An Overview of the Management of Congestive Heart Failure in Malta

Stuart Schembri, David Sammut, Nicola Camilleri

Abstract

Background: In July 2003 the National Institute of Clinical Excellence (NICE) issued guidelines on the management of congestive heart failure. We set out to assess the management of congestive heart failure in St. Luke's Hospital (SLH), Malta.

Methods: The files of patients admitted to SLH during the month of January 2002 were retrieved. Eligible patients were those with a history of congestive heart failure. Patients who had passed away by the time of the audit or whose files were untraceable were excluded from the audit. Data from the file pertaining to that specific admission was entered in a pre-prepared data sheet. This includes demographic data about the patient, investigations performed to reach diagnosis and assess severity, pharmacological and non-pharmacological management of heart failure, and planned follow-up at time of discharge.

Results: The management of 97 patients was assessed. All patients with a clinical diagnosis of congestive heart failure had an electrocardiogram, chest X-ray, urea, electrolytes and creatinine estimation and a full blood count. Regarding the other tests recommended by NICE, echocardiography was performed in 28% of patients, serum glucose was assayed in 87%, liver function tests in 36%, thyroid function tests in 24%, urinalysis in 13%, lipids in 8% and spirometry in none. Two per cent of patients had lifestyle modification advice documented in the file. Pharmacological treatment consisted of diuretics (98%), ACE inhibitors (71%), angiotensin II receptor blockers (4%), ß-blockers (9%), spironolactone (12%) and digoxin (25%).

Conclusions: There is still scope for improvement in the management of congestive heart failure locally.

Keywords

Congestive heart failure, management audit.

Stuart Schembri MD, MRCP
Department of Medicine St. Luke's Hospital
Gwardamangia MSD 07-Malta
Email: stuart@keyworld.net

David Sammut MD, MRCP
Department of Medicine St. Luke's Hospital
Gwardamangia MSD 07-Malta
Email: dsammut@waldonet.net.mt

Nicola Camilleri MD
Department of Medicine St. Luke's Hospital
Gwardamangia MSD 07-Malta
Email: nicky_camilleri@waldonet.net.mt

Introduction

Chronic heart failure is known to be a major public health problem in industrialised countries with ageing populations. Its prognosis has been equated with that of the more common malignancies. The management of heart failure requires frequent, prolonged, and costly admissions to hospital.[1,2]

Despite this, studies have repeatedly shown that heart failure is generally not managed optimally.[3,4] Effective therapies are underprescribed and patients are often non-compliant.[3,4] Lifestyle modifications such as exercise training and rehabilitation, advice on smoking and alcohol consumption or vaccination against influenza and pneumococcal disease are often ignored.[3,4] Should medical care improve, many hospital admissions would prove avoidable.[3-5]

In July 2003 the National Institute of Clinical Excellence (NICE) issued guidelines[6] on the management of congestive heart failure. NICE is an independent organisation within the NHS responsible for providing national guidance on treatment and care in the UK. We set out to assess the management of congestive heart failure in St. Luke's Hospital (SLH), Malta using the NICE guidelines as the standard for ideal quality of care in order to identify areas of potential improvement.

NICE guidelines

The key recommendations from the NICE guidelines are summarized in this section.

Diagnosis

- The basis for the historical diagnoses of heart failure should be reviewed according to the algorithm outlined in Figure 1.
- Doppler 2D echocardiographic examination should be performed to exclude significant valvular heart disease, assess the systolic (and diastolic) function of the (left) ventricle and detect intracardiac shunts.

Treatment (Figure 2)

- Lifestyle modification should be enforced in all patients. This should address exercise promotion, smoking cessation, modification of alcohol intake and vaccination.
- All patients with heart failure due to left ventricular systolic dysfunction should be considered for treatment with an ACE inhibitor.
- Beta blockers licensed for use in heart failure should be initiated in patients with heart failure due to left ventricular systolic dysfunction after diuretic and ACE

