

Clinical profile and prognosis of hospitalized patients with congestive heart failure in Isehara, Japan

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Since the clinical profile and prognosis of heart failure depending on time of the study performed, regional characteristics of background population and different race, we attempted to evaluate the prognosis of symptoms and life expectancy of Japanese patients with heart failure. We evaluated the clinical profiles and prognoses of 1,015 consecutive patients with congestive heart failure (CHF) for whom hospitalization was required.

A total of 1,015 consecutive CHF patients (584 males and 431 females) were enrolled in this study, however the total number of events investigated was 1,409. Of these patients, survival was confirmed in 413 patients, death was confirmed in 299 patients, and the prognoses of 303 patients remained unknown due to transfer to other hospitals or for some other reasons. The mean age on admission was 68.4 ± 14.9 years. In both males and females, the peak age at the onset of CHF was in the seventies, and for patients in their eighties, the number of female patients with CHF was larger than that of male patients. Major underlying heart diseases consisted of ischemic heart disease (34%), valvular heart disease (22%), dilated cardiomyopathy (11%), and hypertension (10%). Most CHF patients who had dilated cardiomyopathy as an underlying disease were hospitalized several times, and 45% of them were hospitalized 3 times or more. The life expectancy of patients with CHF caused by ischemic heart disease was the poorest, and their 5-year and 10-year survival rates were 55% and 38%, respectively. Similarly, 5-year and 10-year survival rates of patients with CHF caused by valvular heart disease, hypertension, and dilated cardiomyopathy were 62% and 44%, 58% and 53%, and 70% and 65%, respectively. In 299 deceased patients, the mean age at death was 72.2 ± 13.9 years. In all these deceased patients, direct causes of death were sudden death (16.1%), CHF (42.2%), others (31.4%), and unknown (10.4%). The frequency of sudden death was highest (25%) in patients with CHF caused by dilated cardiomyopathy, followed by those with CHF caused by valvular heart disease (18%) and those with CHF caused by ischemic heart disease (17.5%). In addition, the frequency of death from CHF was highest (60%) in those with CHF caused by dilated cardiomyopathy, followed by those with CHF caused by ischemic heart disease (49.2%).

Key words: congestive heart failure, prognosis, underlying heart diseases, epidemiology

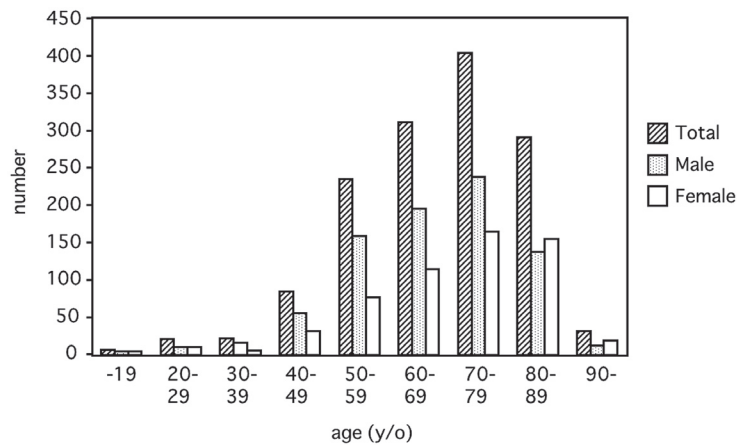
INTRODUCTION

The clinical profile and prognosis of heart failure differ depending on time, region, and race. Recently, it has been reported that in the United States there are approximately 5 million patients with heart failure, and that approximately 0.5 million people are newly diagnosed with heart failure every year [1].

In Japan, the number of patients with heart failure is predicted to be at least 1 million, however, the exact number of such patients remains unclear because few epidemiological studies of heart failure have been conducted to date. During the evaluation of symptoms, prognoses, and life expectancy of heart failure, it is necessary to take account of race, as well as to clarify underlying heart diseases.

Table 1 Clinical characteristics of patients

Total number of patients	1015
Male	584
Female	431
Age	68.4±14.9y/o
Number of survivor	413
Number of Deceased	299
Number of Unknown	303

**Fig. 1** Age on admission in patients with CHF

In this study, we evaluated clinical profiles and prognoses of congestive heart failure (CHF) in 1,015 consecutive Japanese patients who were hospitalized in our hospital.

