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Consensus and Contemporary Research Insights for Achieving Uniform Standards to Understand Epidemiological Trends in the Heart Rate in Patients with Heart Failure including Chronic Kidney Disease

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ABSTRACT

Background

Heart failure (HF) represents a major epidemic with high morbidity and mortality rates. The distinct pathophysiological processes have categorised the HF into that with reduced ejection fraction (HFrEF), preserved ejection fraction (HFpEF) and midrange ejection fraction (HFmrEF). We explored the collective opinion of the cardiologists in providing insights into the proposed evaluation program for the assessment of the heart rate variability in patients with heart failure

Methods

We conducted an in-person opinion meeting, based on the current evidence-base medicine approach across a broad group of 112 leading cardiologists practising in the country with approximately 3000-man-hours of cumulative clinical experience, to understand the contemporary perspectives in the context of heart rate in patients with HF

Results

Cardiologists uniformly record the heart rate during the evaluation of HF patients with most of them n=81, (72%) giving high priority to the accurate recording of heart rate as an important vital sign in everyday practice. There was a consensus for the need to study the trends and patterns of heart rate especially at the time of discharge with correlation with the heart rate at the time of admission. 52 % of respondents (n=58) encountered that half of the patients have HFpEF or HFmrEF. 80 % (n= 90) agreed or strongly agreed that the pathophysiology of HFpEF and HFmrEF are heterogeneous and the management remains controversial. Data capturing formats for the real-world information should collectively focus on the symptoms and signs that are compatible with the diagnosis of heart failure. HFrEF and HFmrEF categories have the maximal scope to provide the benefits of Ivabradine. Patient's education is an important element to enhance health care, yet 52% (n=58) regularly counsel and educate the patients about the quality management of HF. Overall the opinion was uniform across the different geographies (p=0.23). Kidney and heart functions are highly connected by organ crosstalk. Sympathetic activation intensifies as chronic kidney disease progresses toward kidney failure

Conclusions

The group was convergent to address a cost-effective, customised modality to capture the real-world data to address the epidemiological gaps that exist in the western world and in the developing countries with cost constraints and limited resources.

Keywords:

INTRODUCTION

Background

Heart failure (HF) represents a major epidemic with high morbidity and mortality rates. The distinct

pathophysiological processes have categorised the HF into that with reduced ejection fraction (HFrEF), preserved ejection fraction (HFpEF) and midrange ejection fraction (HFmrEF).

The Epidemic of Heart Failure in South Asia

Importantly, South Asia accounts for a quarter of the world population, but it already claims close to 60% of the global burden of heart disease. Besides the epidemics of type 2 diabetes mellitus and coronary heart disease already faced by South Asian countries, recent studies suggest that South Asians may also be at an increased risk of HF, and that it presents at earlier ages than in most other racial/ethnic groups. Although a frequently underrecognized threat, an eventual HF epidemic in the densely populated South Asian nations could have dramatic health, social and economic consequences, and urgent interventions are needed to flatten the curve of HF in South Asia. There are varied reasons for these trends, and it has been well explained that the mechanisms that may explain an increased risk of premature HF in South Asians compared with other groups, with a special focus on highly relevant features in South Asian populations including premature coronary heart disease, early type 2 diabetes mellitus, ubiquitous abdominal obesity, exposure to the world's highest levels of air pollution, highly prevalent pretransition forms of HF such as rheumatic heart disease, and underdevelopment of healthcare systems. [1]

The Burden of Heart Failure in India

Heart failure has emerged as an important and increasing disease burden in India.

The Trivandrum Heart Failure Registry is a landmark study that recruited consecutive patients admitted for acute HF among 16 hospitals in Trivandrum, Kerala in 2013. Guideline-directed medical therapy (GDMT) was defined as the combination of beta-blockers (BB), renin angiotensin system blockers (RAS), and mineralocorticoid receptor antagonists (MRA) in patients with HF with reduced ejection fraction (HFrEF, EF < 40%) at discharge.

Among 1205 patients HFrEF constituted 62% of patients and among them, 25% received GDMT. The 5-year mortality rate was 59% and median survival was 3.1 years. Sudden cardiac death and pump failure caused 46% and 49% of the deaths, respectively. Components of GDMT associated with lower 5-year mortality risks were discharge prescription of BB, RAS blocker, and MRA. Readmissions, older age, lower systolic blood pressure, NYHA class III or IV, and higher serum creatinine were also associated with higher 5-year mortality.

It was deciphered that 3 out of every 5 patients had died during 5-years of follow-up with a median survival of approximately 3 years. Lack of GDMT in patients with HFrEF and frequent readmissions were associated with higher 5-year mortality. [2]

It has been researched, that documentation of receipt of guideline-directed medical therapy in CAD, HF, and atrial fibrillation has been significantly higher in practices with EHRs in India compared with sites without EHRs. These findings from the American College of Cardiology's PINNACLE (Practice Innovation and Clinical Excellence) India Quality Improvement Program (PIQIP) to evaluate the association between EHR use and quality of cardiovascular disease care in India, shed a spotlight on the value of EHRs in future health care policy-making in India with regard to widespread adoption of EHRs in primary and advanced specialty care settings across public and private sectors. [3]

Heart Failure and Chronic Kidney Disease

It needs exploration that β-blockers reduce mortality/morbidity in patients with heart failure (HF) and advanced chronic kidney disease (CKD), a population underrepresented in HF trials. In HFrEF patients with advanced CKD, the use of β-blockers was associated with lower morbidity and mortality. Although inconclusive due to limited power, these benefits were not observed in similar patients with HFpEF or HFmrEF [4]

Sympathetic activation intensifies as CKD progresses toward kidney failure and such an intensification is paralleled by a progressive rise in heart rate but it is not reflected by plasma norepinephrine [5]

We explored the collective opinion of the cardiologists in providing insights into the proposed evaluation program for the assessment of the heart rate variability in patients with heart failure

Methods

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practising in the country with approximately 3000-man-hours of cumulative clinical experience, to understand the contemporary perspectives in the context of heart rate in patients with HF.

