SH70: Is there a role for a functional (metal-based) antibiotic cement spacer in treating shoulder PJI?

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Response: A functional spacer (stemmed metal humeral component loosely placed with antibiotic-loaded cement) may be used as part of a planned two-stage exchange arthroplasty or is an option for definitive treatment with a one-stage procedure in select cases.

Strength of Recommendation: Limited

Delegate Vote: 51 (98%) agree; 0 disagree; 1 (2%) abstain

Rationale: A comprehensive literature review was performed to identify all studies on the role of functional (metal-based) spacers in treating shoulder PJI. The following search strategy was utilized: shoulder AND infection AND ((replacement OR arthroplasty) OR salvage OR resection OR spacer OR prostalac OR one-stage OR two-stage OR exchange OR revision OR hemiarthroplasty). These terms were searched for in PubMed and Scopus through December 2024. Exclusion criteria were non-English language articles, nonhuman studies, retracted papers, case reports, review papers, studies without clinical follow-up/infection rates, studies that did not specify what type of antibiotic spacer was utilized, and technique papers without patient data. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria were followed. Citations from recent systematic reviews were also examined to ensure no relevant articles were excluded by the search criteria. There were 87 manuscripts that underwent review and 7 articles met inclusion and exclusion criteria.

There is limited data regarding the use of a functional metal-based antibiotic cement spacer. Prior studies have focused on the use of antibiotic spacers when the articular portion of the head is made of antibiotic cement. [2,3,5,8] These studies demonstrated high success of infection eradication after two-stage exchange and these all-cement spacers were occasionally, but rarely, used as definitive treatment. Implant associated complications included implant fracture and glenoid osteolysis. For the purpose of this review, a functional metal-based spacer was defined as a stemmed hemiarthroplasty that was coated in antibiotic cement. The largest study examining the utility of a functional metal-based spacer was completed by Stone et al. comparing the outcomes of debridement and implant retention, one-stage exchange, and two-stage exchange. [11] The protocol for two-stage exchange included the use of an antibiotic cement coated hemiarthroplasty. Of the 29 patients undergoing two-stage exchange, 10 (34%) elected to never undergo the second-stage and there was no recurrence of infection in this group. They did not examine the patient reported outcomes of patients treated definitively with a functional spacer. In a retrospective study, Levy et al. utilized a functional spacer in 14 patients as first-stage of an anticipated two-stage treatment of shoulder PJI. [7] Overall, 9 of the 14 patients (64%) elected to never undergo the 2nd stage of the surgery. The 9 patients treated definitively with a functional spacer had significant improvements in ASES, SANE and shoulder range of motion compared to pre-operatively. Importantly, no patients had a recurrence of infection. In a follow-up study on the same cohort with minimum 5-year outcomes, they found continued survival free of

infection and high patient satisfaction with the functional spacer. [10] Other studies examining the outcomes of two-stage exchange have utilized a functional metal-based spacer in a small portion of included patients and have demonstrated no recurrence of infection, although the pooled sample size is low (8 shoulders).[1,9]

The remaining literature regarding functional metal-based spacers was extrapolated from manuscripts examining one-stage exchange where the construct was an antibiotic cemented hemiarthroplasty. In a series by Klatte et al., 26 patients underwent single stage revision for shoulder PJI with an antibiotic cemented hemiarthroplasty.[6] They compared this cohort to a single stage reverse shoulder arthroplasty (RSA). Overall, the reinfection rate was low (6%) and there were no significant differences in Constant-Murely score between the hemiarthroplasty patients and the RSA cohort; although there was a strong trend to improved outcomes with RSA. Finally, Ince et al. demonstrated no recurrence of infection in 15 patients treated with a single-stage antibiotic cemented hemiarthroplasty at a mean follow-up of nearly 6 years.[4]

A functional metal-based antibiotic spacer is a reasonable treatment option as a temporary spacer for the two-stage treatment of shoulder PJI. Although functional metal-based spacers and traditional all-cement spacers have not been compared, the reported infection eradication rate for functional spacers is comparable. Additionally, there may be a decreased likelihood that patients treated with a functional metal-based antibiotic spacer require a 2nd stage surgery, particularly in patients that are lower demand or have higher medical comorbidities.

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