Reduced CIED Infections with an Antibacterial Envelope: Microbiologic Analysis of the WRAP-IT Study

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**Introduction:** Cardiovascular implantable electronic device (CIED) infections are associated with significant morbidity, mortality, and cost. There is limited evidence on antibiotic prophylactic strategies to prevent CIED infection. Recently, the TYRX Envelope, which elutes a combination of rifampin and minocycline for a minimum of 7 days, was shown to significantly reduce major CIED infections in the WRAP-IT trial. We sought to characterize the pathogens among patients who experienced an infection in the current era.

**Methods:** All patients undergoing CIED replacement, upgrade, revision, or de novo cardiac resynchronization therapy (CRT-D) received standard of care antibiotic prophylaxis and were randomized 1:1 to receive TYRX or not. The primary endpoint was major CIED infection within 12 months of the procedure. Major infection was defined as an infection resulting in (1) system extraction or revision, (2) long-term suppressive antibiotic therapy, or (3) death. Data were analyzed using the Cox proportional hazards regression model.

**Result:** A total of 6,983 patients were randomized worldwide with 3,495 randomized to receive an envelope and 3,488 randomized to the control. At 12 months, 25 major infections (0.7%) were observed in the envelope group and 42 major infections (1.2%) in the control group, resulting in a 40% reduction of major infections (HR: 0.60, 95% CI: 0.36-0.98, $P=0.04$). Of 63 infections assayed, causative pathogens were identified in 36 infections whereas cultures were negative in 27 cases. Staphylococcus species (n=22) were the predominate pathogens and a 53% reduction was observed with the use of TYRX (Figure). Moreover, there was only 1 CIED pocket infection with Staphylococcus species in the envelope group compared to 14 pocket infections in the control group. A comparison of timing of infection in the envelope group showed the presentation of 11 endocarditis/bacteremia infections at 103±84 days compared to 14 pocket infections presenting at 70±78 days from the procedure.

**Conclusion:** In this large randomized trial, the use of the TYRX Envelope containing rifampin and minocycline resulted in a significant reduction of major CIED infections and was effective against staphylococcal species, which are the predominant cause of pocket infections.