Estimation of possible candidates for ivabradine in rural Japan and investigation of their clinical characteristics

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Background: In Japan, ivabradine is indicated in patients with heart failure (HF) with sinus rhythm and a resting heart rate (HR) ≥75/min under standard treatment. Particularly, it is effective for HF with reduced left ventricular ejection fraction (LVEF). However, elderly people have a higher incidence of atrial fibrillation than young people, and their sinus node function is further deteriorated, resulting in a lower intrinsic HR. In addition, Japan is an ultra-aging society, especially in the countryside; therefore, the target patients for ivabradine may be limited in these regions.

Purpose: We sought to estimate the possible candidates for ivabradine and investigate their clinical characteristics in our hospital located in rural Japan.

Method and results: We retrospectively studied 14733 consecutive patients who were suspected heart disease who underwent echocardiography between January 2006 and October 2018 in Kitaishikai Hospital located in Ozu city (Proportion of the population aged ≥65 years: 34%, in 2015) and did not take ivabradine treatment. Of these, 187 patients with hemodynamically stable condition whose E/A ratio was measured and met the criteria of LVEF <40% and HR ≥75 /min were confirmed. Of these, 153 patients reached HR <75 /min with additional intensive medication within one year after the index echocardiography (Controlled group; mean HR: 82 to 62/min). The remaining 34 patients with uncontrolled HR (Uncontrolled group; mean HR: 84 to 82/min) were considered possible candidates for ivabradine (34/14733: 0.23%, 2.6 patients per year; median age, 74 years; male, 56%; median LVEF, 32%; ischemic cardiomyopathy, 53%). In the comparison of clinical and echocardiographic parameters in these two groups, Uncontrolled group had a significantly smaller left ventricular diastolic volume index (71 [59–85] vs 82 [66–109] /ml/m^2, p=0.02), left ventricular systolic volume index (50 [39–59] vs 59 [42–80] / ml/m^2, p=0.04), stroke volume index (22 [18–26] vs 26 [20–32] /ml/m^2, p=0.02), left atrial volume index (47 [40–64] vs 59 [45–71] /ml/m^2, p=0.02), and more hemodialysis (12 vs 3%, p=0.04) than Controlled group. However, the discrimination ability of these parameters for identifying Uncontrolled group was modest (Figure).

Conclusion: In rural Japan, possible candidates for ivabradine may be rare, so daily attention should be paid. Patients with reduced ejection fraction, small left ventricle, and hemodialysis may be the possible targets for this therapy.

Discriminative ability
for identifying possible candidates for ivabradine