

ARE THERE BENEFITS FOR PATIENTS ATTENDING 'A HEART FAILURE CLINIC'? A FIVE YEAR REVIEW

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ABSTRACT

Objective: To determine the effects of attendance at a chronic 'heart failure clinic', with emphasis on patient education on morbidity, hospitalisations and mortality associated with heart failure due to left ventricular systolic dysfunction.

Design: Retrospective case audit study.

Setting: University hospital with a primary catchment area of 500,000 inhabitants.

Patients: 100 patients (aged 54-87 years, 59% male) with a confirmed diagnosis of left ventricular systolic dysfunction.

Methods: Patients regularly reviewed at a 'heart failure clinic' where emphasis was placed on optimisation of drug therapy, patient education, self-management, and adherence to treatment regimes.

Results: The median age of the study population was 72 (50-87 years), 89% had a current NYHA status of III/IV. The average dose of frusemide was 111mg/day, with 74% of the study group receiving an ACE inhibitor and 15% an angiotensin II antagonist or vasodilator. Hospitalisation rate was 0.7±0.1 admissions per patient per year, the length of stay during admission was 11.8±2 days (females) and 10.5±2.2 days (males), and the average length of survival from first clinic attendance was 5.3±1.75 years for females and 2.97±0.5 years for males.

Conclusions: Attendance at a 'heart failure clinic' ensures optimisation of medication, reduction of patient admission rate and duration of hospitalisation.

INTRODUCTION

Heart failure is a common and chronic condition with an estimated prevalence in the UK of 0.4%, rising to 2.8% in those aged over 65 years.¹ It is an increasingly significant cause of morbidity, accounting for 5% of all adult hospital admissions and carrying a mortality of 20%-75% depending on severity.²⁻⁴ The cost burden to the National Health Service in 1990/91 was estimated to be almost £360 million representing over 1% of the total NHS expenditure.⁵ Hospitalisations and acute admissions accounted for 59.5% of this total.

Angiotensin-converting enzyme (ACE) inhibitors have been proven to reduce morbidity and mortality, but a significant proportion of eligible heart failure patients do not receive these drugs.^{4,6-8} Possibly as a consequence of this, the outlook for such patients in the community has not improved.⁹

Consideration of the high costs associated with heart failure, combined with the observation that optimal cost-

saving therapies are not always offered, begs the question of how best to provide care for these patients. While specialist clinics caring for other common chronic disorders such as diabetes and asthma are common, few patients are cared for at specialist 'heart failure clinics'. If such specialist clinics are to have a role, it is clear that they must be demonstrated to provide better patient care and patient outcomes than is available in current practice. The aims of this study were to determine whether structured follow-up at a dedicated 'heart failure clinic' reduces the morbidity and improves the outlook and care for patients with heart failure.

METHODS

A consultant-led dedicated 'heart failure clinic' was established in 1991 to accommodate patients completing a series of heart failure-based research projects. More recently it has provided a focus for the management of patients previously followed up at an outpatient clinic or discharged from a general medical ward. The clinic is held twice a month, and all patients are reviewed by a consultant physician and junior doctor experienced in the treatment of heart failure. The clinic requires low technology and utilises only two doctors and one nurse for eight hours a month; in this time however it is possible to review 48-60 patients every month.

The patient records for the first 100 patients with a confirmed diagnosis of left ventricular systolic dysfunction secondary to ischaemic heart disease or idiopathic dilated cardiomyopathy attending this clinic during the period 1993-1998 were examined retrospectively. Patients with diastolic dysfunction or normal ejection fraction, valvular heart disease or who had undergone a revascularisation procedure during the study period (approximately 30% of the clinic's population) were excluded from this audit.

Data was collected on patient demography, New York Heart Association Classification (NYHA) for heart failure, medication, clinic attendance and hospitalisations due to heart failure. A database was designed in Microsoft Access for Windows version 2.0 into which the patient details were entered. The data was exported to Microsoft Excel version 5.0 for analysis and generation of figures. Life-table analysis was performed on SPSS (Statistical Package for Social Scientists) for Windows version 6.0.

All the patients initially presented to the hospital services with an acute symptomatic exacerbation of heart failure, and had proven echocardiographic and / or radionuclide ventriculographic systolic dysfunction with reduced ejection fraction measured by radionuclide ventriculography. Patients were reviewed at this clinic at three- to six-monthly intervals (more frequently if necessary) according to heart failure status and the need for titration of medication.

