Current Management of Cardiac Implantable Electronic Device Infections: Results of an Infectious Emissions Network Survey

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INTRODUCTION
Cardiac implantable electronic devices (CIEDs) including pacemakers, implantable cardioverter-defibrillators (ICD), and cardiac resynchronization therapy (CRT) devices have revolutionized the management of arrhythmias & heart failure.

In 2009, >235,000 new pacemakers & 130,000 ICDs were implanted in the U.S. while another 100,000 pacemakers & 73,000 ICDs were replaced [1]. CIED infection rates range anywhere from <1% to 4% [1-3]. It is not known how frequently infectious disease specialists encounter CIED infections in clinical practice. Management guidelines are largely driven by expert opinion [4] and little is known of individual practice patterns.

METHODS
A seven-question electronic survey of ID physicians was piloted by infectious disease specialists. While guidelines exist for managing these infections, supporting literature is largely based on expert opinion. We sought to better understand current CIED treatment practices of ID physicians.

RESULTS
The questionnaire was first piloted by infectious disease physicians at 2 large, academic medical centers. The final 7-question questionnaire was electronically distributed to EIN members between January 29, 2015 and February 22, 2015. Descriptive statistics were calculated using SAS 9.4 (Carey, NC).

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STUDY POPULATION
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TABLE 1. Demographics

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>n (%) (n=543)</th>
<th>n (%) (n=360)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>130 (23.9)</td>
<td>120 (22.1)</td>
</tr>
<tr>
<td>5-14</td>
<td>114 (21.2)</td>
<td>124 (22.8)</td>
</tr>
<tr>
<td>14-15</td>
<td>109 (20.1)</td>
<td>126 (22.6)</td>
</tr>
<tr>
<td>≥15</td>
<td>115 (20.9)</td>
<td>≥ 15 (27.6)</td>
</tr>
</tbody>
</table>

TABLE 2. Experience w/ CIED Infections

<table>
<thead>
<tr>
<th>Cases treated during past 2 years</th>
<th>n (%) (n=360)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>166 (46.1)</td>
</tr>
<tr>
<td>5-10</td>
<td>125 (34.7)</td>
</tr>
<tr>
<td>11-25</td>
<td>55 (15.3)</td>
</tr>
<tr>
<td>≥25</td>
<td>14 (3.9)</td>
</tr>
</tbody>
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FIGURE 1. Device Removal by Organism

- S. aureus
- Coag-neg staph
- Enterococcus
- Entere Gran-neg rod
- Pseudomonas

CONCLUSIONS
Despite widespread CIED use, complications requiring the care of an infectious disease specialist remain infrequent.
Most EIN members agree that complete device removal is warranted in the setting of S. aureus bacteremia, pocket infection & lead-associated endocarditis.
Most are likely to treat CIED pts w/ S. aureus bacteremia for longer periods (28-42d) vs. other Gram-positive or Gram-negative organisms.
In the pacemaker-dependent pt w/ a CIED infection, a device holiday of 2-6d is generally preferred.
Long-term chronic suppressive oral antibiotics are commonly being used in lead-associated endocarditis when complete device removal is not possible.

REFERENCES