

Authors: Theodore Blaine, Ilya Voloshin

QUESTION 3: Is there a role for preoperative joint aspiration prior to second-stage revision after treatment of elbow periprosthetic joint infection (PJI)?

RECOMMENDATION: Preoperative joint aspiration may play a role in the evaluation of the elbow arthroplasty for PJI before second-stage revision.

LEVEL OF EVIDENCE: Consensus

DELEGATE VOTE: Agree: 96%, Disagree: 0%, Abstain: 4% (Unanimous, Strongest Consensus)

RATIONALE

There are no studies that specifically investigate and prove that there is a role for preoperative aspiration of the elbow prior to second-stage revision arthroplasty. However, in a review of published studies that have addressed total elbow infection, aspiration was found to be the standard of practice in these studies. Furthermore, there is a logical rationale that preoperative aspiration provides useful information for both the diagnosis and treatment of total elbow arthroplasty (TEA) infections. When the risk factors for infection are higher (such as in patients with diabetes, obesity or rheumatoid arthritis), preoperative aspiration prior to second-stage revision has an even stronger recommendation. Currently, no evidence exists regarding what constitutes a positive aspiration. Therefore, the significance of the results should be assessed on a case-by-case basis.

Rudge et al. discussed the management of infected elbow arthroplasty by two-stage revision in 19 patients managed at their center [1]. In their algorithm for management, the authors state, “If the infective organism and sensitivities had been identified before the first stage, further antibiotics were added as necessary. If at the six-week postoperative review there were clinical signs of ongoing infection or inflammatory markers had not normalized, an aspiration was performed. If the aspirate analysis was positive, then patients underwent a repeat first-stage procedure (debridement and washout). If the aspirate analysis was negative, then a second-stage procedure was planned, but with a low threshold for making an intraoperative decision to repeat the first stage rather than re-implanting prosthetic components, if concerned about possible ongoing infection.” These authors therefore recommend aspiration prior to second-stage revision as a means of determining when to proceed to the second stage, what procedure to perform

and which antibiotics to use.

Using this protocol, the authors were able to treat the majority of TEA infections successfully — “Of the 19 patients undergoing a first-stage procedure, 16 (84%) remained infection free, of whom 11 had proceeded to a second stage and five had not. Of 14 patients undergoing a two-stage revision, 11 (79%) remained infection free. Of patients requiring further surgery due to recurrent infection, 2 (67%) remained infection free after a repeat two-stage revision, with the third patient still awaiting the second-stage procedure.”

When aspiration is performed, the joint fluid should be evaluated for white blood cell (WBC) count, with particular attention to the differential (polymorphonuclear percentage). In addition, the fluid should be sent for aerobic and anaerobic cultures. Gram stains lack sensitivity and specificity and are not routinely recommended [2,3]. Cultures remain the most effective method for specific organism identification. The addition of Acid-Fast Bacilli (AFB) and fungal cultures should be performed if there is concern for atypical infecting organisms. Additionally, incubating cultures for a longer period (21 days) may assist in identifying fastidious organisms such as *Cutibacterium acnes*.

REFERENCES

- [1] Rudge WJ, Eseonu K, Brown M, Warren S, Majed A, Bayley IL, et al. The management of infected elbow arthroplasty by two-stage revision. *J Shoulder Elbow Surg.* 2018;27:879–886. doi:10.1016/j.jse.2017.12.033.
- [2] Spangehl MJ, Masterson E, Masri BA, O’Connell JX, Duncan CP. The role of intraoperative Gram stain in the diagnosis of infection during revision total hip arthroplasty. *J Arthroplasty.* 1999;14:952–956.
- [3] Morgan PM, Sharkey P, Ghanem E, Parvizi J, Clohiesy JC, Burnett RSJ, et al. The value of intraoperative Gram stain in revision total knee arthroplasty. *J Bone Joint Surg Am.* 2009;91:2124–2129. doi:10.2106/JBJS.H.00853.



Authors: Akin Cil, Vani Sabesan, Gokhan Karademir

QUESTION 4: What is the role of permanent resection when treating a chronic elbow periprosthetic joint infection (PJI)?

RECOMMENDATION: Permanent resection is a salvage treatment for chronic elbow PJI. Preservation of medial and lateral condyles should be considered to improve functional outcomes.

LEVEL OF EVIDENCE: Limited

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