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Heart Failure 2019: Insights From the National Society of Cardiovascular Journals*

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Abstract: Heart failure (HF) represents one of the biggest problems of the health care systems in the developed countries. The prevalence of HF has the characteristics of pandemic in the European Society of Cardiology (ESC) member countries. The population aging and poorly controlled cardiovascular risk factors such as hypertension, overweight, and diabetes are the most important factors accounting for this situation. The differences in the disease epidemiology, diagnosis and therapy among ESC member countries have been recently well described in the Atlas registry. To further understand the specific features in the ESC countries, the ESC Editors Network created the initiative to present the most important publications from the National Societies Cardiovascular journal (NSCJ) every year. For the year 2019 the decision was made to select articles in the field of HF. The following review presents the selection of such papers. **J Kardiol 2021; 28 (Online): 1–3.**

Key words: heart failure, European Society of Cardiology, national society cardiovascular journals, publications

Abbreviations

adjHR	Adjusted hazard ratio
CAVD	Calcific aortic valve disease
CCU	Coronary care unit
ESC	European Society of Cardiology
GLS	Global longitudinal strain
HF	Heart failure
HfpEF	Heart failure with preserved ejection fraction
HfrEF	Heart failure with reduced ejection fraction
KCCQ	Kansas City Cardiomyopathy Questionnaire
LP(a)	Lipoprotein (a)
LVEF	Left ventricular ejection fraction
MRI	Magnetic resonance imaging
NSC	National societies of cardiology
NSCJ	National society cardiovascular journals
NYHA	New York Heart Association
SGLT2	Sodium-glucose cotransporter-2
SSc	Systemic sclerosis
TAVI	Transcatheter aortic valve implantation
LS	Liver stiffness

Introduction

The prevalence of heart failure (HF) is increasing worldwide as a result of continuous ageing of the population, and unresolved problem of poorly controlled cardiovascular risk factors such as hypertension, overweight, and diabetes [1]. Facing these challenges, continuous progress of chronic HF treatment over the recent decades have been achieved concomitantly [2]. Several disparities have been observed, however, and the increase in prevalence of those risk factors, and HF respectively depends on many factors such as gender, educational and socioeconomic levels in different geographical areas [3]. Differences in prevalence of HF across Europe have been described recently by the Atlas Writing Group of the European Society of Cardiology (ESC) [4]. Adequate HF treatment improves quality of life and survival. However, optimal guideline-directed therapy of HF including angiotensin-converting enzyme inhibitors, angiotensin-receptors blockers, beta-blockers, and mineralocorticoid receptor antagonists is not applied to many patients, because of limiting factors [1, 5]. The improvement in HF treatment needs the specificities in different ESC member countries to be taken into account. This approach is expected to be best achieved and disseminated to cardiologists by the National Society of Cardiovascular Journals (NSCJ). During the ESC Congress 2019 in Paris, the ESC Editors Network started an initiative to boost the dissemination of cardiology science, published in the NSC journals by summarizing in a review paper the evidence gathered in selected areas of knowledge. The ESC Editors Network members decided the first topic of such review to be the publications in the field of HF.

In 2019 evolving concepts have been highlighted, regarding optimized administration of sacubitril-valsartan with initiation during the index admission for HF [6, 7]. The potential benefit of SGLT2 inhibitors in reducing cardiovascular mortality and heart failure among diabetics have been widely reported by international journals [8-9]. By contrast, NSCJ reported more specific aspects of HF, mainly devoted to regional epidemiologic aspects, pathogenesis, unusual features for diagnosis, and specific causes of HF and their treatment.

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A panel of contributions on HF published by these NSCJ in 2019 has been selected by their respective Editors-in-Chief and commented in this short summary.

