Heart Failure

Advanced cardiac failure is a condition that can cause significant symptoms, especially breathlessness, peripheral oedema and fatigue, despite maximal medical therapy. Symptomatic treatment that may help patients with advanced heart failure manage better includes non-pharmacological interventions including involvement with occupational therapy and physiotherapy and various pharmacological therapies including diuretics and medications for dyspnoea relief. Accurate prognostication is difficult and physicians often underestimate life expectancy. Sudden death due to ventricular arrhythmias is associated with advanced heart failure and this needs to be thought about in advance in patients with automated implanted cardiac defibrillators.

Epidemiology and Pathophysiology

Clinical features

Investigations

Management

Pharmacological therapy

Certain cardiac medications such as beta blockers improve mortality but are not typically associated with improvement in daily symptoms. Other medications such as furosemide, digoxin and nitrates may bring symptom improvement.

Furosemide and loop diuretics

Spironolactone

ACE Inhibitors and Angiotensin II Receptor Blockers

Angiotensin is a hormone that is part of the renin-angiotensin-aldosterone system and is involved in increasing blood pressure through vasoconstriction and stimulating the release of aldosterone from the adrenal glands which promotes renal sodium retention.

Both angiotensin converting enzyme (ACE) inhibitors and angiotensin 2 receptor blockers (ARBs) reduce mortality, hospitalizations and improve symptoms of dyspnoea, fatigue and exercise capacity.1 2

Renal function needs close monitoring in patients on ACE inhibitors and ARBs, especially in hypotensive patients. Additionally, patients with a very low blood pressure (e.g. in cardiogenic shock) may experience further drops in blood pressure with dizziness and in these cases ACE inhibitors and ARBs may need to be ceased. Cough is a common adverse effect of ACE inhibitors that may limit its tolerability.

Angiotensin Receptor-Neprilysin Inhibitors
Neprilysin is an enzyme that inactivates several peptide hormones including bradykinin, natriuretic peptides and adrenomedullin. In combination with valsartan, the neprilysin inhibitors sacubitril reduces mortality and improves symptoms in heart failure to a greater degree than enalapril alone.\(^3\) It is not clear if it improves symptoms or mortality in advanced heart failure when compared with ACE inhibitors or ARBs.

Adverse effects include dizziness due to hypotension, cough, hyperkalaemia and renal failure, and rarely life-threatening angioedema.

**Beta blockers**

Beta blockers reduce heart rate and thus myocardial energy requirements through blocking the beta-adrenergic receptors. They are associated with mortality improvement as well as improvement of symptoms\(^4\) however they are also frequently associated with adverse effects that also impact on quality of life. Adverse effects include hypotension and bradycardia, and worsening of peripheral vascular disease.

**Ivabradine**

**Digoxin**

**Sodium-Glucose Cotransporter 2 Inhibitors**

**Inotropes**

**Non-pharmacological therapy**

**Automated implantable cardioverter-defibrillators**

**Prognostication**

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\(^1\) Cleland JG et al. The perindopril in elderly people with chronic heart failure (PEP-CHF) study. Eur Heart J 2006.


\(^4\) Packer M et al. Effect of carvedilol on the morbidity of patients with severe chronic heart failure: results of the carvedilol prospecive randomized cumulative survival (COPERNICUS) study. Circulation 2002