INVITED ARTICLE

HEART FAILURE IN THE ELDERLY

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ABSTRACT

Heart failure commonly occurs in the elderly age group. Treatment mainly centres on the use of digoxin and diuretics. In intractable heart failure other agents ie inotropic agents and vasodilators may be considered. Routine maintenance on diuretic and digoxin should not be encouraged. A conscious effort to tail off these medication is needed.

Keywords : Digoxin, diuretic, vasodilator, maintenance, withdrawal

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INTRODUCTION

This is a clinical syndrome resulting from the failure of the heart to supply the tissues of the body with an adequate amount of blood to meet their requirement both at rest and during activity. Heart failure is very much an illness of the elderly.

There is an eight to ten fold difference in prevalence between the age groups 45-65 years and the over 75 years of age[1]. Community studies show a prevalence of 6% in the over 65 years and of 10% in the over 75 age group. A look at inpatient records shows a prevalence ranging from 14% up to 30% of admissions to geriatric units with heart failure[2]. The significance of heart failure in the elderly comes from the severity of the illness. It is the commonest cause of death in the elderly[3]. The five-year mortality rate of heart failure is approximately 50%. The high prevalence in the elderly has been attributed to the cumulative effects of different heart diseases together with age-related changes in the cardiovascular system[4,5].

In this article, we discuss the following aspects of heart failure in the elderly:

(1) Pathophysiology of heart failure
(2) Clinical presentation
(3) Rationale for treatment
(4) Management approach

(1) Pathophysiology of heart failure

Heart failure is not always due to impaired myocardial contractility which is normally expressed by the left ventricular ejection fraction (LVEF). Measurement of LVEF is normal in up to 50% of the elderly patients with heart failure[6]. It is now known that cardiac output is dependent on four major factors[7] - preload, contractility, afterload and heart rate.

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In the compromised frail elderly with compensated heart disease, the occurrence of fever with increased metabolism chest infection with hypoxia, and anaemia may be sufficient to tip the elderly to clinical heart failure.

(2) Clinical Presentation

Heart failure can be classified according to which ventricle is failing. Establishing the right diagnosis is important as it leads to the application of the correct management.

i. Left Ventricular Failure

This commonly results from ischaemic heart disease, hypertension and valvular heart disease (aortic and mitral valve). It is usually acute in onset. The main symptoms and signs result from the effects of increasing pulmonary venous congestion and pressure. The symptoms include dyspnoea which initially starts with exertion but progresses to breathlessness at rest with orthopnoea and paroxysmal nocturnal dyspnoea. The common signs are fine basal crepitations in the lungs, tachycardia, gallop rhythm and the presence of a third heart sound.

ii. Right Ventricular Failure

This is commonly a result of left ventricular failure. Other causes include chronic lung disease and recurrent pulmonary emboli. The commonest symptom is breathlessness. However, this is more gradual in onset and progression may present as increasing fatigue. The signs are due to increasing fluid overload with features of raised jugular venous pressure (JVP), hepatomegaly and dependent oedema.

In the elderly, the diagnosis of heart failure is often complicated. Patients may not always present in the above way. Atypical presentations such as general fatigue, increasing immobility, confusion, incontinence and recurrent falls are all documented in the elderly. A high level of suspicion and careful clinical assessment are essential. Unfortunately the common symptoms and signs of heart failure may be indicative of other illnesses. The fine basal crepitations may be from prolonged bed rest, pulmonary fibrosis or even infection. Dyspnoea commonly occurs with chronic lung disease, asthma, chest infection and acidosis. The raised jugular venous pressure is a common finding. The commonest causes are asthma or chronic obstructive lung disease (COLD). Unless it is only noted in inspiration a raised JVP is not necessarily from heart failure.

Likewise there have been many elderly who have been started on diuretics because of leg oedema. Leg oedema may be from other causes, including gravity, low protein state and non-steroidal anti-inflammatory agents. In heart failure, the excessive fluid overload results in a triad of raised JVP, hepatomegaly and dependent oedema. Heart failure should be diagnosed when all of these are present.

(3) Rationale for treatment[8-10]

The first aim is to seek for the causes of heart failure and resolve it. With regard to the heart failure per se, treatment is usually similar regardless of cause.