Epidemiology

Epidemiology of HF among ESC member countries has been presented recently by Timmis A, et al. [3]. The conclusion of the Atlas scientific group is that there are inequalities in the prevalence of risk factors, cardiovascular disease burden, cardiovascular mortality, and some therapeutic methods implementation (coronary interventions, device implantations and cardiac surgery procedures) among the ESC member countries. These parameters depend on socio-economic factors and mostly are worse in middle-income, compared to high-income countries. More country specific features can be understood by publications from National Societies of Cardiology (NSC). Badran HM, et al. in a single center observational study on 1006 patients admitted to the coronary care unit (CCU), estimated the prevalence of HF by gender, preserved or reduced left ventricular ejection fraction (LVEF). They reported higher prevalence of HF at all and higher incidence of HF with reduced ejection fraction (HFrEF) in female patients. Female patients were older, more obese, with more co-morbidities, but had less acute coronary syndromes and required less percutaneous coronary interventions. Despite those differences the prognosis was similar in female and male patients [10]. Nationwide information on mortality and readmissions in patients admitted for HF are also of major interest. In this regard epidemiological information from administrative databases using the minimum basic dataset and international classification of diseases codes are of great value. A retrospective analysis from Spain aimed to identify factors associated with in-hospital mortality and readmissions in patients with HF and to analyze the relationship between hospital characteristics and clinical outcomes [11]. The study included a total of 77,652 patients admitted for HF. Mean age was 79 years and 55% of patients were women. In-hospital mortality during the index episode was 9.2%, rising to 14.5% at 1 year. The 1-year cardiovascular readmissions rate was 33%. The most important risk factors for in-hospital mortality and 1-year mortality were stroke, metastatic cancer, cardiorespiratory failure, shock, and acute myocardial infarction. Interestingly, risk-standardized mortality rates were lower among patients discharged from high-volume hospitals (defined as those with > 340 HF discharges). In addition, the availability of a cardiology department at the hospital was associated with better clinical outcomes [11].

Etiology and predisposition

Calcific aortic valve disease (CAVD) is a disorder of high social significance not only because it is widespread but also because it can progress while clinically unrecognized over a long period of time. After development of severe aortic stenosis, the 2-year survival rate in the absence of surgical intervention is about 50%. Nowadays, the causes of this pathological condition and its exacerbation mechanisms remain unknown. Tomova V, et al. tested the hypothesis that the polymorphism rs10455872 at the lipoprotein (a) (LP[a]) gene locus, encoding LP(a) increases the risk of aortic valve disease. One hundred forty six individuals: 108 patients with CAVD and 38 controls were studied. The authors reported that the patients with at least one mutant allele of the gene have four times greater risk for CAVD development. They argued that confirmation of genetic nature of the disease can help to prevent or optimize treatment of this frequently seen disease [12]. In addition modalities for the diagnostic evaluation of transthyretin-amyloidosis have improved significantly over the recent years, using structural screening by magnetic resonance imaging (MRI) assessment, as reported by Kauffmann, et al. [13]. The coexistence of both diseases (namely CAVD and transthyretin-amyloidosis) appears to hold important diagnostic and prognostic implications. The value of electrocardiogram, echocardiography, MRI, Technetium scintigraphy and endomyocardial biopsy have been pointed out in this regard. On the other hand, subclinical myocardial involvement is common in systemic sclerosis (SSc) and is associated with HF and poor prognosis. In a study of 73 SSc patients, Vertes V, et al. tested the 2D-speckle-tracking-derived global longitudinal strain (GLS) method for early myocardial involvement in the disease. As a control group served 23 gender- and age-matched healthy volunteers. Significantly lower GLS values were found in patients compared to volunteers (-17.2 ± 2.3 vs -18.7 ± 1.4%, $p = 0.001$). The GLS correlated also with the duration of the disease from the onset of the Raynaud phenomenon ($r = 0.274$; $p = 0.021$), from the first non-Raynaud symptoms ($r = 0.245$; $p = 0.039$) and with the New York Heart Association (NYHA) functional class of the patients ($r = 0.242$; $p = 0.042$) [14].

Pathogenesis

In a prospective study including 297 patients Lelyavina TA, et al. reported the potential for muscle differentiation, regeneration and growth of satellite skeletal muscle precursor cells obtained from patients with HFrEF. They concluded that the studied parameters do not differ from those found in healthy donors. This may explain one of the mechanisms by which training walking patients for more than 1,5 hours daily contributes to the development of physiological reverse myocardial remodeling to a greater extent than aerobic training [15].