METHODS

The subjects were 1,015 consecutive Japanese patients who were diagnosed with CHF and hospitalized in Tokai University Hospital between January 1, 1990 and December 31, 2001. The diagnosis of CHF was made based on the diagnostic criteria proposed by the Framingham Study [2], and the gender and age of patients, underlying heart diseases that caused CHF, frequency of hospitalization, direct causes of death, and survival periods were evaluated. All values were expressed as the mean \pm standard deviation, and statistical analysis was performed by comparing the mean value using unpaired t-test. Survival rates were compared using log-rank test.

RESULTS

Table 1 shows the details of the clinical characteristics of the patients with CHF. A total of 1,015 consecutive patients (584 males and 431 females) were enrolled in this study. Since there were some patients who were hospitalized several times, the total number of events investigated was 1,409. Of these patients, survival was confirmed in 413 patients, death was confirmed in 299 patients, and the prognoses of 303 patients remained unclear due to transfer to other hospitals or for some other reasons. The mean age on admission was 68.4 ± 14.9 years. When the mean age on admission was classified by major underlying heart diseases, it was lowest (58.1 ± 14.1 years) in patients with CHF caused by dilated cardiomyopathy compared to those with CHF caused by ischemic heart disease, valvular heart disease, or hypertension. Figure 1 shows the distribution of age on admission in CHF patients. In both males and females, the peak age at the onset

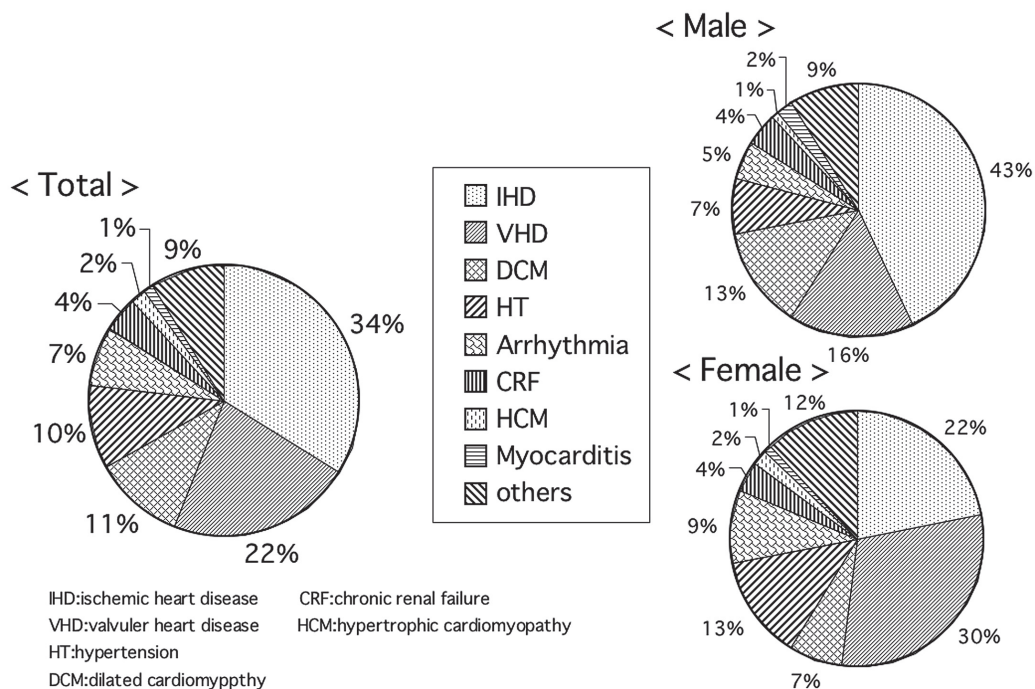


Fig. 2 Underlying diseases in patients with CHF

of CHF was in the seventies, and the number of female patients in their eighties was larger than that of males. Figure 2 shows the details of underlying heart diseases in CHF patients. The number of patients with CHF caused by ischemic heart disease was largest (34%), followed by those with CHF caused by valvular heart disease (22%), those with CHF caused by dilated cardiomyopathy (11%), and those with CHF caused by hypertension (10%). In males, the number of patients with CHF caused by ischemic heart disease or dilated cardiomyopathy was larger than the number with CHF caused by valvular heart disease or hypertension. Subsequently, we evaluated the frequency of hospitalization, survival periods, and mortality in CHF patients classified by 4 major underlying heart diseases (ischemic heart disease, valvular heart disease, dilated cardiomyopathy, and hypertension). Figure 3 shows the frequency of hospitalization classified by major underlying heart diseases. The frequency of hospitalization was higher in patients with CHF caused by dilated cardiomyopathy, and 45% of them were hospitalized 3 times or more. Figure 4 shows survival rates classified by major underlying heart diseases. The life expectancy of patients

