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High Variability in Outcomes of Two-Stage Exchange to Treat Periprosthetic Joint Infection

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High Variability in Outcomes of Two-Stage Exchange to Treat Periprosthetic Joint Infection

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INTRODUCTION

Periprosthetic joint infection (PJI) is a challenging condition to manage with sobering morbidity and mortality.^{1,2} Treatment options range from simple irrigation and debridement with prosthetic retention to explantation and placement of a temporary cement spacer. Indications for each option are unclear and non-uniform despite significant efforts to understand the management outcomes. Until recently, a uniform definition of success was unavailable, thus clouding the discussion of treatment options. Two-stage exchange is currently considered the “gold-standard” in North America, yet an appropriate understanding of the actual success and ancillary effects of treatment is needed. With the advantage of an expert opinion defining success, this study was designed to understand the status of the current literature and the guidance it provides regarding two-stage exchange arthroplasty.

MATERIALS AND METHODS

All pertinent publications regarding outcomes of two-stage exchange involving more than 10 hip arthroplasties, from 1991 to 2012, were assembled and reviewed. Rates of infection eradication, non-infectious complications and demographic details were collected. Fifty-one published articles that included a total of 2,444 infected total hip arthroplasties treated with a two-stage protocol were included (Table 1). In addition to ascertaining the reported success rate, each article was reviewed for reporting of the components constituting successful PJI treatment as described by Diaz-Ledezma et al.³ These components include: (1) infection eradication, (2) no subsequent surgical intervention, and (3) no occurrence of PJI-related mortality.

The Delphi Method for PJI – Success Defined

- Infection eradication - characterized by a healed wound without fistula, drainage, or pain, and no infection recurrence caused by the same organism strain.
- No subsequent surgical intervention for (sepsis, necrotizing fasciitis).
- No occurrence of PJI-related mortality (by causes such as sepsis, necrotizing fasciitis).
- Retention of prosthesis is not the only defining factor of success.

TABLE 1

Number of Articles Assessed	51
Date Published (Range)	1991-2012
Compiled data	Average (Range)
Reported Number of Patients per Article	46 (8-202)
Age (Years)	63 (49-72)
Males	26 (4-109)
Females	22 (2-95)
Number of Patients that Received Reimplantation	45 (8-186)
Average Follow-Up (Months)	57 (20.4-168)
Minimum Follow-Up (Months)	26 (2-120)
Maximum Follow-Up (Months)	102 (36-203.5)

Table 1. Compilation of data from the 51 articles assessed in this analysis.

RESULTS

The reported success rate in these studies for two-stage exchange arthroplasty ranged from 78% to 100% (Standard Deviation = 6.09%). Statistically significant correlation between reported outcome and sample size, year of publication, average age, gender, inter-stage duration, number of methicillin-resistant *Staphylococcus aureus* infections, and length of follow up were not appreciated.

Measures of a successful PJI treatment were not easily extracted from this literature. Forty (78%), 16 (31%), 0 (0%), and 32 (63%) cases provided inadequate data to determine clinical failure, infection recurrence with identical organism, reoperation secondary to infection, or infection-related mortality, respectively. Only 4 cases (8%) provided sufficient information to assess the success of treatment with definition provided by Diaz-Ledezma et al.

DISCUSSION

Despite advances in the diagnosis and management of PJI, the outcome of the most commonly implemented surgical protocol for treatment remains highly variable and generally unpredictable. As such, perhaps evidence is insufficient to suggest this modality is appropriately labeled as a “gold-standard.” Given the severe impact of PJI on the mortality and morbidity of arthroplasty patients, future endeavors involving well controlled and defined investigations are imperative.

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