



REVIEW ARTICLE

CIED Infection Management: Gaps between Guidelines and Patients

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The implantation of cardiac implantable electronic devices (CIED) and subsequent CIED infections have risen in recent years; a retrospective study the National Inpatient Sample (NIS) discharge records revealed an 96% increase in CIED implantations between 1996 and 2008; in accordance with the increase in device implantations, this study showed a 210% increase in CIED infections in the same time period [1]. Furthermore, CIED infections are associated with significant morbidity and mortality, with a 30-day mortality rate up to 5-8% [2,3]. Given the substantial burden of CIED infections, cardiology societies have issued multiple recent guidelines addressing the appropriate management of these infections. In both the 2020 European Heart Rhythm Association and the 2017 Heart Rhythm Society guidelines on CIED, CIED removal in cases of definitive CIED infection (class I) and *S. aureus* bacteremia without evidence of CIED infection (class I) over chronic suppressive antibiotic therapy [2,3].

The guideline recommendations are based on expert opinion and a 2012 retrospective study by Le, et al. of 280 patients with staphylococcal CIED infections which demonstrated a seven-fold increase in 30-day mortality with antibiotic therapy without device removal. In this study, 73% of participants had a Charlson comorbidity index of < 3 (low risk), 0% had orthopedic hardware and only 3% had vascular grafts [4]. A 2017 prospective, observational study of 53 patients by Peacock, et al. evaluated CIED infections and clinical predictors of salvage therapy. At 6 months post discharge, 26 patients (49%) were infection-free and thus were classified as having a successful salvage of their device.

The remaining 27 patients (51%) had a failed attempted salvage for the following reasons: persistence or relapse of infection (N = 6), use of chronic suppressive antibiotic therapy (N = 7), or death (N = 14) [5].

Despite the body of evidence and guideline concurrence, a recent study by Portey, et al. reported as many as 80% of suspected or confirmed CIED infections are not managed in accordance with the above guidelines, while the COGNITO study reported 50% of cardiologists and 70% of PCPs did not recommend guideline based therapy [6,7]. However, this same study reported that 23% of PCPS, 91% of electrophysiology-trained (EP) cardiologists, and 29% of non-EP cardiologists were aware of the recommendations [5], demonstrating that the gap between guideline-directed management and real-world clinical practice cannot be wholly explained by lack of awareness of the recommendations. In my clinical experience, I have to believe EP would be consulted in most if not all cases of CIED infection. This discrepancy led to the American Heart Association (AHA) launching the CIED Infection Summit and the National CIED Infection Initiative aimed at increasing awareness of the guidelines [8]. However, I believe this initiative will not change clinical practice as the underlying disconnect may be due to differences in the studied population from clinical trials for which the guidelines are based and real-world patients experiencing CIED infections.

As there is significant overlap between CIED infection risk factors, perioperative risk factors and overall mortality, further studies are needed to understand the

risks and benefits of CIED removal vs chronic suppressive antibiotics in our higher risk patients, thus truly enabling a patient centered, evidence based discussion.

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Conflicts of Interest

None.

Disclosures

None.

Authors Declaration

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