During clinic visits patients were weighed, examined, questioned regarding symptoms of heart failure and had routine blood tests performed.

TABLE 1
Ejection fraction, age, survival from diagnosis, admissions per year and length of stay according to NYHA class.

NYHA class	Mean ejection fraction	Mean age	One year survival	Five year survival	Ten year survival	Average no. admission/year	Average length of admission
II (n=11)	24.3 ±7.8	66 ±8.5	100%	100%	N/A ±0.4	0.18 ±5.1	2.6
III (n=73)	27.5 ±9.4	72 ±7.0	99%	88%	44%	0.6 ±0.9	4.4 ±4.8
IV (n=16)	20.6 ±8.2	73 ±4.2	87%	20%	6%	2.0 ±1.5	17.1 ±21

± standard deviation

PATIENT EDUCATION

Patient education was considered paramount and emphasis was placed on dietary advice (avoidance of salt-rich foods, and the addition of salt during cooking or at the table), adherence to medication and other life-style measures such as weight loss and exercise regimens and annual influenza vaccination (uptake 92%). To improve compliance drug regimens were kept as simple as possible, and patients were regularly encouraged to adhere to their medication. However patients were also advised how to modify these therapeutic regimens to keep to an absolute minimum any interference with social activities.

The greatest emphasis in patient education, however, was placed on recording daily weight, the presence of ankle oedema and symptoms of worsening heart failure. Suitable patients (94%) were supplied with a diary to enter their daily weight and symptoms, and they were instructed to weigh themselves at the same time each morning and to monitor relevant symptoms such as breathlessness, orthopnea and paroxysmal dyspnoea. These patients were then instructed to increase their diuretic dose (i.e. take an extra 40mg of frusemide or 2.5mg of metolazone daily) for two days until their weight had returned to baseline recordings or symptoms had abated. If the increase in weight or symptoms persisted for more than two days, patients were instructed to seek early medical help. The importance of seeking very early medical advice in the event of rapidly worsening symptoms was particularly stressed and patients were given a specific contact name and phone number within the hospital to ensure direct access and continuity of care.

RESULTS

Patient demographics

At the time of the study 59% were male, the median age was 72 years (54-87 years) and the median age at diagnosis of heart failure 69 years (45-87 years). The aetiology of heart failure was ischaemic heart disease in 98% of the study group and idiopathic dilated cardiomyopathy in 2%. The average duration of follow-up at the clinic was 3.2 years (four months to seven years); 97% of patients were receiving a diuretic (average 111mg frusemide daily), 74% an ACE inhibitor, 5% an angiotensin II antagonist and 10% a vasodilator.

At the time of the study the NYHA functional status was 11% NYHA class II, 73% NYHA class III and 16% class IV.

Morbidity and Mortality (Table 1)

During the period of the study patients attended the clinic on average for 4.1±0.1 visits *per annum* (female 3.6 and male 4.4 clinic visits *per annum* respectively). The average number of hospital admissions per year was 0.7±0.1 with an average inpatient stay of 11.8±2.0 and 10.5±2.2 days for females and males respectively, which compares favourably to a previously reported national average of 1.33 admissions per year,^{5,9} and an average inpatient stay of 14.5-15.2 days for this age group.

The average survival time from first diagnosis was 5.3±1.75 years for women and 2.97±0.5 years for men and one, five and ten year mortality rates were 3% (females 3%, males 4%), 26% (females 14%, males 38%) and 47% (females 24%, males 69%). The average mortality rate from first attendance at the clinic was 15% (females 11%, males 19%) for the first year, 37% (females 28%, males 44%) following five years and 37% (females 28%, males 44%) following seven years.

As expected, worsening NYHA functional class was associated with increasing mean age, increasing annual admission rate and average length of admission, and a decrease in ejection fraction and survival rate.

