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QUESTION 6: Is there a role for sonication of retrieved shoulder implants in the diagnosis of shoulder periprosthetic joint infection (PJI)?

RECOMMENDATION: There is currently no evidence to support routine sonication of the retrieved shoulder implant in the diagnosis of shoulder PJI.

LEVEL OF EVIDENCE: Limited

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

RATIONALE

PubMed and Embase were searched from 1980 to January 2018 to identify studies evaluating the role of sonication of retrieved implants in shoulder PJI. A secondary search of the references of included studies was also conducted. Prior work has evaluated the role of sonication of retrieved implants in hip and knee arthroplasty. In some of these scenarios, sonication of implants has been used to improve PJI culture sensitivity via disruption of bacterial biofilms (see Hip and Knee, Section 2.4. Pathogen Isolation, Culture Related Matters, Question 6 for full discussion of available literature and recommendations from the International Consensus Meeting (ICM) on musculoskeletal infection) [1–7]. Our search identified two studies that have evaluated the role of implant sonication specifically in the setting of shoulder PJI [3,5].

Piper et al. compared periprosthetic tissue culture and implant sonication followed by sonicate fluid culture from 136 shoulder arthroplasty revisions performed for any indication between 2004 and 2008 [5]. For the sonicate fluid culture, a cutoff of > 20 colony forming units per milliliter was used to exclude contaminants. Thirty-three cases had a definite shoulder PJI and 2 had probable shoulder PJI. The sonicate fluid culture showed slightly better sensitivity for detecting shoulder PJI compared with periprosthetic tissue culture (66.7% vs. 54.5%, $p = 0.046$). There was no difference in specificity (98% vs. 95.1%, $p = 0.26$). The authors concluded that sonication improved the diagnosis of shoulder PJI.

Grosso et al. compared intraoperative tissue and fluid culture to sonication fluid culture for 53 revision total shoulder arthroplasty procedures, of which 25 were identified as shoulder PJI [3]. The sensitivity and specificity of the intraoperative cultures were 96% and 75%, respectively. Using a cutoff of > 20 colony forming units per milliliter, the sonication fluid culture had sensitivity and specificity of 56% and 93%, respectively. While the sensitivity was greater for intraoperative culture than sonication ($p = 0.001$), there was no difference in speci-

ficity ($p = 0.07$). The authors concluded that implant sonication had no benefit in comparison to standard intraoperative cultures for shoulder PJI diagnosis.

The Piper et al. and Grosso et al. studies differed in several ways including the diagnostic criteria for shoulder PJI (2 positive cultures vs. 1 positive culture with other signs of infection), length of culture (7 days vs. 12 to 14 days) and the sonication methods. Overall, the conflicting results of these two limited studies make it unclear whether sonication can improve diagnosis of shoulder PJI.

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QUESTION 7: Should preoperative antibiotics be held until after cultures are obtained in revision shoulder arthroplasty (RSA)?

RECOMMENDATION: Recent studies have shown that preoperative antibiotic prophylaxis does not adversely affect intraoperative culture results. We do not recommend routinely holding preoperative antibiotics in RSA.

LEVEL OF EVIDENCE: Limited

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