

Single Center Outcomes of an Innovative Rapid Two-Stage Knee Revision for Prosthetic Joint Infections

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Background & Purpose

FirstHealth of the Carolinas is a community healthcare system comprised of four hospitals serving 15 rural counties in North and South Carolina. Moore Regional Hospital, the flagship facility, performed over 900 total hip and knee joint arthroplasties in 2025.

Periprosthetic joint infection (PJI) is a serious complication of joint arthroplasty, typically managed with two-stage revision arthroplasty – the current gold standard. While highly effective, two-stage revisions require two major surgeries over a three-to-six-month time frame, leading to prolonged functional impairment, interim complications, and increased healthcare utilization and costs.

The purpose of this study is to present our institutional experience with a rapid two-stage revision arthroplasty, in which the second-stage reimplantation is performed as a separate procedure within 10 days of prosthesis removal and during the same hospitalization.

Methods

Study Design

- Retrospective chart review conducted at FirstHealth of the Carolinas located in Pinehurst, North Carolina, USA

Inclusion Criteria

- Patients who underwent rapid two-stage revision of the knee for management of PJI between January 2022 and July 2025

Assessment Data

- Patient demographics, causative PJI pathogen, treatment details (acute intravenous [IV] and suppressive oral antimicrobials), 30-day readmission rates, six-month and two-year revision failure rates, and six-month mortality rates

Results

	Patients N = 32
Gender – no. (%)	
Female	13 (40.6)
Male	19 (59.4)
Age – years	
Mean	66
Range	48-85
PJI Classification – no. (%)	
Early	2 (6.3)
Delayed	14 (43.7)
Late	16 (50)
Treatment prior to 2-stage revision– no. (%)	
Any treatment	24 (75)
Prior surgical procedure	15 (62.5)
Antibiotics (IV or PO)	9 (37.5)
Time to reimplantation - days	
Average	5.2
Range	2-9
Pathogens – no. (%)	
Gram negative	7 (21.9)
Coag negative staph	6 (18.8)
MRSA	5 (15.6)
MSSA	5 (15.6)
Other	5 (15.6)
Culture negative	4 (12.5)

	Patients N = 32
Antibiotics after 2-stage – no (%)	
6 weeks IV therapy	25 (78.1)
< 6 weeks IV therapy	3 (9.4)
> 6 weeks IV therapy	4 (12.5)
Suppressive antibiotics – no (%)	
6 months	28 (87.5)
> 2 years	8 (25)
None	4 (12.5)
Infectious complications– no (%)	
Superficial infection	3 (9.4)
Revision failure	2 (6.3)
Within 6 months	0 (0)
Late failure	2 (6.3)
Adverse reaction to antibiotics – no (%)	
During IV treatment course	9 (28.1)
During suppression	1 (3.1)
Readmissions (30 day) – no.(%)	5 (32)
Mortality (6 month) – no. (%)	2 (6.3)

Conclusions

Although many European countries have adopted one-stage revision for treatment of PJIs, two-stage revision remains the gold standard treatment in the US. Recent studies have challenged this paradigm, and our experience illustrates good outcomes of a rapid two-stage revision. The success rate of standard two-stage revision arthroplasty varies in the literature, with reported eradication rates ranging from 54% to 100% with an average of 84.8%. In comparison, our institutional experience with a rapid two-stage revision demonstrated a 93.8% success rate with only two patients experiencing revision failure. Notably, this rapid approach maintained low readmission and mortality while avoiding a second hospitalization and subsequent recovery period for the patient. Furthermore, incidences of infectious complications and adverse reactions were comparable to those observed in standard two-stage revisions.

Consequently, rapid two-stage revision arthroplasty – characterized by an abbreviated interval between prosthesis explantation and reimplantation – presents a safe and effective strategy for managing PJs, characterized by low rates of recurrence and complications.