

Editorial



Cardiac Implantable Electronic Device Therapy in Korea: Increasing but Still Quite Low

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OPEN ACCESS

Received: Apr 30, 2019

Accepted: May 7, 2019

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Conflict of Interest

The author has no financial conflicts of interest.

The contents of the report are the author's own views and do not necessarily reflect the views of the *Korean Circulation Journal*.

► See the article “Temporal Trends of Cardiac Implantable Electronic Device Implantations: a Nationwide Population-based Study” in volume 49 on page 841.

Cardiac implantable electronic devices (CIEDs) including pacemakers (PMs) for bradyarrhythmia, implantable cardioverter defibrillators (ICDs) for tachyarrhythmia, and cardiac resynchronization therapy (CRT) for improvement of heart failure, have developed rapidly over the last decades. The early PMs which required a thoracotomy for implantation had a fixed output and rate, and longevity was only a few months. However modern CIEDs are small enough to be implanted through local anesthesia, have an expected longevity of more than 10 years, and can periodically adjust their output and rate. Also, magnetic resonance imaging (MRI), which was contraindicated in patients with CIED, became possible by the development of an MRI-compatible CIED. Although the incidence of CIED therapy has increased steadily with the development of CIED technologies,^{1,2)} most studies have been performed in the Western countries or Japan, and the trend of CIED therapy in Korea has not been studied.

In a nationwide population-based study published in the current issue of this journal, temporal trends of CIED therapy in Korea between 2009 and 2016 were evaluated and a total of 35,421 CIED implantations were performed during the study period.³⁾ Compared to 2009, the number of new implantation of PMs, ICDs, and CRT devices increased by 2.0 (1,977 to 3,910), 3.6 (230 to 822), and 4.9 (44 to 217) times in 2016, respectively. The mean age of patients with CIED and the prevalence of comorbidities increased with time.

This study shows that the number of CIED implantations increased rapidly during the study period, especially in elderly patients. The increase of CIED implantation in Korea can be explained for several reasons. The number of PM implantations is closely related to the number of patients with bradyarrhythmia. Although bradyarrhythmia can be caused by some underlying diseases such as myocardial ischemia, myocardial fibrosis, and sarcoidosis, aging is usually the most important cause. In recent years, the population of Korea has rapidly aged, and older patients with bradyarrhythmia have also increased. In the past, patients and physicians rejected the invasive procedures such as PM implantation in these elderly patients. However, since the safety of PM implantation has been well known recently, PM implantation has been actively performed in elderly patients with symptomatic bradyarrhythmia. With regards to ICD, the importance of cardiopulmonary resuscitation education is emphasized, leading to a steady increase in the survival rate of out-of-hospital cardiac arrest patients, and

therefore, the number of ICD implantation for secondary prevention has increased. Recently, Korean reimbursement criteria of ICD therapy for primary prevention has been expanded based on accumulated data on the effectiveness and safety of ICD therapy in patients at a high risk of sudden cardiac arrest, affecting the increase in the number of ICD therapy.

However, the CIED therapy rate remains low compared to other countries. In the case of PMs, the implantation rate of Korea was about 5%–20% of those of Japan and western Europe countries.⁴⁾⁵⁾ As mentioned previously, the criteria for CIED therapy has expanded over the last few decades, but almost all medical practices in Korea are strictly controlled by a government-controlled medical insurance coverage system. Therefore, some patients whose physicians believe that CIED therapy is needed do not meet the medical insurance criteria for CIED therapy and do not receive appropriate therapy. In addition, PM implantation is simpler and safer than previously; however, some clinicians are reluctant to implant PMs in some very elderly patients with poor underlying health due to the risks of the procedure itself or potential post-procedural difficulties in management. If a leadless-PM that is already available in many countries is introduced into Korea, PM therapy will be performed in a significant number of these patients. The ICD implantation rates of Japan and western Europe were 7–37 times higher than that of Korea. The risk of all-cause death and sudden cardiac death in Korean heart failure patients who met the criteria of ICD implantation for primary prevention were not lower than those of patients in the Multicenter Automatic Defibrillator Implantation Trial II and Defibrillators in Non-Ischemic Cardiomyopathy Treatment Evaluation standard therapy groups.⁶⁾ However, most studies on the effectiveness of ICD for primary prevention were performed in Western countries. Although several previous Korean ICD studies have shown the efficacy of ICD for primary prevention, the number of patients was small despite the long inclusion period⁷⁾⁸⁾; therefore, large-scale national-wide studies are needed to demonstrate the effectiveness and safety of ICD therapy for primary prevention in Korean patients. If physicians are more confident in the effectiveness and safety of ICD therapy based on the results of large-scale studies, the incidence of ICD therapy is expected to increase gradually.

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