

AUDIT

Evidence of inadequate investigation and treatment of patients with heart failure

Karen W Clarke, David Gray, John R Hampton

Abstract

Objective—To determine the referral rates to hospital and level of investigation of patients with heart failure, and to assess whether they are receiving optimum management.

Design—A retrospective survey.

Setting—Nottingham Health District.

Patients—505 patients receiving loop diuretic treatment prescribed by their general practitioner.

Main outcome measures—Referral to hospital as an inpatient or outpatient for assessment of assumed cardiac failure; investigations—electrocardiography, chest radiography, and echocardiography; treatment with angiotensin converting enzyme inhibitors.

Results—Only 56% of patients prescribed loop diuretics fulfilled the diagnostic criteria for heart failure. Of these, 74% had been referred to hospital, of whom 80% had had an electrocardiograph, 75% a chest radiograph, but only 31% an echocardiogram. Only 17% of patients with heart failure were being treated with angiotensin converting enzyme inhibitors in conjunction with loop diuretics.

Conclusions—Patients with heart failure in the Nottingham Health District are not being adequately investigated or receiving the optimum treatment.

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Heart failure affects between 0.4% and 0.8% of the general population in the United Kingdom.^{1,2} We estimate that the prevalence of heart failure is more likely to be in the region of 1.5% (unpublished data), this is compatible with data from the United States³ and makes the condition as common in Nottingham as ischaemic heart disease.⁴ The treatment of chronic heart failure uses a considerable proportion of National Health Service resources,⁵ and 5% of all adult hospital admissions are due to heart failure⁶ with each patient staying in hospital for between eight⁵ and 17 days.⁶

There is now good evidence to suggest that all patients with symptomatic heart failure and impaired left ventricular systolic function will benefit from treatment with an angiotensin converting enzyme inhibitor^{7,8}

and therefore all patients with assumed heart failure should have an echocardiogram and treatment with an angiotensin converting enzyme inhibitor if tolerated.

In allocating resources it is important to know not only the prevalence of a condition but also the demand that is placed or might be placed on specialist services.

Recent evidence suggests that general practitioners rather than the hospital services treat most of these patients,² and we therefore decided to investigate how patients with heart failure in our health district are treated and to determine what use they make of local cardiological services and whether they are receiving optimum treatment.

It is likely that most patients with symptomatic heart failure will be prescribed a loop diuretic either alone or in combination with other treatment such as an angiotensin converting enzyme inhibitor; patients prescribed loop diuretics by their general practitioner were therefore chosen as our study population.

Patients and methods

METHODS

General practices were selected at random from the Nottinghamshire Family Health Services Authority list, and were asked if their practice computers were able to produce a list of all patients on loop diuretics. Six general practices from the 20 practices initially selected were able to produce such a list and agreed to participate in the study. The notes of 505 patients so identified were then examined in the general practitioners' surgeries by one of the authors (KWC). The patients' sex, age at diagnosis, symptoms and signs, investigations carried out, and current medication were all recorded. Five of the practices were urban and the other semirural. The practices had a total of 22 000 patients aged over 30 registered with them, and the age sex breakdown of these practices was similar to that of Nottinghamshire as a whole.

The clinical diagnosis of heart failure poses problems, and whereas several standard sets of criteria have been developed to assist in the diagnosis^{9,10} these involve clinical examination of the patient. For the purposes of our study, patients were judged to have had diuretics prescribed for heart failure if they satisfied any one of the following criteria.

Cardiovascular
Medicine, University
Hospital Nottingham
K W Clarke
D Gray
J R Hampton

Correspondence to:
Dr Karen W Clarke,
Cardiovascular Medicine,
University Hospital,
Nottingham NG7 2UH.

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Data on patients

| | Median age (yr) | F/M |
|--|-----------------|-------|
| All patients on diuretics (n = 505) | 73 | 60/40 |
| Patients with heart failure (n = 281) | 76 | 47/53 |
| Patients referred to hospital (n = 230) | 71 | 48/52 |
| Patients treated by general practitioner (n = 275) | 80 | 70/30 |

(a) Exertional dyspnoea, orthopnoea, or paroxysmal nocturnal dyspnoea relieved by diuretic treatment.

(b) Dyspnoea with signs of a raised jugular venous pressure, or a third heart sound, or ankle oedema, or basal crepitations.

(c) Dyspnoea with an increased cardiothoracic ratio, upper lobe blood diversion, or frank pulmonary oedema on a chest radiograph.

(d) Dyspnoea with echocardiographic evidence of left ventricular dysfunction or impaired left ventricular contraction apparent during a contrast ventriculogram.

