Characteristics and Outcomes of Occult Infections in Presumed Aseptic Nonunions: A Retrospective Cohort Study

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Purpose: The primary aims were to determine the rate of unexpected positive cultures in presumed aseptic nonunions compared between 2 historical sampling and culture protocols, and to assess the rate of positive cultures that represent an occult infection. The secondary aims were to assess the antimicrobial sensitivity of microorganisms cultured in occult infections, and to assess healing rates based on culture results.

Methods: A retrospective chart review was performed at a single Level I trauma center from June 2002 to December 2022 to identify adult patients with a presumed aseptic nonunion that were treated with single stage revision surgery by a single surgeon. The primary outcomes were the rate of unexpected positive cultures compared between 2 historical sampling and culture protocols (old: 1-3 samples cultured for 7 days vs new: 5 samples cultured for ≥14 days), and the rate of occult infections. Secondary outcomes were the antimicrobial sensitivity of microorganisms cultured in occult infections and the rate of nonunion healing, compared between culture results based on the new protocol.

Results: 179 patients were included. The overall rate of unexpected positive cultures was 30% (n = 53/179). The rate was 14% (n = 15/105) with the old protocol, and 51% (n = 38/74) with the new protocol (P<0.001). Cutibacterium acnes and coagulase-negative staphylococci were the most common microorganisms. The rate of nonunions with positive cultures that met criteria of occult infection with the new protocol was 19% (n = 14/74), and 71% (n = 15/21) of microorganisms identified in these occult infections were sensitive to clindamycin.

There were no differences in nonunion healing rates based on culture results. Overall, 84% (n = 150/179) of patients healed after the primary revision procedure.

Conclusion: Occult infections are identified in 1 in 5 presumed aseptic nonunions using a standardized sampling and culture protocol with at least 5 deep tissue samples that are incubated for at least 14 days. Empiric antimicrobial treatment with oral clindamycin alone may be sufficient after nonunion revision surgery until culture results are definitive.