

Ageing, demographics, and heart failure

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KEYWORDS

Heart failure;
Elderly;
Epidemiology;
Comorbidities

Heart failure (HF) is a complex clinical syndrome resulting from structural or functional cardiac disorders. In the developed world, HF is primarily a disorder of the elderly. It is one that is accompanied by many non-cardiac comorbidities that affect treatments given, the patient's response and treatment tolerance and outcomes. Even the pathophysiological mechanisms of HF change as we look at older patient populations. Younger HF patients typically have ischaemic heart disease and HF with reduced ejection fraction (HFrEF), whereas older patients have more hypertension HF with preserved ejection fraction (HFpEF). The prevalence of HF has progressively increased for many years and rises even more steeply with age. The outcomes of older especially HFpEF patients have not progressed as much younger HFrEF cohorts. We need more studies specifically recruiting older HF patients with more comorbidities, to guide real-world practice, and we need more assessment of patient-reported outcomes and quality of life rather than just mortality effects. The management of elderly patients with HF requires a more holistic approach recognizing individual needs and necessary support mechanisms and our future trials need to guide us more in achieving these gains.

Introduction

Heart failure (HF) is a complex clinical syndrome resulting from structural or functional cardiac disorders and characterized by symptoms such as shortness of breath, ankle swelling, and fatigue.¹ Heart failure in the developed world is primarily a disorder of the elderly² increasing from 1% among those aged 45-55 years to over 10% in the over 80 year olds.

The effects of age

Comorbidities and mortality in HF both increase with age.^{3,4} The typical pathophysiology of HF changes as we look at older patient populations. Younger HF patients typically have antecedent ischaemic heart disease or idiopathic or genetic -dilated cardiomyopathies. Elderly patients, in contrast, typically have a history of hypertension and multiple other comorbidities.⁵ In the younger

patient a dilated ventricle with significant remodelling and reduced ejection fraction is more common (HFrEF), whereas in the elderly the more common picture is a small hypertrophied ventricle with preserved ejection fraction (HFpEF). An older synonym for HFpEF was 'diastolic' HF, as opposed to the more 'systolic' HF seen in HFrEF. However, the term HFpEF is now preferred to that of diastolic HF especially as HFrEF also frequently shows diastolic dysfunction⁶ just as subtle abnormalities of systolic function may be also found in patients with HFpEF and many therapies may be tested in both conditions.⁷ Heart failure with reduced ejection fraction has multiple proven therapies to reduce mortality and hospitalization rates, whereas HFpEF has none, perhaps helping somewhat to explain why hospitalization rates for HFpEF have stayed high whereas those of HFrEF have been reducing, an effect also explained by older populations at risk.⁸

Epidemiology

An estimated 23 million individuals worldwide live with HF,⁹ with overall prevalence rates in developed countries

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of 1-2% of the adult population.¹⁰ The prevalence of HF has progressively increased for many years, both as a consequence of effective therapies keeping patients alive longer and the ageing many populations worldwide,¹¹ with the later explaining more of the increase. The prevalence of HF rises steeply with age.¹² Heart failure, mainly HFpEF, is one of the most common reasons for presentation to primary care for symptomatic dyspnoea, even when heart disease had not been diagnosed in the patient previously.^{13,14}

Prognosis

Heart failure is associated with a poor long-term prognosis with a 5-year survival rate still less than 50%.¹⁵ Heart failure remains a major cause of disability and is still the most common cause of hospitalization in the developed world. An ESC HF registry¹⁶ reported a 44% 12-month hospitalization rate and a 17% annual mortality rate for hospitalized HF patients; and 32% and 7%, respectively in stable/ambulatory patients. In this study, sudden death and worsening HF were the most common modes of death for the patients, although along with the ageing population there has a change in the distribution of the causes of death toward non-cardiovascular causes in older especially HFpEF patients, consistent with an increased number non-cardiovascular comorbidities.¹⁷

The effects of age on therapy

Most clinical trials in HFrEF have recruited younger patients,^{18,19} and combined with a relative lack of trials for HFpEF this leaves us with a severe evidence imbalance in favour of younger HFrEF patients as opposed to older HFpEF patients. Although subgroup analyses in the major clinical trials have not consistently shown age to be a factor, these trials themselves have largely excluded real-world older patients with multiple comorbidities.²⁰⁻²⁴ Very few studies specifically recruited older HF patients (notable exceptions being the SENIORS trial²⁵ and the CIBIS-ELD trial²⁶) so that we still have a real evidence lack in elderly HF patients. Although guidelines proclaim that pharmacotherapy and other treatments²⁷ of HFrEF in elderly patients are recommended to be the same as for younger patients, in the real world, the use of guideline-directed medical therapy is notoriously lower in older patients.

The effects of comorbidities

Among older HF patients, women and comorbidities predominate, including hypertension,²⁸ diabetes,^{29,30} lung disease,³¹ coronary disease,³² renal failure,³³⁻³⁵ sleep-disordered breathing^{36,37} anaemia,³⁸ and iron deficiency predominate.^{39,40} This is despite, along with the elderly, in general, women and patients with comorbidities being selectively not recruited into major clinical trials in HF. There are some particular features in the older patient with HF, which potentially make them less tolerant to drug therapy and more prone to medication errors and side effects.⁴¹ These include dementia and cognitive decline, anorexia,⁴² muscle wasting,⁴³⁻⁴⁵ and frailty⁴⁶⁻⁴⁸ all of which more

common in the elderly^{49,50} and may have an impact on the risk/benefit relationship of treatments given.⁵¹ Both HFpEF and HFrEF patients can have multiple comorbidities that can affect their treatments and their clinical course,⁵² although the extent of this between the two patterns of HF is controversial.⁵³ The older HF patients' needs are not only just for mortality reducing therapies but also for quality of life enhancement, well-designed end-of-life care and the involvement of their carers in decision making thought-out the disease process.⁵⁴

Summary

The elderly patients with HF are becoming a major cause of health care expenditure in cardiology and yet our clinical trials have to date not told us accurately how they should be managed to best effect. In this elderly population, therapeutic decisions should be tested for both effectiveness and applicability and we must recruit typical patients, not just 'trial' patients. The management of elderly patients with HF requires a more holistic approach to recognizing individual needs and necessary support mechanisms.

Funding

This paper is part of a supplement funded by the Heart Failure Association of the European Society of Cardiology.

Conflict of interest: Nothing related to this work. Outside of this work, in the last 3 years, Professor Coats declares having received honoraria and/or lecture fees from: Astra Zeneca, Bayer, Menarini, Novartis, Nutricia, Servier, Vifor, Actimed, Cardiac Dimensions, CVRx, Enopace, Faraday, Gore, Impulse Dynamics, Respocardia, Stealth Peptides, V-Wave.

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