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Editorial

Small but Persistent Infection of Cardiac Implantable Electronic Devices (CIED)

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▸ See the article "The Burden and Risk Factors for Infection of Transvenous Cardiovascular Implantable Electronic Device: a Nationwide Cohort Study" in volume 49 on page 742.

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Infection of cardiac implantable electronic devices (CIEDs) is a disease that can pose a great risk.[1] Since it is usually not cured by antibiotics, principle of treatment is to remove the entire system implanted into the body.[2] The degree of difficulty of CIED removal depends on the indwelling time after CIED implantation and the type of CIED — high voltage lead or low voltage lead, active or passive fixation. In particular, it is very difficult to remove the lead after one year of implantation. Special tools and procedures are needed and surgical removal may be necessary in some cases. In order to prevent these infections, it is very important to manage thorough adequate skin preparation, strict aseptic technique and careful surgical technique and a thorough quality control program.

The infection rate of CIED is known to be around 1% to 2% among reported observational and registry studies,[3][4] which were performed in the Western countries, but there is not much data in Korea. This study[5] confirms the infection rate of CIED devices in Korea at a large scale using the National Health Insurance or Medical Aid data. It also showed that the replacement of CIED significantly increased the risk of CIED infection, which was similar to the previous report.[6] The incidence of CIED infection in Korea was 1.95 per 100 person-years. The incidence of infection after CIED replacement was 3.97 per 100 person-years in replacement, compared with 1.4 per 100 person-years in first implantation. According to this study,[5] the rate of infection in the replacement was high within 30 days after the procedure, and after 30 days, it occurred at the same frequency as the first implantation, suggesting that the infection increased in relation to the replacement procedure itself. Therefore, efforts have been made to reduce the infection rate at replacement.

To prevent CIED infection, prophylactic antibiotics, hematoma prevention, capsulectomy, pocket drainage, and antibiotic envelope have been utilized. Incremental antibiotics did not reduce CIED infection.[7] In particular, the revision wound is a reaction to a foreign object over a long period of time, resulting in a complex multistage inflammation that leads to fibrosis, which becomes an important source of bacterial proliferation.[8] Capsulectomy can be considered to prevent this. However, capsulectomy can increase the risk of inflammation by increasing the incidence of hematoma. Comparisons were made in randomized studies, but no clear results were obtained.[9] Recently, there has been use of an antibiotic envelope.[10] Adjunctive use of an antibacterial envelope resulted in a significant lower incidence of major CIED infection.[11]

CIED infection continues to be small but persistent for many years despite advances in technology. More research and efforts are needed in the future to minimize/decrease CIED infection, especially in CIED replacement.

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