ICD for Patients With Severe Renal Dysfunction
The Balance of Risk and Benefit
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Cardiovascular disease is accompanied by various complications presenting in numerous ways. Among these, renal dysfunction has the most marked impact on the course of cardiovascular disease. For instance, impaired renal function is a strong predictor of mortality in advanced heart failure, and the presence of renal dysfunction accelerates the progression of vascular disorders. The same may be said of arrhythmic conditions because most arrhythmic problems are generally based on heart failure or ischemic heart disease. Furthermore, issues derived from impairment of kidney function, such as electrolyte abnormalities and effects of drug metabolism, directly affect the course of arrhythmia. Therefore, the risk of sudden cardiac death increases by a hazard ratio of 1.11 for every 10 mL/min decline in glomerular filtration rate in patients with ischemic heart disease.

An implantable cardioverter defibrillator (ICD) is a device that can detect and terminate potentially life-threatening tachyarrhythmias via defibrillation to prevent sudden cardiac death. However, the efficacy of this therapy differs in patients depending on the existence of various comorbidities and an ICD is, therefore, considered to be ineffective and inappropriate for most patients with advanced heart disease. In this current issue of International Heart Journal, Fu, et al have summarized clinical trials investigating the efficacy of ICD among patients in all stages of chronic kidney disease (CKD). They demonstrated that patients with CKD stage 3 would benefit from treatments with ICD implantation compared with those with CKD stage 3 not receiving treatments with ICDs, whereas there was no significant improvement in all-cause mortality in patients with CKD stages 4 or 5. The most novel point in their study was the analysis of the efficacy of ICD based on a detailed classification of each stage of CKD. An intriguing finding was that the efficacy of ICD differed slightly in each stage of CKD. The most critical point on this issue is the balance between efficacy of ICD implantation and risk of complications associated with ICD implantation. The results suggested that the risk of implantation would overcome the benefit of ICD implantation in patients with severely impaired renal function. Patients with CKD suffer from more device-related complications than patients without kidney disease, and the risk was proportionately increased with the severity of renal dysfunction. In addition, the presence of dialysis added a different burden because infection risk is further increased during dialysis, which is liable to induce transient bacteremia. Furthermore, the efficacy of an ICD might be reduced because of increasing defibrillation thresholds.

First, the presence of renal dysfunction significantly aggravated the course of various diseases, and this may offset the comparatively minute benefits expected by implantation of an ICD. The result that ICD efficacy was divergent among various previous reports suggested that a concise evaluation of the risk and benefit of an ICD is required to determine appropriate indications for the implantation of an ICD. In such cases, complications other than renal dysfunction, such as the presence of diabetes, history of hospitalization because of heart failure, lung disease, low serum sodium, and atrial fibrillation, may also have a marked influence on the burden of renal dysfunction. Severe renal dysfunction, such as that requiring dialysis, adds the most marked risk to the cardiovascular problem; therefore, specific therapeutic consideration for each state of renal dysfunction should be individualized for the most appropriate selection of device therapy. In addition, in the presence of renal dysfunction, we need to evaluate comorbidities, such as heart failure, to predict the accurate risk of each therapeutic strategy and to select appropriate interventions in these patients with highly complicated risk.

Disclosure

Conflicts of interest: The author declares there are no conflicts of interest.

References


