Use of the TYRX Antibacterial Envelope as Standard of Care for Cardiac Implantable Electronic Device (CIED) Patients is Associated with Significantly Lower Rates of CIED Infection and Lower Costs to the Healthcare System

**DESIGN**

The goal of this single-center retrospective cohort study from University of Pittsburgh Medical Center (UPMC) was to evaluate the clinical and economic impact of using the TYRX Antibacterial Envelope as Standard of Care (SoC).

SoC use-calculations included an average cost to treat an infection, the infection rate percentage from the No-TYRX group (patients who were not implanted with the TYRX Antibacterial Envelope), and the acquisition cost of the TYRX Envelopes. The TYRX Antibacterial Envelope cost was $795.00 per unit for pacemakers (PMs) and $895.00 per unit for Implantable Cardioverter Defibrillators (ICDs).

**METHODS**

Every patient undergoing a CIED implantation in the electrophysiology (EP) laboratory was included in this study (n=1,476). In the 2 years prior to the study, the infection rate in this EP laboratory was between 1% and 2% of procedures. In this study, some implanters (surgeons who implanted the device) used the TYRX Antibacterial Envelope in every patient as a SoC, termed “Yes-TYRX” group (n=365), whereas other implanters did not use it at all, termed “No-TYRX” group (N=1,111).

**RESULTS**

- 1.7% CIED Infection rate without the TYRX Envelope at 6 months (19 infections, p=0.06)
- 1.9% CIED Infection rate without the TYRX Envelope at 12 months (20 infections, p=0.023)
- 0 CIED Infection rate with the TYRX Envelope at 6 and 12 months (0 infections, p=0.006)

**CONCLUSIONS**

Use of the TYRX Antibacterial Envelope as SoC was associated with a significantly lower rate of CIED Infections. CIED Infections result in significant patient and healthcare system burden, high costs, long length of stays, and higher mortality rates.

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**Financial Implications of Use of TYRX Envelope as a SoC**

<table>
<thead>
<tr>
<th>n</th>
<th>INFECTION RATE (N)</th>
<th>INFECTION CARE COST**</th>
<th>DIFFERENTIAL COST***</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Patients</td>
<td>365</td>
<td>1.71% (6.20)</td>
<td>$342,854</td>
</tr>
<tr>
<td>Preoperative Risk Score &lt; 3</td>
<td>179</td>
<td>1.03% (1.85)</td>
<td>$101,708</td>
</tr>
<tr>
<td>Preoperative Risk Score ≥ 3</td>
<td>186</td>
<td>2.45% (4.55)</td>
<td>$250,115</td>
</tr>
<tr>
<td>Early Reintervention</td>
<td>12</td>
<td>6.67% (0.80)</td>
<td>$43,941</td>
</tr>
</tbody>
</table>

Hypothetical projection assumes that Yes-TYRX patients experience the same infection rate as actually observed among No-TYRX patients.

**Infection Care Cost = Number Infected X Cost of Infection; ***Differential Cost = Infection Care Cost minus Cost of TYRX Envelope as a SoC

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2. Study performed utilizing the TYRX™ Non-Absorbable Antibacterial Envelope.
3. The 12-month mortality rates were not published in the paper, but the senior author provided permission for our use.