with CHF caused by ischemic heart disease was markedly poor, and 5-year and 10-year survival rates were 55% and 38%, respectively. Similarly, 5-year and 10-year survival rates of those with CHF caused by valvular heart disease, hypertension, and dilated cardiomyopathy were 62% and 44%, 58% and 53%, and 70% and 65%, respectively. Table 2 shows the detailed clinical characteristics of CHF patients who were confirmed deceased. A total of 299 patients were deceased, and their mean age at death was 72.2 ± 13.9 years. When the mean age at death was classified by major underlying heart diseases, it was lowest (56.4 ± 15.4 years) in those with CHF caused by dilated cardiomyopathy. However, the mean age at death was highest (80.5 ± 10.8 years) in those with CHF caused by hypertension. Overall, male patients accounted for 61.2% of all deceased patients. When the number of deceased patients was classified by major underlying heart diseases, it was highest (70.8%) in those with CHF caused by ischemic heart disease, followed by those with CHF caused by hypertension (40%, and females were predominant over males). Although 27.4% of all CHF cases were complicated by atrial fibrillation, the

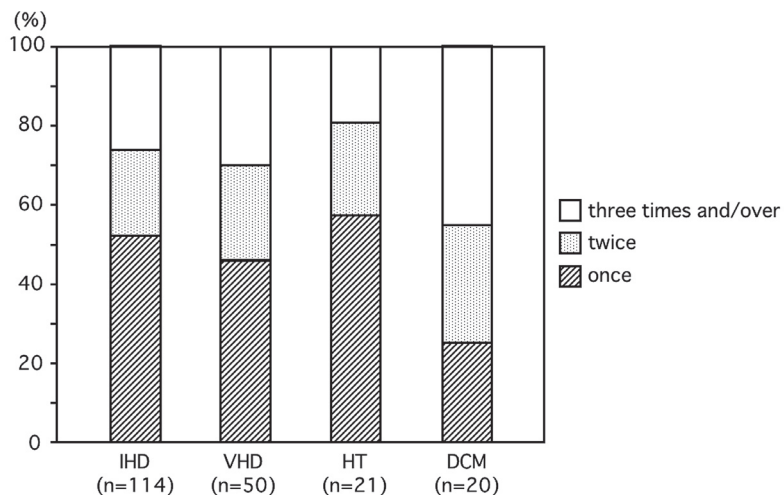


Fig. 3 The repeated admission in comparison and underlying diseases

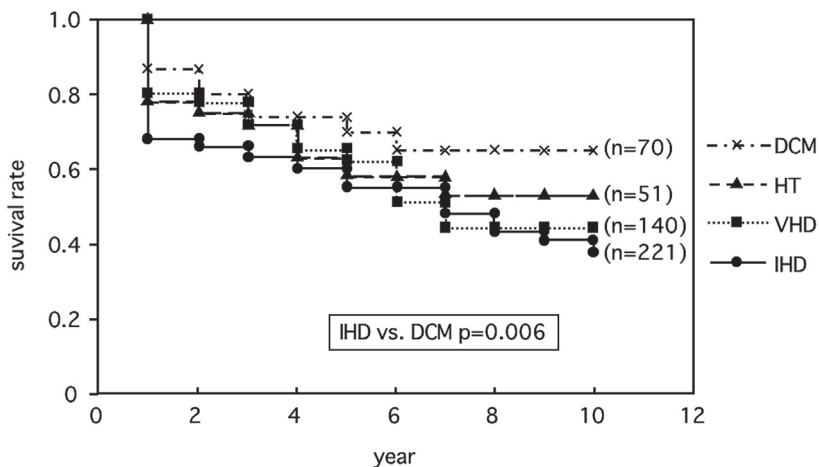


Fig. 4 Survival Rate (log rank analysis)

Table 2 Clinical characteristics of deceased patients

	Total	IHD	VHD	HT	DCM	other
n	299	120	61	25	20	73
Age at deceased(y/o)	72.2 ±13.9	74.1 ±10.0	75.9 ±10.6	80.5 ±10.8	56.4 ±15.4	67.1 ±17.5
Number and percentage of male patients	183 (61.2%)	85 (70.8%)	32 (52.5%)	10 (40%)	15 (65%)	43 (58.9%)
Af	82 (27.4%)	19 (15.3%)	38 (62.3%)	4 (16%)	5 (25%)	16 (21.9%)

