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QUESTION 2: What are the indications for one-stage and two-stage exchange arthroplasty when treating an acute or chronic elbow periprosthetic joint infection (PJI)?

RECOMMENDATION: Two-stage exchange arthroplasty should be considered for patients with chronic elbow PJI. There are no clear indications for one-stage exchange arthroplasty for infected total elbow arthroplasty (TEA), but two-stage exchange is preferred in patients with sinus tract and/or compromised soft tissues around the elbow or those with systemic sepsis.

LEVEL OF EVIDENCE: Consensus

DELEGATE VOTE: Agree: 100%, Disagree: 0%, Abstain: 0% (Unanimous, Strongest Consensus)

RATIONALE

Treatment strategies for elbow PJI have generally taken four forms: debridement, antibiotic and implant retention (DAIR), one-stage exchange arthroplasty, two-stage exchange arthroplasty, and resection arthroplasty. While DAIR is reported to be successful, this discussion will focus on staged reconstruction [1,2].

The body of evidence to support one-stage exchange arthroplasty is very sparse, with only one retrospective case series reported in the literature. Gille et al. reported on six infected TEAs treated with one-stage exchange arthroplasty. The outcome was successful in five patients, with a follow-up period ranging from 6 months to 16 years. Outcomes indicated patient satisfaction in four of six patients and a mean Mayo Elbow Performance Score of 67 points [3].

The evidence for two-stage exchange arthroplasty is greater than for one-stage, but is also limited to retrospective case series (level IV evidence). In an initial report, Wolfe et al. performed successful two-stage exchange arthroplasty on one elbow in their series of 12 elbow PJIs [4]. Yamaguchi et al. reported successful treatment in four out of five patients with infected TEAs [5]. In a follow-up study of an expanded patient cohort, Cheung et al. found a 28% reinfection rate with two-stage exchange arthroplasty [6]. Finally, Peach et al. studied 26 elbows undergoing two-stage exchange arthroplasty and reported successful eradication in 23 patients (88%) [7]. Pooling of the data on two-stage exchange arthroplasty from the literature results in 59 unique patients with an 18% recurrence rate.

Many of the studies regarding treatment of infected TEAs include a mix of acute and chronic infections with a wide range of surgical treatments and antibiotic regimens. In the setting of acute infection with early diagnosis, some authors recommend DAIR [8,9]. Most of these studies emphasize the importance of sufficiently robust patient health, an adequate soft tissue envelope, a sensitive organism and use of local intra-articular antibiotic placement in addition to intravenous therapy. In particular, debilitated patients may be treated with chronic antibiotic suppression if they are not able to tolerate the proposed surgical course, while intractable infections or inadequate soft tissue sleeves can be managed with resection arthroplasty [2,10].

There are no studies comparing one-stage and two-stage exchange TEA in similar patient populations. Achermann et al. studied 27 elbow PJIs, but most were treated by DAIR. In this series, one patient with a delayed infection was treated with one-stage exchange and two late infections with two-stage exchange arthroplasty. All three patients in this series had successful eradication of infection [9]. Spormann et al. reported on three late (> 24 months) and one acute (< three months) elbow PJIs treated with two-stage reconstruction (all were cleared of infection). Similarly, a one-stage exchange was used in one patient with a delayed (3 to 24-month) TEA infection, which was also successful [8]. Finally, in a review article Somerson et al. found inadequate data to recommend one-stage reconstruction, but reviewed the relative success of two-stage exchange arthroplasty with eradication of infection in 72-88% of patients [10].

Given the paucity of data surrounding one-stage exchange elbow arthroplasty, it is difficult to recommend an indication for this approach in the setting of elbow PJI. Though evidence overall remains limited regarding two-stage exchange, we conclude that this approach is currently favored for the treatment of acute and chronic infected TEA.

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