

Managing Periprosthetic Infections in Total Ankle Arthroplasty: Risk Factors and Treatment Outcomes from a Single Center

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Introduction

- Total ankle arthroplasty (TAA) is an increasingly accepted treatment for end-stage ankle osteoarthritis, a condition that is predominantly post-traumatic in nature. While TAA effectively reduces pain and preserves joint motion, periprosthetic joint infection (PJI) remains a rare but potentially devastating complication with reported incidence rates ranging from 1.2% to 8.9%. This severe complication can lead to implant failure and substantial morbidity, frequently necessitating complex surgical interventions such as irrigation and debridement, revision arthroplasty, or conversion to arthrodesis. Despite the growing use of TAA, the existing literature on PJI in this specific setting remains limited compared to the extensive data available for hip and knee arthroplasties, underscoring a critical need for further clinical evidence

Methods

- Study Design:** Single-center retrospective study (2004–2018).
- Study Population:** 33 patients diagnosed with PJI after primary TAA.
- Classification:** Infections were categorized as **early postoperative** (<4 weeks), **acute hematogenous** (<4 weeks of symptoms but after an infection-free period), or **late chronic** (>4 weeks after surgery or prolonged symptoms).
- Surgical Interventions:** Included irrigation and debridement (I&D) with polyethylene exchange, revision arthroplasty, conversion to ankle arthrodesis, or a permanent cement spacer

Results

Microbiological Profile	<i>Staphylococcus aureus</i>	13 (39.4%)
	Coagulase-Negative Staph (CoNS)	10 (30.3%)
	<i>Streptococcus</i> Species	7 (21.2%)
	Culture Negative Rate	3 (9.1%)
Initial Surgical Strategy & Failure	I&D + Poly Exchange (DAIR)	11 (33.3%)
	Revision Arthroplasty (2/3-Stage)	7 (21.2%)
	Conversion to Arthrodesis	13 (39.4%)
	Definitive Cement Spacer	2 (6.1%)
	Overall Initial Failure Rate	8 (24.2%)
Definitive Final Outcomes	Final Ankle Arthrodesis	17 (51.5%)
	Final Revision TAA	8 (24.2%)
	Retained Primary TAA	6 (18.2%)
	Permanent Cement Spacer	2 (6.1%)
	Infection Eradication Rate	100% (33/33)
	Limb Salvage / Amputation Rate	100% Limb Salvage

Demographics & Risk Factors	Age & Sex	60.5 ± 10.2 yrs 60.6% Male
	Obesity (BMI >30 kg/m²)	16 (48.5%)
	Prior Ankle Surgery	25 (75.8%)
	Postop Wound Complications	11 (33.3%)
Infection Subtypes & Lab Markers	Late Chronic (>4 weeks)	19 (57.6%)
	Early Postoperative (<4 weeks)	8 (24.2%)
	Acute Hematogenous	6 (18.2%)

Discussion

Strict Patient Selection & Preoperative Optimization:

Obesity (48.5%), prior surgeries (75.8%), and soft-tissue wound complications (33.3%) represent major risk factors. Preoperative risk mitigation (smoking cessation, weight loss, soft-tissue evaluation) is mandatory.

Narrow Clinical Window for DAIR:

Joint preservation via I&D + Poly exchange should be strictly restricted to early acute infections with symptom duration < **7 days** and stable implants. Delayed intervention drives a 45.5% failure rate.

Staged Conversion Arthrodesis is the Salvage Gold Standard:

Conversion to ankle fusion (TTC nail or cannulated screws) demonstrated the lowest failure rate (**7.7%**) compared to revision TAA (**28.6%**), making it the safest salvage procedure in chronic PJI with bone loss.

Oral & Systemic Hematogenous Vigilance:

Acute hematogenous infections require high clinical suspicion. Dental procedures and distant infections require prompt attention and potential prophylaxis in TAA patients.

Conclusion

Management of periprosthetic ankle infection requires an **individualized, pathogen-directed, and staged surgical approach**. While DAIR has limited applicability in delayed presentations, **staged conversion to arthrodesis provides a highly reliable method for infection control and joint salvage**. A structured multidisciplinary treatment protocol yields **100% infection eradication and complete limb salvage** without secondary amputations.