Treatments are aimed at (i) improving cardiac output and (ii) reducing fluid retention.

In the majority of cases, these would be the main therapeutic approaches. In more intractable heart failure attention to the following may be beneficial:

i. Reduction in sodium retention
ii. Reversal of some of the more harmful effects of increased aldosterone activity
iii. The use of new inotropic agents in an attempt to improve contractility[11].

The main treatment modality for heart failure is the use of diuretics. Diuretics reduce the preload and result in an improvement in the symptoms and signs without an increase in the cardiac output. Cardiac output can be increased by either the use of inotropic agents or via reduction in the afterload.

This reduction in afterload involves the use of arterial vasodilators.

(4) Management Approach

(a) Accurate Diagnosis

It is important to be aware of atypical presentations in the elderly. Inappropriate treatment is not without hazard.

A full history and clinical examination are essential.

The routine investigation would normally include:

i. Full blood count
ii. Urea and electrolytes
iii. Chest X-ray (erect film in inspiration)
iv. ECG

(b) Line of Management

i. To establish the cause of heart failure and resolve or reverse it.
ii. Rest is mandatory. While awaiting response to treatment, this is one of the few absolute indications for rest. It is important not to further stress the failing heart. Once clinical parameters improve gradual mobilization can be undertaken. Should the BP allow, the patient should be propped up in bed or seated in a chair with the legs supported. This helps to relieve breathlessness by reducing pulmonary congestion.
iii. Oxygen therapy helps to relieve the strain on the heart and it provides increased oxygen to compensate for the decreasing cardiac output.

The above are common to all types of heart failure. The treatment for left and right heart failure follows:

(a) Acute Left Heart Failure

This is a medical emergency especially if pulmonary oedema is present. The main cause is from an acute increase in preload with acute pulmonary congestion. The aim is to reduce the increased preload. Management of pulmonary oedema is the same as in younger patients.

(b) Right Heart Failure/Congestive Heart Failure

Usually a less aggressive approach is undertaken. Apart from the common steps above, consideration should be given to:

i. *Diuretic[12]*

The choice of diuretic depends on the severity and urgency of the clinical situation. In mild heart failure, a short acting thiazide is often used. In more severe failures as well as those with renal impairment a more potent diuretic like or loop diuretic eg. frusemide is used.

Hazards to be aware of include hypokalaemia which may require correction. The elderly are particularly prone to hypokalaemia as their total body potassium may be reduced even prior to diuretic therapy.

ii. *Digoxin[13]*

The use of potent diuretics has in recent times overtaken the use of digoxin in heart failure. Digoxin improves heart failure in the following ways:

(1) as an inotropic agent

(2) by slowing the ventricular heart rate during both sinus and supra-ventricular tachyarrhythmias

The improvement in cardiac output occurs both in the acute and the chronic usage of the drug[14,15].

Its usage may be limited by its very narrow therapeutic range. In the elderly where renal function has normally declined, the risk of toxicity is increased.

The role of digoxin in heart failure is still controversial.

There are some indications:

- Supra ventricular tachyarrhythmias ie fast atrial fibrillation. The aim is to control the ventricular rate at 70-80 beats/minute.
- When diuretic usage has not produced an adequate response.

iii. Hydration

In the elderly, the renal function even in a normal individual may be reduced as a result of the ageing process. In cardiac failure patients, the fall in cardiac output often aggravates this impairment. Fluid restriction serves only to further reduce cardiac output and further jeopardize renal perfusion. It is more appropriate to maintain an adequate fluid intake and to use diuretics to reduce excessive fluid.

Intractable Heart Failure

This occurs when the use of diuretics and digoxin has not achieved an adequate response. Under this condition, the following should be considered:

(1) Reassessment of possible causative and precipitating factors ie anaemia and chest infection and initiate appropriate therapy.
(2) Drug compliance.
(3) Prevention of excessive salt intake.
(4) Ensure adequate dosage of diuretic especially in patients with renal impairment where higher dosages of loop diuretic are required.
(5) Ensure that the correct dose of digoxin is used. Clinically, the aim is to achieve a slowing of ventricular rate to 70-90 beats/min. Assessing serum digoxin levels may be necessary to ensure they are in the therapeutic range.
(6) Discontinue drugs aggravating heart failure ie NSAIDs.