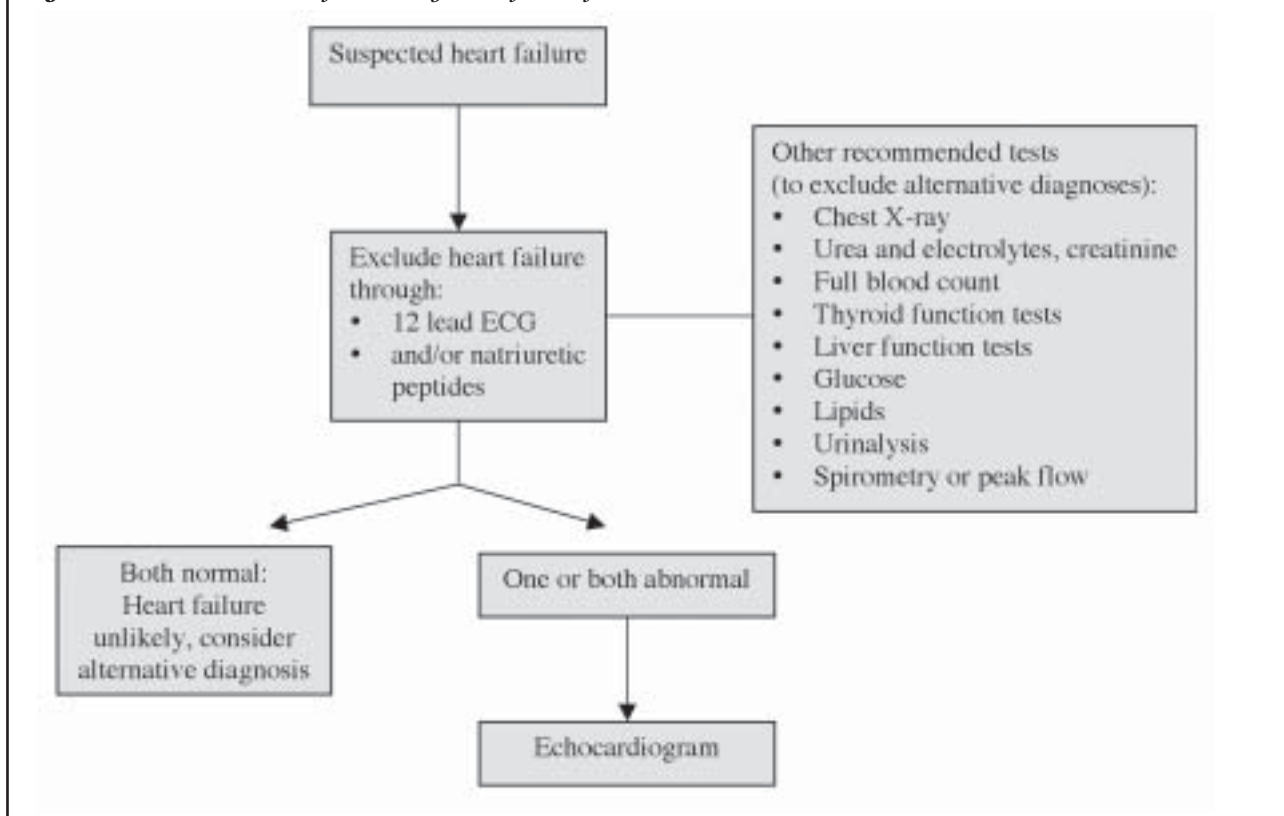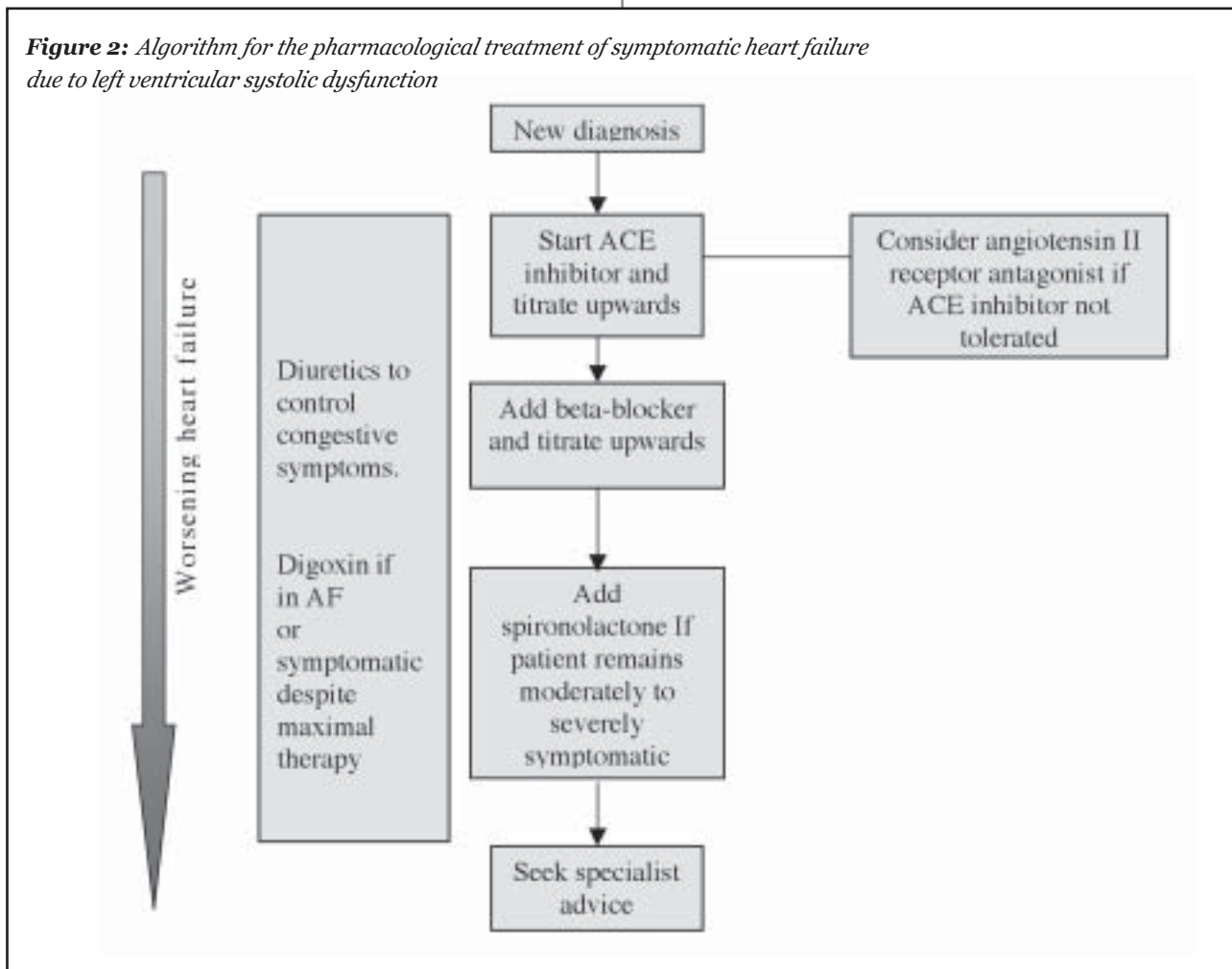**Figure 1:** *Recommendations for the diagnosis of heart failure*

```
                    ┌─────────────────────────┐
                    │ Suspected heart failure │
                    └─────────────────────────┘
                                 │
                                 ▼
```