DISCUSSION

Although the number of patients involved in this retrospective study is small, these results suggest that patients attending a clinic dedicated to heart failure management, when compared with available national heart failure data, are hospitalised less frequently, have shorter inpatient stay and survive longer. In accordance with previously reported population-based studies, our population was elderly, sick (89% NYHA III and IV) and predominantly male. This renders our observations relevant to the heart failure population within the community.^{1,10}

Possibly the most important finding of this study is that attendance at a dedicated outpatient clinic ensures optimal use of proven therapies. In our study population, 74% of patients received an ACE inhibitor, and a further 15% an angiotensin II antagonist or a vasodilator. These are favourable figures when compared to previous reports suggesting that

only 10%–54% of patients with heart failure receive an ACE inhibitor,^{3,4,11,12} and similar to those recently reported by McAlister *et al.* for a dedicated heart failure clinic.² Clearly one of the key roles of a dedicated 'heart failure clinic' is to optimise medical therapy.

A clinic dedicated specifically to patients suffering from heart failure also allows more emphasis to be placed on patient education, including a reinforcement of the need for strict adherence to treatment regimens and therapeutic compliance. It is clear that suboptimal patient education with a resultant lack of compliance with diet and medication may account for up to 23.5% of hospital re-admissions with decompensated heart failure.¹⁴ This has been further reinforced by Cline *et al.* who recently reported a similar significant reduction in hospitalisation rates to 0.7 admissions per patient per year following improved patient education and easy access to a nurse-led clinic, a figure identical to that for patients attending our clinic.¹⁵ It is also likely that strict adherence to regular weight control and improved recognition of a deterioration in the symptoms of heart failure, combined with encouragement to seek early medical assistance in the event of a deterioration in symptoms, also resulted in a reduction in hospital admissions.

Large population-based studies, such as those from Framingham and Rochester, confirm that the prognosis attached to heart failure is poor although clearly improved by drug therapy.^{6,7,10,16–20} The use of ACE inhibitors as part of a heart failure regimen has consistently shown an improvement in patient survival: 74% of our patients were prescribed an ACE inhibitor.^{6,7,18} The one year mortality rates in the *treatment arms* of the SOLVD and V-HeFT II studies, which recruited patients with NYHA classes II/III, were 12.3% and 9% respectively.^{7,18} The PRAISE study, which recruited patients with NYHA class III/IV on background ACE inhibitor therapy, reported a one year mortality rate of 25%.¹⁹ The recently published CIBIS-II study (patients with NYHA class III/IV and background ACE inhibitor therapy) reported an estimated annual mortality rate of 13.2% in the placebo group and 8.8% in the bisoprolol group.²⁰ Both the PRAISE and CIBIS II studies utilised a study population with similar NYHA characteristics and similar mortality although the demographic features of this cohort differed from those of the population described in this study. Although this was not a randomised controlled study, the mortality rates for our older and generally iller study population, 3% at one year, 28% at five years and 47% at ten years following first diagnosis and 15%, 37% and 38% after one, five and seven years clinic follow-up compare favourably with the treatment arms of these major heart failure trials.

At the time this specific study was completed, β -blockers were not routinely prescribed in our clinic. The convincing evidence of substantial benefit for drugs, such as carvedilol, bisoprolol and metoprolol, offers scope for additive improvement in outcome under specialist supervision,^{20–22} although the age and presence of multiple pathologies in non-study-based patients with heart failure might limit the current use of these agents.

LIMITATIONS

The major limitations of this study are the small numbers of patients involved and the possibility of selection-bias in the cohort under review. Although this study represents a consecutive series of patients prospectively followed up at

a 'heart failure clinic', it is not a random selection of community-based patients. Nevertheless patient demographics in this study do agree more closely with the results from large community- and hospital-based epidemiological studies than with the baseline data supplied by the large intervention trials such as CONSENSUS, SOLVD and CIBIS-II. This suggests that our patient population may more closely match patients in the community and hospital practice within the UK.

Another limitation is that this was not a prospective randomised trial of the efficacy of attendance at a 'heart failure clinic' compared to non-attendance. Logistical problems would be incurred in such a study, the major one being the difficulty in obtaining a group with well-defined proven left ventricular systolic dysfunction with which to compare. Heart failure patients are not a homogeneous group, with approximately one-third having high ejection fraction failure, and these patients are reported to do less well. In contrast, patients attending a dedicated 'heart failure clinic' are sufficiently well defined to be included in this type of study, and this is not true for the majority of community- or hospital-based patients.

CONCLUSION

Although this study was not randomised or prospective, comparison of our results with those of major drug studies, in which the patient groups were generally younger and with less severe heart failure, is favourable. Follow-up at a 'heart failure clinic' with appropriate patient education appears to be associated with increased prescribing of ACE inhibitor therapy, and a reduced hospital admission frequency and length of inpatient stay: this is at a cost of increased outpatient review and is thus, financially-speaking, cost-effective. Further outcome studies are essential to establish the role of intensive outpatient care in achieving improved long-term outcome and reduced cost in heart failure patients.