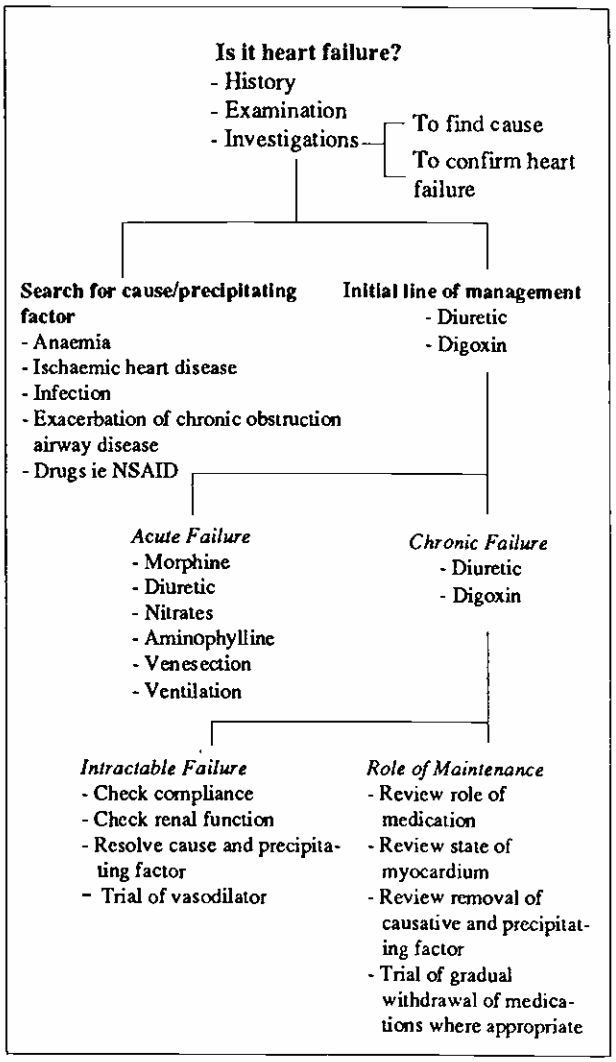
Following this, vasodilator therapy[16] may be considered. In heart failure, the afterload is greatly increased and reduction of this may increase cardiac output. The vasodilators used should be primarily arterial or a combination of venous and arterial (Fig 1).

Fig 1

Use of Vasodilators

Vasodilators	
Arterial	Venous and Arterial
Hydrallazine	Prazosin
Nifedipine	Captopril
Minoxidil	Nitroprusside

Fig 2 – Approach to Heart Failure



Various vasodilators ie. hydrallazine, prazosin and captopril have been used. Experience of these drugs in the elderly is still inadequate. Of recent interest is the use of ACE inhibitors[17-19] eg. captopril, enalapril. In addition to vasodilation, the excessive side effects of hyperaldosteronism are reduced. Usage of these drugs is not without risk. Care is needed and ideally they should be started in a hospital setting. The dosage should be small initially and gradually increased. Under these conditions, the more serious side effects can be avoided or minimised.

ROLE OF MAINTENANCE THERAPY

As diuretics and digoxin are drugs with many side effects, their prolonged usage will serve to increase the incidence of adverse side effects. Some studies have shown that up to 20% of elderly admitted to geriatric units are on digoxin or diuretics[20].

It has been suggested that in up to two-thirds of cases, the drug was unnecessary and could be withdrawn safely over a period of time[20-22]. Withdrawal was often possible when the heart failure was due to an acute precipitating factor which may have resolved. The myocardium is essentially unimpaired. In conditions where the myocardium has been damaged as in the late stages of ischaemic heart disease or where the precipitating factor persists such as in late chronic lung disease, maintenance therapy is required and withdrawal would result in relapse.

In every situation, the lowest effective dosage should be maintained. Regular review to exclude adverse drug reaction is essential.

Fig 2 summarises the approach to heart failure.

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