

Bloodstream Infections After Burn Injury: Assessing the Wound as a Potential Source Through Microbiologic Concordance

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Background/Objective: Burn injury predisposes patients to bloodstream infection (BSI) through disruption of the skin barrier, persistent systemic inflammation, and prolonged exposure to invasive support devices. Once established, BSIs contribute substantially to morbidity and mortality in burn patients. However, determining the source of bacteremia remains challenging because burn wounds and intravascular devices may represent competing potential sources. Source attribution also carries quality and financial implications, as some BSI classifications may affect reimbursement. Therefore, we evaluated temporally matched, species-level wound–blood culture concordance to assess the burn wound as a plausible source of bacteremia and to inform burn-specific source attribution.

Methods: A cohort of 1,326 index burn admissions to a single ABA-verified burn center from 2018–2025 was analyzed using the Burn Care Quality Platform and electronic medical record data. Bacteremia was defined as a positive blood culture; repeat positive cultures >7 days later were considered new episodes. Species-level concordance was defined as recovery of the same bacterial organism from a wound culture collected within 24 hours of the positive blood culture. Concordance was estimated with exact 95% confidence limits.

Results: Fifty-eight patients developed bacteremia (4.4%), comprising 73 bacteremia episodes. Of these, 33/73 episodes (45.2%) had an eligible wound culture obtained within 24 hours. Species-level wound–blood concordance occurred in 22/33 episodes (66.7%; 95% CI, 48.2–80.0). At the patient level, 40/58 bacteremic patients had at least one wound culture, with 70.0% concordance (95% CI, 53.5–83.4). The median time from admission to first bacteremia was 8 days (IQR 5–15).

Conclusions: Species-level wound–blood concordance occurred in two-thirds of assessable bacteremia episodes, suggesting the primary burn wound may account for a substantial proportion of bloodstream infections otherwise potentially attributed to central line-associated, device-associated, or other nosocomial sources. This calls into question whether existing frameworks adequately factor in the burn wound when classifying BSI origin and highlights the need for further study that incorporates systematic wound culturing, device exposure metrics, and clinical context. Burn patients may thus represent a distinct population in whom BSI source attribution requires careful evaluation, especially when such classifications carry reimbursement implications. Future studies should explore competing sources among non-concordant episodes, including vascular, respiratory, and urinary sources.

Applicability of Research to Practice: Improved wound–blood source attribution may refine interpretation of BSI in burn patients. More accurate attribution may reduce potential misclassification and support more accurate infection surveillance, quality reporting, and prevention strategies.

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