Results

PATIENT DEMOGRAPHY

Of the 505 patients 300 (60%) were female and 205 (40%) were male. The median (range) age at the time of starting diuretics was 73 (0–96) years including those with congenital heart disease (76% of patients were ≥ 65 when they were first prescribed frusemide).

PATIENTS PRESCRIBED DIURETICS FOR HEART FAILURE

Of the 505 patients being treated with diuretics by their general practitioner, 281 (55.6%) fulfilled our diagnostic criteria for heart failure. The other main reasons for prescribing frusemide were hypertension (16%) and ankle oedema of unknown cause (11%).

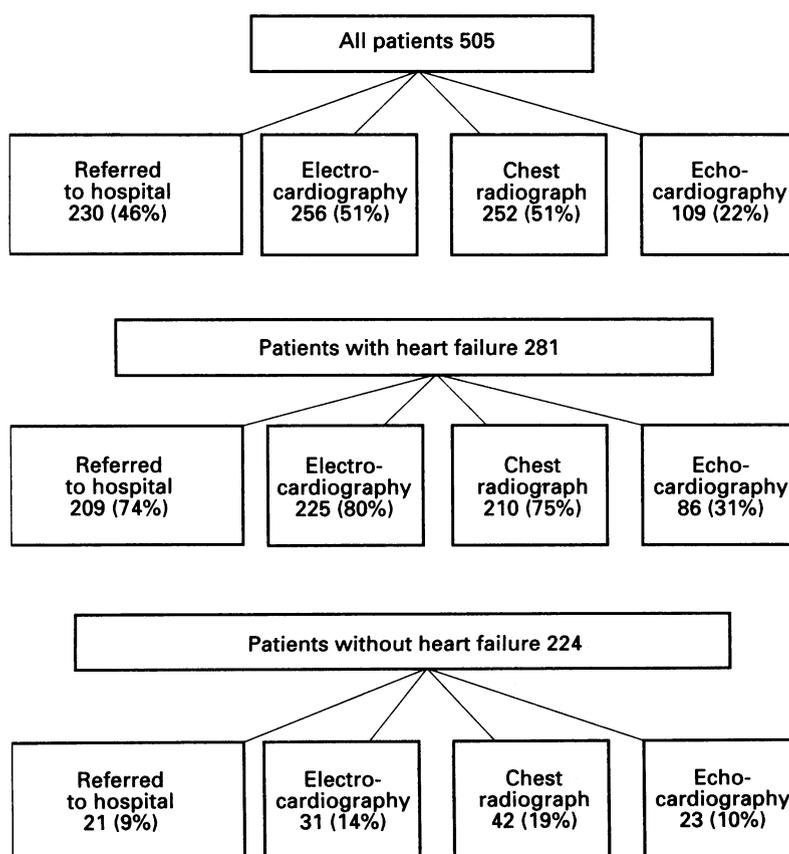
HOSPITAL REFERRAL

Of the 505 patients on diuretic treatment 230 (46%) were referred to one of two teaching hospitals in the city for investigation of presumed heart failure. Half (52%) were admitted as emergency cases and half (48%) were referred to the medical out patient clinics.

The table shows that the patients not referred to hospital tended to be elderly (median age 80 years) and female (70% of the patients not referred to hospital). Among patients not referred, 26% had ankle oedema as the only indication for diuretic prescription and in 11% no obvious symptoms were recorded in their notes. By contrast, ankle oedema was the sole symptom in only one patient who was referred to hospital.

Two general practitioners referred 38% of their patients taking loop diuretics, two referred 44%, and the others 52% and 55%.

Of the 281 patients who fulfilled our diagnostic criteria for heart failure 209 (74%) had been referred to hospital; 115 (55%) had been admitted acutely. These 209 patients actually accounted for 91% of the total hospital referrals; the remaining 72 patients fulfilled our diagnostic criteria for heart failure but the general practitioners did not consider it necessary to refer them for specialist advice.



Investigations of patients

INVESTIGATIONS

Electrocardiograph

Of the 505 patients 256 (51%) had had an electrocardiograph; of these 24% had been arranged by the general practitioner.

Of the 281 patients with evidence of heart failure 225 (80%) had had an electrocardiograph, of which 19% had been arranged by the general practitioner. These accounted for 88% of the total electrocardiographs performed.

Chest radiograph

Of the 505 patients 252 (51%) had had a chest radiograph. Of these 189(73%) were abnormal in keeping with heart failure.

Of those patients who fulfilled our criteria for heart failure 210 (75%) had had a chest radiograph; 27 of these were normal. These 210 patients accounted for 83% of all the radiographs performed.

