Cardiac Resynchronization Therapy – Is There Any Racial Difference? –

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Heart failure is the commonest cardiovascular disease that causes high morbidity and mortality. In a selected group of patients with evidence of electrical dyssynchrony, cardiac resynchronization therapy plus defibrillator backup (CRT-D) was established as an important adjunctive therapy. Numerous landmark trials demonstrated that such therapy improved clinical symptoms and quality of life, reduced heart failure hospitalization and reduced mortality.¹ In view of these beneficial results, CRT-D was classified as a Class I indication in both American² and European³ heart failure device therapy guidelines. However, most of the studies focused mainly on Western populations and it is interesting to know if CRT has a similar beneficial effect in Asian populations.

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Some previous studies that mainly recruited Chinese patients intensively investigated the effect of CRT. One study involving 25 patients who fulfilled the criteria for CRT-D implantation, assessed them serially up to 3 months after biventricular pacing and after pacing was withheld for 4 weeks.⁴ The results of the study showed significant improvements in ejection fraction (EF) and myocardial performance after pacing for 3 months and these beneficial effects were pacing-dependent. A subsequent study involved 42 patients who were eligible for CRT-D implantation and their serial N-terminal pro-B type natriuretic peptide (NT-proBNP) levels were measured at baseline and at 3 months after device implantation.⁵ There was a significant reduction in NT-proBNP levels at 3 months after CRT and the reduction of NT-proBNP correlated with the change in left ventricular EF and with improvement in exercise capacity. Furthermore, a study of 83 patients with CRT-D implantation demonstrated a significant reduction in both early and late systolic mitral regurgitation, which contributed to left ventricular reverse remodeling.⁶

The beneficial effect of an implantable cardioverter defibrillator (ICD) has also been studied in 70 consecutive Chinese patients who satisfied MADIT-II criteria but did not undergo ICD implantation.⁷ The 2-year sudden cardiac death risk was comparable with that of the MADIT-II conventional group but higher than in the MADIT-II defibrillator group. The authors concluded that Chinese patients should receive a similar beneficial effect from ICD. In conclusion, CRT-D was convincingly shown to have a beneficial effect in Asian populations

as well as Western populations.

In this issue of the Journal, the investigators of The Clinical Efficacy of Cardiac Resynchronization Therapy with an Implantable Defibrillator in a Japanese Population: Result of the MIRACLE-ICD Outcome Measured in Japanese Indication (MOMIJI) Study provide additional evidence of the beneficial effect of CRT-D in Japanese patients.⁸ By comparing historical data from the Multicenter InSync ICD Randomized Clinical Evaluation (MIRACLE-ICD) general phase populations, the study demonstrated that a Japanese population fulfilling the criteria for undergoing CRT-D implantation had a similar symptomatic improvement as Western populations. The strength of the current study is the involvement of many centers and the hospitalization data were adjudicated by a American heart failure physician to reduce the potential bias in comparison between the current study and the MIRACLE-ICD studies.

Although this study illustrated the efficacy of CRT-D in Japanese patients, there were several limitations. First, the sample size was small and the rate of utilization of medical therapy was suboptimal. Only 72.5% of the studied patients received beta-blockers. Previous study has suggested that suboptimal medical therapy might reduce the beneficial effect of CRT.⁹ Also, the etiology of heart failure in this patient group was mainly non-ischemic dilated cardiomyopathy and such patients have been shown to respond better than those with ischemic cardiomyopathy, so this might introduce potential bias.¹⁰

The echocardiographic data were incomplete in this study, although it was a secondary endpoint. Only 66% of the patients in the current study had echocardiographic data. It is unknown if improvement of EF and reduction of chamber size correlated with the improvement in clinical symptoms in this study. Also, there was no preprocedural dyssynchrony assessment. A previous study by another Japanese group showed that an echocardiographic dyssynchrony assessment was unable to predict responders among Japanese patients.¹¹ The role of echocardiographic-guided CRT patient selection is still controversial and it would be of interest if this group of investigators could provide more information about this issue.

The results of the MIRACLE-ICD general phase study were not in fact released and it was not a randomized trial. The current study was not a randomized study either and did not involve control group. As a result, the potential placebo effect in this study population cannot be underestimated. Also, this study was not powered to detect mortality difference and fur-

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ther study is essential to determine if Japanese patients received a comparable mortality benefit with CRT-D. Such mortality data are important for justification of the usage of these expensive medical devices.

Momomura and colleagues have made an important contribution to the understanding of the efficacy of CRT-D in the Japanese population. We look forward to seeing their long-term results from a larger sample with more comprehensive echocardiographic data. By analyzing those results, hopefully we will be able to identify any racial differences and achieve better response rates in the future.

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