Cardiac Implantable Electronic Device Infection in Cardiac Referral Center in Thailand

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Background: Incidence of cardiac implantable electronic device (CIED) infection is rising compared with the rate of CIED insertion. In western countries, majority of CIED infection are caused by methicillin-resistance staphylococci. However, microbiology and risk factors of CIED infection in Thailand has never been studied.

Objective: To identify microbiology and risk factors of CIED infection.

Methods: A retrospective cohort study was conducted at Ramathibodi Hospital in Bangkok, Thailand to investigate causative organisms of CIED infection in patients referred for generator removal and lead extraction between October 2002 and December 2017. All patients with CIED infection were included. A 1:1 matched case-controlled study was performed to determine risk factors associated with CIED infection.

Results: During the studied period, there were 43 episodes of CIED infection. Median (interquartile range) age of patients with CIED infection was 70.0 (53.4-78.8) years, and 34 (79.1%) were male. 25 (58.1%), 15 (34.9%), 2 (4.7%), and 1 (2.3%) were permanent pacemaker, automatic implantable cardioverter defibrillator, cardio-resynchronization therapy pacemaker, and cardio-resynchronization therapy defibrillator-related infection, respectively. Gram-positive bacteria were the most common isolated organism (18 episodes, 41.9%). These included coagulase-negative staphylococci and Staphylococcus aureus in 23.3%, and 16.3% of episodes, respectively. Gram-negative bacilli were isolated in 6 episodes (14.0%). Pseudomonas aeruginosa is most common Gram-negative organism. 7.0% were polymicrobial and 37.2% were culture negative. 51.2% of the episodes underwent complete device removal. Demographic characteristics including age, gender, body weight, and underlying diseases were not different between patients with and without CIED infection (p>0.05). Compared to those without CIED infection, patients with CIED infection were associated with using narrow spectrum Gram-positive coverage preoperative antibiotic (0.0% vs 22.2%; p=0.027) and previous CIED infection (0.0% vs 48.4%; p<0.001).

Conclusion: Microbiology of CIED infection in Thailand is similar to western countries, albeit higher Gram-negative organisms. Preoperative antibiotic spectrum should cover both Gram-positive and Gram-negative organisms. In addition to vancomycin, antibiotic with Gram-negative coverage should be used as an empirical antibiotic for CIED infection in Thailand. Multicenter study of CIED infection in Thailand should be performed.

Keywords: Antibiotic, Cardiac implantable electronic device infection, Microbiology