Exclude heart failure through:
- 12 lead ECG
- and/or natriuretic peptides

Other recommended tests (to exclude alternative diagnoses):
- Chest X-ray
- Urea and electrolytes, creatinine
- Full blood count
- Thyroid function tests
- Liver function tests
- Glucose
- Lipids
- Urinalysis
- Spirometry or peak flow

Both normal: Heart failure unlikely, consider alternative diagnosis

One or both abnormal

Echocardiogram

Figure 2: *Algorithm for the pharmacological treatment of symptomatic heart failure due to left ventricular systolic dysfunction*

New diagnosis

Start ACE inhibitor and titrate upwards

Consider angiotensin II receptor antagonist if ACE inhibitor not tolerated

Add beta-blocker and titrate upwards

Add spironolactone If patient remains moderately to severely symptomatic

Seek specialist advice

Worsening heart failure

Diuretics to control congestive symptoms.

Digoxin if in AF or symptomatic despite maximal therapy

inhibitor therapy regardless of whether symptoms persist or not.

- Diuretics should be routinely used for the relief of congestive symptoms and fluid retention in patients with heart failure.
- Spironolactone should be considered in patients who remain moderately to severely symptomatic despite optimal therapy.
- Digoxin should be considered if a patient in sinus rhythm remains symptomatic despite therapy with a diuretic, ACE inhibitor (or angiotensin II receptor antagonist) and beta-blocker or if the patient is in atrial fibrillation in which case it is used as first-line therapy.