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Cardiologists uniformly record the heart rate during the evaluation of HF patients with most of them n=81, (72%) giving high priority to the accurate recording of heart rate as an important vital sign in everyday practice. There was a consensus for the need to study the trends and patterns of heart rate especially at the time of discharge with correlation with the heart rate at the time of admission. 52 % of respondents (n=58) encountered that half of the patients have HFpEF or HFmrEF. 80 % (n= 90) agreed or strongly agreed that the pathophysiology of HFpEF and HFmrEF are heterogeneous and the management remains controversial. Data capturing formats for the real-world information should collectively focus on the symptoms and signs that are compatible with the diagnosis of heart failure. HFrEF and HFmrEF categories have the maximal scope to provide the benefits of Ivabradine. Patient's education is an important element to enhance health care, yet 52% (n=58) regularly counsel and educate the patients about the quality management of HF. Overall the opinion was uniform across the different geographies (p=0.23).

Non-pharmacological management of HF includes the focus on fluid and the diet. The patients should be advised about fluid intake (based on the patient's body weight), physical activity, exposure to heat, etc. Fluid intake should be reduced, especially in advanced HF patients. Alcohol should be totally avoided in patients with alcoholic cardiomyopathy. In other patients, alcohol moderation needs to be discussed. Limit salt intake, especially in patients with advanced HF. Advise on the use of salt substitutes with caution as they may contain potassium. If salt substitutes are used in large quantities with RAAS blockers, it may lead to hyperkalemia. There is distinct role of exercise. A stable HF patient should be encouraged to exercise, but the functional capacity of the patient should be taken into consideration. The other lifestyle changes include, smoking should be strongly discouraged, pneumococcal and influenza immunization should be encouraged, stress management should be advised.

Pharmacological treatment is the cornerstone of HF management. Even though there is not much difference between patients with HFrEF and HFpEF as far as prognosis is concerned, they differ in terms of response to therapies. Notably, it is only in patients with HFrEF that treatments have been proven to reduce both morbidity and mortality

Ivabradine is recommended to be used in patients with sinus rhythm, who have a heart rate >70 beats per minute (bpm) despite being treated with a maximally tolerated dose of a beta-blocker

Risk scores are used for predicting mortality and hospitalization and, hence, can guide the interventions used for HF management. Thus, low-risk patients may be able to receive lower intensity monitoring and vice versa.

Discussion

The group was convergent to address a cost-effective, customised modality to capture the real-world data to address the epidemiological gaps that exist in the western world and in the developing countries with cost constraints and limited resources. There need to be specific interventions aimed at curbing adverse trends of heart failure, HF management approaches that can improve the prognosis of prevalent HF in South Asian countries, and research gaps in this important field.

Other rising lifestyle-related risk factors such as use of tobacco products, hypertension, and general obesity need special attention. Quality improvement programmes with strategies to improve adherence to GDMT and reduction in readmissions may improve HF outcomes in this region.

The Indian consensus for the protocol for the management of HF recommends that of all the different risk scores, the panel recommends the use of The Meta-Analysis Global Group in Chronic Heart Failure (MAGGIC) Risk Calculator, which calculates 3-year mortality risk. The variables included in the risk score are as follows: age, gender, body mass index (BMI), New York Heart Association (NYHA) class, systolic BP, smoking, DM, left ventricular ejection fraction (LVEF), left bundle branch block (LBBB), use of RAAS blockers, beta-blocker use, chronic obstructive pulmonary disorder (COPD), and HF diagnosed >18 months ago. Another simple risk score that can be considered is the SHIFT Prognostic

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Model, which is based on simple clinical characteristics (increased resting heart rate, low EF, raised creatinine, NYHA Class III/IV, duration of HF, history of LBBB, low systolic BP, age, AF, and use of ivabradine) and predicts CV death and/or hospitalization for the next 2 years.

Both MAGGIC and SHIFT scores are readily available online and can be used to predict prognosis in a HF patient. [6]

Future research work is evolving to understand the burden of heart failure in India. The data are scarce on the burden, prevailing practice patterns and long-term health outcomes of HF patients in India. The Kerala heart failure registry (KHFR) is a multi-centric, prospective, and hospital-based registry in Kerala, India. Consecutive patients admitted with the diagnosis of acute heart failure satisfying the European Society of Cardiology (ESC) criteria will be enrolled in the registry. Data on demographic, clinical, laboratory, imaging, other diagnostics and therapeutic approaches employed, and the usage of guideline based medical therapy is intended to be collected as part of the registry. Additionally, all registered patients are being planned to be followed-up regularly at 1-month, and thereafter at every 3-months. Both mortality and hospital admission data will be collected during the follow-up visits. There is a plan for recruiting 7500 HF patients in the KHFR. Once completed, KFHR is going to be the largest HF registry in India. It will validate a HF mortality risk score developed based on a previously conducted Trivandrum Heart Failure Registry in the KHFR patients.[7]

Cardiac remodeling occurs frequently in chronic kidney disease patients and affects quality of life and survival. [8] Current treatment options are highly inadequate. As kidney function declines, numerous metabolic pathways are disturbed. Kidney and heart functions are highly connected by organ crosstalk. Among others, altered volume and pressure status, ischemia, accelerated atherosclerosis and arteriosclerosis, disturbed mineral metabolism, renal anemia, activation of the renin-angiotensin system, uremic toxins, oxidative stress and upregulation of cytokines stress the sensitive interplay between different cardiac cell types

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