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QUESTION 3: What is the role of intraoperative histology examination in the evaluation of an elbow arthroplasty for periprosthetic joint infection (PJI)?

RECOMMENDATION: Intraoperative histology for the evaluation of elbow PJI in isolation is not sufficient for the diagnosis of infection.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 92%, Disagree: 4%, Abstain: 4% (Super Majority, Strong Consensus)

RATIONALE

There are a number of studies related to the use of histologic examination for the diagnosis of PJI in hip and knee arthroplasty [1–4]. The available literature suggests that although histology cannot be used as a standalone test for the diagnosis of PJI, it does provide valuable information in the work-up of patients with suspected PJI (in fact, the MusculoSkeletal Infection Society (MSIS) workgroup included histological examination as a criterion for its diagnosis) [5,6]. The controversy that exists is what constitutes a positive histology [4]. Currently, based on the MSIS criteria, the presence of more than five neutrophils in more than five high-power fields is indicative of positive histology. The latter is based on examination of periarticular tissues for the diagnosis of infection and the role of histology during reimplantation to assess the presence of persistence infection is less well studied.

The role of histology in the workup of patients with painful total elbow arthroplasty (TEA) is less well known. Our extensive search of the literature revealed only one study that specifically examines the subject of histology in the diagnosis of infected TEA [7]. This study was a retrospective analysis of 208 patients undergoing revision TEA. The sensitivity of histology in the diagnosis of PJI was 51.3%, with a specificity of 93.1%. The positive predictive value of histological examination was 60.6% with a negative predictive value of 90.2%.

Among the cohort, 65 (31%) did not have either histology or cultures taken at the time of revision, which raises the question of selection bias. The sampling sites of the histologic specimens were not standardized and were performed at the discretion of surgeon, averaging less than two samples per patient. Finally, the gold standard to define infection was the presence of a single positive intraoperative culture. Within these limitations, the data suggests that when intraoperative histology demonstrates acute inflammation (according to the criteria of Mirra et al. [8]) the probability of infection is high, but the absence of the acute inflammation does not rule out infection.

Based on the literature (mostly from hip and knee arthroplasty) and our understanding of the challenges that exist in the work-up of patients with painful TEA, we recommend that histological examination of tissues from around the elbow be part of the workup of patients undergoing revision TEA.

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QUESTION 4: Is there a role for sonication of retrieved implants from an elbow in the diagnosis of a possible periprosthetic joint infection (PJI)?

RECOMMENDATION: At present, there is no evidence to support the routine use of sonication of removed elbow implants to improve the diagnostic accuracy or yield of cultures in the diagnosis of elbow PJI.

LEVEL OF EVIDENCE: Limited

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

RATIONALE

Sonication involves the application of high-frequency ultrasound (approximately 40 kHz) to a retrieved implant in an ultrasound "bath" of appropriate fluid medium. The liquid medium from the bath is then collected and centrifuged, and these aliquots are