Follow-up

- All patients with chronic heart failure require monitoring.
- This should consist of a clinical assessment of functional capacity, fluid status, cardiac rhythm, a review of medication, serum urea, electrolytes and creatinine.
- Frequency of monitoring depends on clinical condition but should not exceed 6 months.

Methods

We conducted a retrospective audit of the management of heart failure at St. Luke's Hospital. The records of all patients admitted to the medical wards in January 2002 were obtained and those patients with a primary or secondary diagnosis of heart failure were considered eligible for the purposes of the audit. Patients who had passed away by the time of the audit

Figure 3: *Form used for data collection*

and those patients whose files were untraceable were excluded from the analysis. Data from the files was entered in a pre-prepared data sheet (Figure 3). Demographic data about the patient, investigations performed to reach the diagnosis and assess severity, management of heart failure (both pharmacological and non-pharmacological), and planned follow-up were recorded on the data sheet.

Four hundred and thirty-nine case notes were requested of which 72 could not be traced, 184 patients had died and 183 case notes were found, of which 97 satisfied the criteria and were entered into the audit.

The diagnosis of congestive heart failure depended on either presentation to Accident and Emergency Department with signs and symptoms suggestive of heart failure or a note in the medical history listing congestive heart failure as a concurrent medical condition.

A total of 97 patients were included in the study and their characteristics are shown in Table 1.

The male-to-female ratio was close to 1:1 with 47 males and 50 females. As expected the females had a slightly higher mean age at 77 years compared to a mean age of 74 years for males.

We looked at the incidence of the following co-morbid conditions: ischaemic heart disease (35 patients), hypertension (46 patients), diabetes mellitus (38 patients), chronic obstructive pulmonary disease (30 patients), chronic renal failure (27 patients), peripheral vascular disease (4 patients), anaemia (2 patients) and gout (2 patients). There were 9 smokers, 29 ex-smokers and 59 non-smokers.

The aim of the audit was to assess the management of patients suffering from congestive heart failure in SLH during admission and follow-up. We compared current practice with the NICE recommendations.

Table 1: *Baseline characteristics of the patients (n=97)*

Characteristic	Number
Gender	
Males	47
Age Range: 54 - 91 years	
Mean: 74 years	
Females	50
Age Range: 57 - 93 years	
Mean: 77 years	
Smoking Status	
Smokers	9
Ex-smokers	29
Non-smokers	59
Co-morbid conditions	
Ischaemic heart disease	35
Hypertension	46
Diabetes mellitus	38
Chronic obstructive-pulmonary disease	30
Chronic renal failure	27
Peripheral vascular disease	4
Anaemia	2
Gout	2

Table 2: *Percentage of patients undergoing recommended tests*

Investigation	% of patients
Echocardiography	28
BNP*	0
ECG	100
Chest X-Ray	100
Urea, electrolytes and creatinine	100
Full blood count	100
Plasma Glucose	87
Liver Function	36
Thyroid Function	24
Urinalysis	13
Lipids	8
Spirometry	0

*BNP is B-type natriuretic peptide, a marker of ventricular dysfunction. Assay currently not available at SLH

Results and Discussion

Diagnosis

The guidelines suggest that when a diagnosis of heart failure is considered, a 12-lead ECG and / or natriuretic peptides should be measured. When one or both are abnormal, the diagnosis should be confirmed by echocardiography. Furthermore, diseases that may present in a similar fashion should be excluded by the tests shown in Figure 1.

Most patients did not have the full range of investigations suggested by NICE (Table 2).

In fact although electrocardiography, a chest radiograph and assays for urea, electrolytes, creatinine and a full blood count were performed in all patients, the use of other tests was rather low. Eighty-seven percent of patients had a blood glucose assessment, 36% liver function tests, 24% thyroid function, 13% urine analysis, 8% lipid profile and none had spirometry.

Echocardiography, for the purpose of these guidelines serves as a diagnostic tool to confirm the diagnosis of chronic heart failure and exclude other pathologies. The guidelines only specify the need for a single echocardiogram; follow-up studies

Figure 4: *Dosage distribution of enalapril in study population*

are not mentioned. The number of patients who had ever had an echocardiogram for any reason was 28% with the dates of tests going back up to 11 years previously.