REFERENCES

- Sutton GC. Epidemiologic aspects of heart failure. *Am Heart J* 1990; 120:1538–40.
- Parameshwar J, Poole-Wilson PA, Sutton GC. Heart failure in a district general hospital. *J R Coll Physicians Lon* 1992; 26:139–42.
- McMurray J, McDonagh T, Morrison CE *et al.* Trends in hospitalisation for heart failure in Scotland 1980–1990. *Eur Heart J* 1993; 14:1158–62.
- Hillis GS, Al-Mohammad A, Wood M *et al.* Changing patterns of investigation and treatment of cardiac failure in hospital. *Heart* 1996; 76:427–9.
- McMurray J, Hart W, Rhodes G. An evaluation of the cost of heart failure to the National Health Service in the UK. *Br J Med Economics* 1993; 6:99–110.
- The CONSENSUS Trial Study Group. Effects of enalapril on mortality in severe congestive cardiac failure. Results of the co-operative north Scandinavian enalapril survival study. *N Engl J Med* 1987; 316:1429–35.
- The SOLVD Investigators. Effects of enalapril on survival in patients with reduced left ventricular ejection fractions and congestive cardiac failure. *N Engl J Med* 1991; 325:293–302.
- Parameshwar J, Shackell MM, Richardson A *et al.* Prevalence of heart failure in three general practices in north west London. *Br J Gen Pract* 1992; 42:287–9.
- Cowie MR, Mosterd A, Wood DA *et al.* The epidemiology of heart failure. *Eur Heart J* 1997; 18:208–25.

- ¹⁰ Rodeheffer RJ, Jacobsen SJ, Gersh BJ *et al.* The incidence and prevalence of congestive heart failure in Rochester, Minnesota. *Mayo Clin Proc* 1993; 68:1143-50.
- ¹¹ The clinical quality improvement network (CQIN) investigators. Mortality risk and patterns of practice in 4,606 acute care patients with congestive heart failure. The relative importance of age, sex and medical therapy. *Arch Intern Med* 1996; 156:1669-73.
- ¹² McDermott MM, Feinglass J, Sy J *et al.* Hospitalized congestive heart failure patients with preserved versus abnormal left ventricular systolic function: clinical characteristics and drug therapy. *Am J Med* 1995; 99:629-35.
- ¹³ McAlister FA, Teo KK, Taher M *et al.* Insights into the contemporary epidemiology and outpatient management of congestive heart failure. *Am Heart J* 1999; 138:87-94.
- ¹⁴ Michalsen A, König G, Thimme W. Preventable causative factors leading to hospital admission with decompensated heart failure. *Heart* 1998; 80:437-41.
- ¹⁵ Cline CMJ, Israelsson BYA, Willenheimer RB *et al.* Cost effective management programme for heart failure reduces hospitalisations. *Heart* 1998; 80:442-6.
- ¹⁶ Ho KKL, Anderson KM, Kannel WB *et al.* Survival after the onset of congestive heart failure in Framingham heart study subjects. *Circ* 1993; 88:107-15.
- ¹⁷ Cohn JN, Archibald DG, Zeishe S *et al.* Effect of vasodilator therapy on mortality in chronic congestive heart failure. *N Engl J Med* 1986; 314:1547-52.
- ¹⁸ Cohn JN, Johnson G, Ziesche S *et al.* A comparison of enalapril with hydralazine-isosorbide dinitrate in the treatment of chronic congestive heart failure. *N Engl J Med* 1991; 325:303-10.
- ¹⁹ Packer M, O'Connor CM *et al.* Effect of amilodipine on morbidity and mortality in severe chronic heart failure. *N Engl J Med* 1996; 335:1107-14.
- ²⁰ CIBIS-II Investigators and Committees. The cardiac insufficiency bisoprolol study II (CIBIS-II): a randomised trial. *Lancet* 1999; 353:9-13.
- ²¹ Paker M, Bristow MR, Cohn JN *et al.* For the US carvedilol study group. The effect of carvedilol on morbidity and mortality in patients with chronic heart failure. *N Eng J Med* 1996; 334:1349-55.
- ²² 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.

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