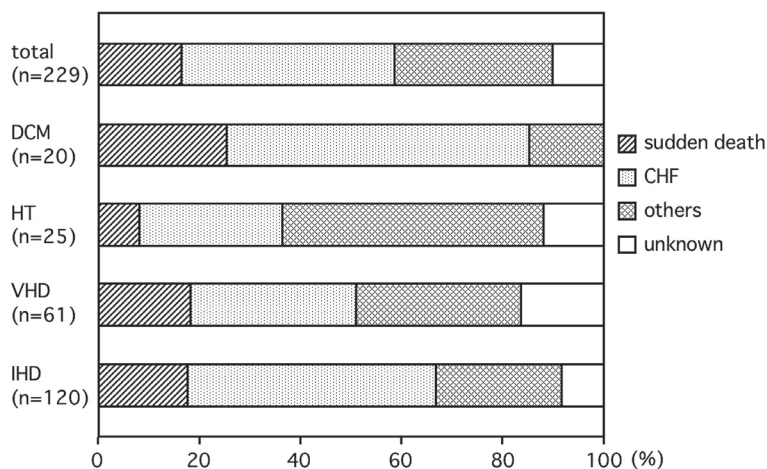


Fig. 5 Direct cause of death in underlying diseases

rate of complication by atrial fibrillation was particularly high (62.3%) in those with CHF caused by valvular heart disease. Figure 5 shows direct causes of death in patients with CHF classified by major underlying heart diseases. Sudden death, including immediate death, was defined as death within 24 hours of the onset of CHF. Death due to the exacerbation of CHF was defined as death from CHF. Death from some causes other than CHF such as cancer, pneumonia, or accident was defined as death from other causes. Death in which the detailed causes remained unclear was defined as death from unknown causes. Sudden death accounted for 16.1% of all deceased cases, and the rate of death from CHF was highest (42.2%), followed by death from other causes (31.4%) and death from unknown causes (10.4%). When causes of death were classified by major underlying heart diseases, the rate of sudden death was highest in patients with CHF caused by dilated cardiomyopathy (25%), followed by those with CHF caused by valvular heart disease (18%), and those with CHF caused by ischemic heart disease (17.5%). In addition, the rate of death from CHF was highest in those with CHF caused by dilated cardiomyopathy (60%), followed by those with CHF caused by ischemic heart disease (49.2%). In contrast to CHF patients with other underlying heart diseases, rates of sudden death and death from CHF were low in those with CHF caused by hypertension, and 48% of these died from non-cardiac causes.

DISCUSSION

Many factors are involved in the prognosis of CHF patients. Basic prognostic factors of CHF are race, gender, age, and underlying heart diseases. The life expectancy of black patients with CHF was reportedly poorer than that of white patients with CHF [10]. In addition, the prognosis of Japanese patients with CHF seems to be better than that of American patients with CHF. Not only race, but also the social and economic backgrounds of patients may also be involved in the prognosis of CHF. In general, the prognosis of male CHF patients is poorer than that of female CHF patients, and the mortality rate doubles with each 10 year increase in the age of patients. Underlying heart diseases are important prognostic factors of CHF. The results of the Framingham Study published in 1971 [2] showed that hypertension was the most common (75%) underlying heart disease of CHF. In our study, however, only 10% of CHF patients had hypertension as an underlying heart disease. Compared with data obtained 30 years or more previously, the recent popularization of hypertension therapy might have contributed to such a decreased percentage of patients with CHF caused by hypertension. However, the types of underlying heart diseases seem to vary with time, and the results of the follow-up Framingham Study over 40 years revealed an increased rate of underlying ischemic heart disease as follows: ischemic heart disease (54%), hypertension (24%), and valvular