B-type natriuretic peptide is a neurohormone secreted from the cardiac ventricles in response to volume expansion and pressure overload. It has been shown to be highly sensitive as a test to rule out chronic heart failure - a normal assay being very unlikely even in a patient with asymptomatic heart failure. The test is not available at St. Luke's Hospital so none of our patients had this assayed.

Treatment

A diagrammatic representation of the algorithm for the pharmacological treatment of symptomatic heart failure is shown in Figure 2.

Our audit showed that only 2% of patients had lifestyle modification advice documented in the case notes. While some degree of lifestyle modification advice is possibly given to most patients, this analysis shows failure to deliver documented standardised recommendations in 98% of patients.

Ninety-eight per cent of patients were treated with diuretics, bumetanide being the most common. The dose ranged from 1mg to 10mg daily in divided doses. Two patients were on frusemide, 1 on bendrofluazide and 4 patients were having both bumetanide and bendrofluazide.

All chronic heart failure patients should be on an ACE inhibitor. The only absolute contra-indications are anuria or angioedema with previous exposure to the drug, bilateral renal artery stenosis, pregnancy and cardiogenic shock. In our patient cohort 70 were on an ACE inhibitor. Out of the remaining 28 patients, 2 were on an angiotension II receptor blocker, 2 had elevated creatinine levels below 200 µmol/L, 1 had peripheral vascular disease which may raise concerns on renal artery stenosis and 3 had creatinine levels above 200 µmol/L but below 300µmol/L. The guidelines advise caution in the use of ACE inhibitors in patients with serum creatinine above 200µmol/L. They recommend monitoring electrolytes and creatinine with discontinuation only if potassium rises above 6mmol/L or creatinine increases by more than 100% or above 350µmol/L.

Seventy-four per cent of patients treated for heart failure were given either an ACE inhibitor or an angiotensin II receptor blocker. Twenty-five patients were not given either treatment, with 6 possible contra-indications as outlined above (in only one case was there documentation in the case notes). It was not clear why the other 19 patients were not being given this treatment.

Enalapril was used in 64 of the 70 patients treated with ACE inhibitors. NICE recommends that this should be started off at a dose of 2.5 mg bd, which is then doubled every second week until the maximum tolerated dose or the target dose of 10-20 mg bd is reached. Figure 4 shows the dosage distribution of enalapril in our patient cohort. It is evident that the doses used are less than those recommended with the mean dose being 9mg dly, less than half the target dose. Only 6 patients are being treated at target doses. In spite of the low doses being used, dosage was increased in only 9% of outpatient visits.
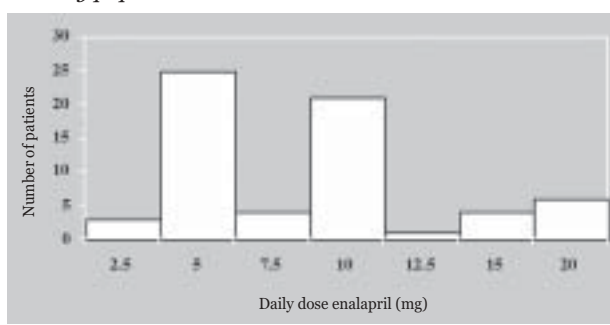
Beta blockers are recommended in all patients with heart failure due to left ventricular systolic dysfunction after diuretic and ACE inhibitor therapy regardless of whether symptoms persist or not.

Three large mortality trials have clearly demonstrated favourable outcomes with beta-blocker use in patients with heart failure using carvedilol, metoprolol and bisoprolol.[7,8,9] At the time of submission, only carvedilol and bisoprolol were licensed in the UK for use in heart failure.

Our audit showed that only 9 patients were on beta-blocker therapy (7 on carvedilol, 1 on atenolol and 1 on sotalol). In our study population there were 30 patients with chronic obstructive pulmonary disease or asthma and 4 patients suffering from peripheral vascular disease. Beta-blockers are contra-indicated in reversible airways disease although a cardio-selective beta-blocker can be used with adequate caution. Peripheral vascular disease is not a contra-indication to prescription of a beta-blocker. Excluding pulmonary disease patients, 13% of eligible patients were on a beta-blocker. In none of the other cases was documentation found in the patients' notes of a reason as to why beta blockade was not started.

