The James A. Rand Young Investigator's Award

Are Intraoperative Cultures Necessary if the Aspiration Culture Is Positive? A PJI Concordance Study

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Introduction: It remains unknown if preoperative synovial fluid culture is equivalent to multiple intraoperative tissue cultures for identifying relevant PJI causative organisms. Our aim was to determine the prevalence of discordance between synovial fluid and tissue cultures, polymicrobial infections, and antibiotic susceptibility patterns among discordant cultures.

Methods: A total of 326 patients (169 hips, 157 knees) who met MSIS diagnostic criteria for PJI following primary TJA were identified from a longitudinally maintained PJI database. Inclusion criteria required a positive preoperative intra-articular synovial fluid and intraoperative tissue culture(s) at time of revision surgery. Patients were divided into two categories: concordant and discordant. Discordant cultures were further subcategorized into “similar” and “different” according to antibiotic sensitivities.

Results: Concordance was identified in 274 (84.0%) patients with similar rates among THAs and TKAs (85.2% vs. 82.8%; ⊠2 0.351, p=0.55). Culture discordance occurred in 52 (16%) patients; 34 (10.4%) in the discordant-similar group and 18 (5.6%) in the discordant-different group. THAs had significantly greater proportion of discordant-different results compared to TKAs (52% vs. 18.5%; ⊠2 6.43, p=0.01). MRSA demonstrated the highest concordance rate (95.0%; 20 of 21), while C. acnes demonstrated the lowest (52.9%; 9 of 17). Within the discordant-similar group, S. epidermidis and C. acnes most commonly were co-infecting organisms. In the discordant-different group, Enterococcus species (22.2%) most commonly grew independently from aspiration and became polymicrobial on tissue culture.

Conclusions: The majority of aspiration and tissue cultures in culture positive PJI are concordant, but this concordance varies based on bacterial species. Both aspiration and tissue cultures should be collected for accurate pathogen identification, especially if aspiration culture is positive for low virulent organisms or for enterococci. Conversely, aspiration cultures positive for MRSA have a very high rate of monomicrobial culture concordance, suggesting that clinicians could commence antibiotic therapy preoperatively in these cases.

Notes