Diagnosis of HF

A number of articles in the NSCJ have been dedicated to diagnostic issues in patients with HF. Vdovenko et al. compared 80 patients (NYHA class I-IIa and stage A-C of the ABCD classification of the American College of Cardiology) with chronic HFpEF with 30 healthy controls by using the 6-minutes walk test and echocardiography [16]. They found that all patients have diastolic dysfunction (60 – abnormal relaxation pattern, and 20 – pseudonormal pattern.), reduced global and segmental strain of the left ventricle. The impact of HF on the other organs has been addressed in the paper of Içen YK, et al. They estimated the liver stifness (LS) in HF patients. They found that in patients with HFrEF the LS estimated by ElastPQ technique increases when patients are in higher functional class by NYHA. A higher LS was associated with higher right ventricular myocardial performance index, regurgitation pressure gradient, NT-proBNP, and aspartate aminotransferase levels [17]. Ischemic cardiomyopathy challenges therapy of HF in many aspects. Assuming that the SYNTAX score is not just a measure of the severity of coronary artery disease, but also of its

complexity, Öztürk S in a single center study tested the degree of coronary atherosclerosis, estimated by SYNTAX score and myocardial viability in patients with ischemic cardiomyopathy. Not surprisingly, patients with a non-viable myocardium had a significantly higher SS compared to those with a viable myocardium (17.6 ± 3.7 vs 14.1 ± 5.2, respectively; p = 0.004) [18].

Treatment

Treatment of HF has generated major scientific interest. Clinical implications of HF associated with valvular heart disease has been reported by several NSCJ. Transcatheter aortic valve implantation (TAVI) is a recommended alternative to surgical aortic replacement for the treatment of symptomatic severe aortic stenosis. Indications are now rapidly expanding towards patients at lower surgical risk. Generalization of the transfemoral vascular approach, technological advances and increased operator skills have resulted in higher rates of procedural success and improved short-term and long-term survival. Notwithstanding, patients undergoing TAVI remain burdened with frequent co-morbidities, and readmission within 30 days from the index hospitalization has been reported as a common complication. Symptomatic HF is an important trigger that leads to TAVI. However, data on the incidence of readmission for HF after successful TAVI are scarce. A French study on 1139 patients, published by Guedeney, et al. reported that readmission for HF occurs in one of 10 patients after successful TAVI, and constitutes a strong risk factor for mortality. In this setting, co-morbidities and LVEF ≤ 35% after TAVI are the main risk factors for readmission for HF. Adjusted hazard ratio ($_{adj}$HR) of LVEF ≤ 35% was 2.12, 95% CI 1.20–3.75, followed by chronic pulmonary disease ($_{adj}$HR 1.81, 95% CI 1.17–2.81), chronic kidney disease ($_{adj}$HR 1.72, 95% CI 1.13–2.62),), diabetes mellitus ($_{adj}$HR 1.67, 95% CI 1.11–2.50), and atrial fibrillation ($_{adj}$HR 1.62, 95%, CI 1.09–2.40) [19]. Besides several large international multicenter trials reported on percutaneous mitral repair of functional mitral regurgitation associated with HF [20, 21], registries from national or single centers provide valuable real-life results in unselected patients which may inform clinical decision making at a local level. Benak A, et al. reported a cohort of 30 MitraClip implantations in patients with dilative cardiomyopathy and severe functional mitral regurgitation. The technical success was very high (97%), with no 90 days mortality. During the 12 months clinical follow up, a significant improvement of functional class by NYHA, and quality of live (Kansas City Cardiomyopathy Questionnaire [KCCQ]), were reported. There was also reduction of left ventricular myocardial mass, and an increase systolic and diastolic arterial pressure. The mortality was 10% for the entire period of follow up [22]. The technique broadens the treatment options for patients with severe functional mitral regurgitation who cannot undergo surgical repair because of valve disease characteristics and left ventricle dysfunction.

In conclusion

Most studies published in the high-ranking impact factor journals focus on drug therapy of HF and are devoted to a broad readership, but fail to characterize important local issues. Publications in the NSCJ, on the other hand, cover a wide spectrum of diagnostic and therapeutic modalities of HF, taking into account the national specificities of the problem. Most of these studies, however, are often single center and observational. That is the reason for the rather small number of included patients, and the lack of experimental models. However, information of HF strategies at a national level are eagerly required to help to implement the ESC clinical practice guidelines and optimize the care of patients with HF.

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