Echocardiography and cardiac catheterisation

Of the 505 patients 109 (22%) had had an echocardiogram. Of these 95(87%) were abnormal with either valvar heart disease or evidence of left ventricular dysfunction.

Of the 281 patients who fulfilled diagnostic criteria for heart failure 86(31%) had had an echocardiogram. Only six of these echocardiograms were normal; 63% had evidence of

left ventricular dysfunction, 20% mitral valve disease, 8% aortic valve disease, and 2% congenital heart disease.

A total of seven (1.3%) patients had had a contrast ventriculogram (as part of the investigation of ischaemic heart disease) and two of these showed impaired left ventricular contraction (figure).

TREATMENT

Eighty (16%) of the 505 patients were prescribed angiotensin converting enzyme inhibitors in combination with loop diuretics. Of these 33 were being treated for hypertension.

Of the 281 patients with heart failure 47 (17%) were also prescribed angiotensin converting enzyme inhibitors. Of these patients 44 had had treatment started by hospital physicians, and all three patients who had treatment initiated by the general practitioner were under the care of the same general practitioner.

Discussion

We have shown that 75% of patients whom the general practitioners are treating with loop diuretics for heart failure have been referred to hospital either as out patients or as acute admissions. The remaining 25% of patients who fulfilled our diagnostic criteria for heart failure were being treated by the general practitioner alone. Forty per cent of the patients with heart failure have been seen as in-patients at least once. Other studies suggest that 7% of all medical consultations for heart failure involve an in-patient stay,² and that there are 14 general practitioner visits for each general medical in patient stay. If the 115 patients who had been admitted in our study had only done so on one occasion each, this would mean that they had been seen by the general practitioners in excess of 1600 times in the same time period. This may be the case, but it would seem to suggest that more of our patients are being referred for specialist opinion.

Most of the investigations carried out have been by hospital practitioners—general practitioners had arranged less than one quarter of the electrocardiographs, and about 10% of the chest radiographs. Despite the fact that 74% of patients with heart failure have been seen at the hospital, only one third have had an echocardiogram. The reason for this is not clear, although it may simply be that many patients are not seen by cardiologists. It could be suggested that all patients with heart failure should have an echocardiogram not only to confirm the diagnosis, but also to exclude valvar heart disease as an underlying cause, and as a possible contraindication to angiotensin inhibitor treatment.

The clinical diagnosis of heart failure is not necessarily accurate¹¹ and there is evidence that only 50% of patients being treated for heart failure have echocardiographic evidence of left ventricular systolic dysfunction.² In our sample, we have shown a much higher rate of

abnormal findings on echocardiography, and two thirds of the patients who fulfil diagnostic criteria for heart failure have evidence of impaired left ventricular function.

Not only are more of the patients in our study referred to hospital, but a higher percentage of them have abnormal echocardiograms in comparison with other studies.² It is important to note, however, that many of our patients are still not being fully investigated. It is also noteworthy that the patients not referred to hospital were older than those who were referred, and this may be influencing referral patterns and investigation.

Perhaps the most important aspect of our study is that few patients with clinical evidence of heart failure, and indeed with echocardiographic evidence of left ventricular dysfunction, are being treated with angiotensin converting enzyme inhibitors. Both the CONSENSUS and SOLVD studies have shown that symptomatic patients with heart failure benefit in terms of quality of life from such treatment.^{7,8} There are 234 patients in our cohort who fulfil our diagnostic criteria for heart failure who are not receiving angiotensin converting enzyme inhibition. Whereas many of these patients have not had an echocardiogram, 26 of them have documented evidence of impaired left ventricular function and are therefore not receiving the optimum treatment. There are also no good reasons why the more elderly patients should not receive angiotensin converting enzyme inhibitor treatment, and we should be investigating these people as thoroughly as others.

We have shown that in Nottingham a large proportion of patients with heart failure are seen at the hospital. Most of them are neither being fully investigated nor necessarily receiving the best treatment. At present the low investigation rate must in part be due to the hospital physicians. It should be remembered, however, that general practitioners could be more involved in appropriate management; we are at present evaluating the demand for an "open access" echocardiography service in our hospital. Not all patients need to have angiotensin converting enzyme inhibitors initiated in hospital,¹² but can safely have them started in the community.

It seems that there is still some way to go in adequately treating patients with heart failure both in the community and after referral to hospital. We recommend that every patient who is clinically thought to have heart failure has an echocardiogram, and we are encouraging local general practitioners to use our "open access" echocardiography service and to treat patients with angiotensin converting enzyme inhibitors themselves when there are no contraindications to do so.

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