NICE recommends that patients already on a beta-blocker for some other reason be kept on the same medication. Due to the initial deterioration in cardiac function after starting beta-blockade, these drugs should be commenced when the clinical condition is stable.

Spironolactone has been shown to increase life expectancy in moderate to severe heart failure.[10] Twelve patients were on spironolactone. Unfortunately it proved very difficult to determine baseline severity of heart failure from the notes as NYHA class is infrequently documented. We therefore cannot comment on whether this drug is being under-utilised.

Follow-up

NICE suggest that all patients with heart failure should have regular follow-up visits. The range between visits should depend on the clinical status of the patient, though the maximum interval should be of 6 months. In our audit we found that 55% of patients had outpatient follow up visits. The interval between appointments ranged from 1 to 12 months. Due to frequent usage of vague terms such as, "first available MOP", it was not possible to determine mean interval between visits.

Conclusions and Recommendations

The analysis performed by us has a number of limitations. It is a retrospective analysis of the management of patients prior to the publication of the guidelines that we used as a gold standard. Most of the evidence on which the guidelines were based had been previously published, and the use of certain drugs already formed part of daily medical practice although their optimal use may have been less widespread.

At St. Luke's Hospital there are logistic difficulties in requesting certain tests such as echocardiograms, notwithstanding the fact that 300 echocardiograms are performed every month. This may not necessarily mean that the clinician is unacquainted with their importance.

Patients who had passed away by the time of the study were excluded as it would be problematic to analyse the adequacy of their follow-up. On the other hand this introduces a bias in our study population since it is difficult to determine whether sub-optimal treatment could have contributed to their death.

Despite the limitations of our audit, which was aimed at getting an overview of current management practice, we suggest that the diagnosis of heart failure should be reassessed in all patients, their notes should be checked and any investigations that need to be done should be carried out as per NICE guidelines. One investigation that should be more frequently used is echocardiography which is currently being done in less than one third of patients.

While 75% of patients are on ACE inhibitors or angiotensin II receptor antagonists, target doses should be attained and more emphasis needs to be placed on incrementing medication at each outpatient visit with a view to reaching maximal tolerated doses. After numerous trials showing the beneficial effects of beta-blockers, their use in the local setting is definitely sub-optimal.

Follow-up should be more consistent and frequent. The involvement of primary care physicians could serve to cut down on hospital out-patient waiting lists and help to optimise patient care.

References

1. McMurray JJ, Stewart S. Epidemiology, aetiology, and prognosis of heart failure. Heart 2000; 83: 596-602.
2. Stewart S, MacIntyre K, Hole DJ, Capewell S, McMurray JJ. More 'malignant' than cancer? Five-year survival following a first admission for heart failure. Eur J Heart Fail 2001; 3: 315-322.
3. Ashton CM. Care of patients with failing hearts: evidence for failures in clinical practice and health services research J Gen Intern Med 1999; 14: 138-140.
4. Chin MH, Goldman L. Factors contributing to the hospitalization of patients with congestive heart failure. Am J Public Health 1997; 87: 643-648.
5. Blue L, Lang E, McMurray JV, Davie AP, McDonagh TA, Murdoch DR, et al. Randomised controlled trial of specialist nurse intervention in heart failure. BMJ 2001; 323: 715-718
6. Chronic heart failure: Management of chronic heart failure in adults in primary and secondary care. National Institute of Clinical Excellence issued July 2003. www.nice.org.uk
7. Packer M, Coats AJ, Fowler MB, et al. Effect of carvedilol on survival in severe chronic heart failure. N Engl J Med 2001;344(22):1651-8.
8. Effect of metoprolol CR/XL in chronic heart failure: Metoprolol CR/XL Randomised Intervention Trial in Congestive Heart Failure (MERIT-HF). Lancet 1999;353(9169):2001-7.
9. The Cardiac Insufficiency Bisoprolol Study II (CIBIS-II): a randomised trial. Lancet 1999;353(9146):9-13.
10. Pitt B, Zannad F, Remme WJ, et al. The effect of spironolactone on morbidity and mortality in patients with severe heart failure. Randomized Aldactone Evaluation Study Investigators. N Engl J Med 1999;341(10):709-17.