25	0.47-3.33	0.650

Table 5: Types of Failure

Failure Type	1.5 Stage (n=25)	2 Stage (n=30)	p-value
Revision	1 (4%)	2 (7%)	0.553
Amputation	0 (0%)	0 (0%)	0.999
Death	0 (0%)	0 (0%)	0.999