heart disease (16%). Recent reports from Western countries [3-7] demonstrated that the frequencies of underlying ischemic and valvular heart diseases were 30-60% and 5-20%, respectively. In Japan, although few studies have reported the frequency of underlying heart diseases, previously reported frequencies were similar to those reported in this study, as follows: ischemic heart disease (32-46%), valvular heart disease (12-28%), dilated cardiomyopathy (15-17%), and hypertensive heart diseases (11-17%) [8, 9]. When the results were compared between Japanese and Western studies, the frequency of underlying ischemic heart disease was highest in both studies, although the rate of Japanese patients with CHF caused by ischemic heart disease was approximately 50% of that of such patients in Western countries. This may be because the incidence of myocardial infarction in Japan is about 1/5 of that in Western countries. In Japan, however, the incidence of dilated cardiomyopathy and valvular heart disease seems to be higher than that in Western countries. In both male and female patients used in this study, the peak age at the onset of CHF was in the seventies, suggesting that the peak age at disease onset is gradually increasing. The number of female patients in their eighties was slightly larger than that of males. In all age groups, the incidence of CHF is slightly higher in males than in females. This is probably because the peak age of female patients at the onset of CHF was 10 years older than that of male patients, and because the frequency of hypertension-induced CHF was higher in elderly females than in males. When the frequency of hospitalization was classified by major underlying heart diseases, 45% of patients with CHF caused by dilated cardiomyopathy were hospitalized 3 times or more, and 30% of those with CHF caused by valvular heart disease and 26.3% of those with CHF caused by ischemic heart disease were also hospitalized repeatedly. In the future, the number of patients with ischemic heart disease may increase, particularly in the elderly, probably resulting in increased number of CHF patients who will be hospitalized repeatedly. When survival rates classified by major underlying heart diseases were compared, the poorest prognosis was found in patients with CHF

caused by ischemic heart disease (5-year and 10-year survival rates were 55% and 38%, respectively). In contrast, 5-year and 10-year survival rates of patients with CHF caused by dilated cardiomyopathy were 70% and 65%, respectively, demonstrating a better prognosis than that of patients with CHF caused by ischemic heart disease. In 1982, The Intractable Diseases Research Group for Idiopathic Cardiomyopathy organized by the Japanese Ministry of Health, Labour, and Welfare reported markedly improved life expectancy of Japanese patients with dilated cardiomyopathy (5-year and 10-year survival rates were 54.3% and 36.0%, respectively). Along with alteration of therapeutic strategies, active and concomitant use of β -blockers [11-13], ACE inhibitors [14, 15], ATI receptor antagonists [16, 17], and spironolactone [18] may contribute to the improvement of life expectancy in CHF patients. Furthermore, we evaluated direct causes of death in CHF patients. Sudden death includes immediate death and death between 1 and 24 hours after the onset of CHF. In this study, sudden death was defined as death within 24 hours of disease onset. The results of multicenter clinical studies of heart failure showed that the frequency of sudden death was 23-50% in Western countries [19], demonstrating the importance of sudden death as a direct cause of death in CHF patients. With regard to sudden death caused by CHF, the evaluation of autopsied cases suggests that acute coronary syndrome is an important factor, and that the frequency of sudden death was slightly higher in patients with CHF caused by ischemic heart disease than in those with CHF caused by dilated cardiomyopathy, although there was no significant difference between the two groups [20]. In our study, the percentage of CHF patients who died suddenly was 16.1%. When the frequency of sudden death was classified by major underlying heart diseases, it was higher in patients with CHF caused by dilated cardiomyopathy (25%) than in those with CHF caused by ischemic heart disease. However, the frequency of sudden death in our patients was lower than that in Western countries. Although this is not shown in the Figures, among CHF patients who died suddenly, rapid changes in the condition were witnessed in 42% of them, 22% of them were found lying on the floor, the condition changed rapidly in the emergency room in

22% of them, and 23% of them died suddenly after admission. Most CHF patients in whom rapid changes in the condition were witnessed or who were found lying on the floor might have died immediately from arrhythmia caused by ventricular fibrillation. Concerning the life expectancy of CHF patients, not only the involvement of underlying heart diseases and cardiac function, but also the involvement of autonomic factors may be important in considering the occurrence of sudden death, suggesting the usefulness of treatment with β -blockers.

CONCLUSIONS

In the present study, more detail clinical profile and prognosis in patients with heart failure were added to the results previously reported by us [21]. We compared the incidence of the underlying diseases associated with heart failure between durations of the former six and the latter six years studied. As a result, a reduction in the incidence of patients with ischemic heart disease and valvular heart disease was observed. On the other hand, the incidence of patients with cardiomyopathy and chronic renal failure tended to increase. These results reflect modification of the underlying disease according to changes of years. Changes in social conditions and improvement of therapeutic strategy may greatly contribute to such developments. However, the details of clinical profiles and prognoses of Japanese patients with CHF remain unclear due to the absence of large-scale epidemiological studies of CHF. Since clinical profiles of CHF markedly differ in many respects between Japan and Western countries, it is questionable to apply the results of clinical studies in Western countries to the treatment of Japanese patients with CHF. Therefore, in the future, large-scale epidemiological studies of CHF in Japan are strongly advised.

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