International Success and Failure of the Treatment of Periprosthetic Hip Infection: A Preliminary Report

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INTRODUCTION: Multiple studies have evaluated the success of different surgical modalities for periprosthetic joint infection (PJI), but most reports are limited to data from single centers/countries. Thus, this preliminary report from the Orthopaedic Device Infection Network (ODIN), which is a collaboration of seven organizations across Australia, New Zealand, the Netherlands, Spain and the United States using standardized data collection/centralized analysis, attempts to overcome that barrier and find an answer to the following questions: What is (1) the success rate of hip PJI treatment, and the postoperative rates of (2) amputation or (3) mortality?

METHODS: Data for this report was collected at 4 institutions. Inclusion criteria was hip arthroplasty treated for PJI (n=242). Study period: 1995 to 2023. Demographics, body mass index (BMI), Charlson Comorbidity Index (CCI), and baseline surgical/infection characteristics such as type of index arthroplasty (primary vs. revision), index arthroplasty indication, infection type (i.e., chronic), infecting organisms, and type of surgery (i.e., single-stage) were noted. Success/failure was assessed according to the Musculoskeletal Infection Society (MSIS) Outcome Reporting Tool (tiers I to III) and a composite outcome (failure: amputation, death, implant revision/removal or infection relapse according to clinician). Postoperative amputations and deaths were also noted. Follow-up range: 6 weeks to 10 years.

RESULTS: Mean age, BMI, and CCI were 65 years, 31.7 Kg/m2, and 3.7, respectively. Majority of hips treated for PJI were primaries (n=170), most were early infections (<90 days, n=119), and the most common infecting organism was Staphylococcus aureus (n=84). Surgical/infection characteristics are shown in Table 1A. Postoperatively, 47 and 60% of hips were categorized as success according to MSIS (tiers I/II) and composite outcome tools, respectively. At latest follow-up, no hip underwent amputation, but mortality rate was 19% (n=46) (Table 1B).

DISCUSSION AND CONCLUSION: The reported failure of treatment of PJI after hip arthroplasty is higher than what have usually been reported in single institution series. The heterogenicity of an international cohort may be more representative of the current PJI treatment outcome. A little more than half of the cases were successfully managed regardless of the success/failure outcome reporting tool utilized. These humbling results call for improvement of strategies to treat hip PJI.

Table 1A. Baseline surgical and infection characteristics.

Surgical and Infection Variables		Entire Cohort (N=242)
Type of index arthroplasty (Implant treated for infection), N (%)	Primary	170 (70)
	Revision	72 (30)
Indication for index arthroplasty (Indication for the implant that was treated for infection), N (%)	Unknown	40 (17)
	Osteoarthritis	95 (39)
	Avascular Necrosis	10 (4)
	Rheumatoid Arthritis	3 (1)
	Malignancy	10 (4)
	Fracture	39 (16)
	Native Septic Arthritis	1 (0)
	PJI	22 (9)
	Other	22 (9)
Type of Infection, N (%)	Early (< 3 months after arthroplasty)	119 (49)
	Chronic (> 3 months after arthroplasty)	94 (39)
	Late-acute (hematogenous)	22 (9)
	Unknown	4 (2)
	Missing Data	3 (1)
Culture Results, N (%)	Negative	28 (12)
	Single-organism	116 (48)
	Polymicrobial	98 (40)
Infecting Organisms (In decreasing order), N	*Staphylococcus aureus*	84
	Staphylococcus epidermidis	64
	Cutibacterium acnes	19
	Staphylococcus capitis ssp urealyticus	16
	Enterococcus faecalis	15
	Staphylococcus hominis	15
	Staphylococcus spp (coagulase negative)	15
	Escherichia coli	13
	Other	122
Surgery Type, N (%)	No Surgery	5 (2)
	DAIR	124 (51)
	Arthroscopic Debridement	1 (0)
	Single-stage Exchange Arthroplasty	16 (7)
	Explantation WITH spacer implantation with the aim of 2-stage exchange	81 (33)
	Explantation WITHOUT spacer implantation with the aim of 2-stage exchange	8 (3)
	Girdlestone	3 (1)
	Missing Data	4 (2)

PJI: Periprosthetic joint infection. DAIR: Debridement antibiotics implant retention. Spp: Species.

Table 1B. Treatment results of periprosthetic hip infection.

Results		Entire Cohort (N=242)
Success or Failure According to MSIS Outcome Reporting Tool (Tiers I/II [Success] vs. Tier III [Failure]), N (%)	Tier I or II	114 (47)
	Tier III	51 (21)
	Missing Data	77 (32)
Amputation, N (%)	No	235 (97)
	Yes	0 (0)
	Missing Data	7 (3)
Death, N (%)	No	191 (79)
	Yes	46 (19)
	Missing Data	5 (2)
Success of Failure According to Composite Outcome (Failure: amputation, death, implant revision/removal or relapse of infection as determined by the treating clinician) N (%)	Success	145 (60%)
	Failure	92 (38%)
	Missing	5 (2)

MSIS: Musculoskeletal Infection Society.