

Periprosthetic Joint Infection in Total Ankle Arthroplasty: Challenges Persist

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INTRODUCTION:

Periprosthetic joint infection (PJI) remains an uncommon but devastating complication after total ankle arthroplasty (TAA). Literature investigating treatment of PJI in TAA is limited or historic, and demonstrates poor patient-reported outcomes and high rates of complications and reoperations. Therefore, continued investigation of treatment guidelines specific to TAA is necessary. This study describes clinical, microbiological, and patient-reported outcomes for treatment of PJI in TAA at minimum 2-year follow-up.

METHODS:

This is a single-institution series of TAA patients (2015-2021) who underwent revision for PJI with minimum 2-year follow-up. PJI was defined by Musculoskeletal Infection Society criteria and acute versus chronic PJI was defined as infectious symptom duration of <4 weeks and ≥4 weeks, respectively. Surgical treatment for PJI consisted of: 1) debridement, antibiotics, and retention of metal implants (DAIR) with polyethylene component exchange, or 2) explant of TAA for staged revision TAA after antibiotic treatment. The primary outcome was maintenance of a functioning TAA implant at final follow-up; the secondary outcome was successful limb salvage. Fisher's exact test compared categorical variables between PJI patients and non-PJI patients.

RESULTS:

Twelve of 973 (1.2%) primary TAA performed at our institution underwent revision for PJI (median age 62.8 (IQR, 57-68) years, three females, median weight 98.0 (IQR, 79.8-104.3) kg). At median follow-up of 5.7 years, 4/5 acute PJI patients and 2/7 chronic PJI patients had a functioning TAA implant; all acute PJI patients and 5/7 chronic PJI patients underwent successful limb salvage (**Table**). All acute PJI patients were eradicated of infection following DAIR (n=4) or explant of TAA (n=1). Chronic PJI patients were initially treated with DAIR (n=3) or explant for staged revision TAA (n=4); however, 3/3 patients treated with DAIR and 3/4 patients treated with explant for staged revision required additional reoperations for recurrence, resulting in permanent cement spacer with washouts (n=1), TTC arthrodesis (n=1), ankle arthrodesis (n=1), two-stage revision TAA (n=1), and BKA (n=2). 4/12 PJI patients (33.3%) had hindfoot arthrodesis prior to primary TAA versus 70 non-PJI patients (7.3%) (P=0.010).

DISCUSSION AND CONCLUSION:

DAIR is a viable option for treatment of acute PJI. However, DAIR and explant with staged revision for treatment of chronic PJI pose significant risks for infection recurrence. Infection recurrence may result in permanent loss-of-function due to limited secondary treatment options after failed revision, including a permanent cement spacer, arthrodesis, and amputation. Additionally, previous hindfoot arthrodesis may be a risk factor for PJI in TAA. Further research is needed to guide evidence-based decision making for treatment of PJI and to improve TAA revision options for PJI that effectively eradicate infection while facilitating the improved ambulation permitted with maintenance of a functioning TAA implant.

Table 1. Summary of Patient Outcomes by PJI Type

Patient #	Age (years)	Sex	Weight (kg)	PJI Type	Initial Treatment	Final Treatment	Final Outcome
1	62	M	98	Acute	DAIR	DAIR	Functioning TAA
2	65	F	85	Acute	DAIR	DAIR	Functioning TAA
3	68	M	100	Acute	DAIR	DAIR	Functioning TAA
4	60	M	95	Acute	DAIR	DAIR	Functioning TAA
5	63	M	102	Acute	Explant	Staged revision TAA	Functioning TAA
6	61	M	99	Chronic	DAIR	DAIR	Permanent cement spacer
7	64	M	101	Chronic	DAIR	DAIR	TTC arthrodesis
8	66	M	97	Chronic	DAIR	DAIR	Ankle arthrodesis
9	67	M	103	Chronic	Explant	Staged revision TAA	Two-stage revision TAA
10	69	M	104	Chronic	Explant	Staged revision TAA	BKA
11	62	M	96	Chronic	Explant	Staged revision TAA	Functioning TAA
12	64	M	99	Chronic	Explant	Staged revision TAA	Functioning TAA