Unmet need for diagnosis of heart failure: the view from primary care

F D R Hobbs

Heart failure and left ventricular systolic dysfunction (LVSD) are major diseases, with existing high prevalence (around 2% each), and prevalence that is on the increase. Based on the ECHOES (echocardiographic heart of England screening) study, which probably provides the most precise estimates on heart failure prevalence to date, 2.3% of adults in England over the age of 45 years suffer all cause heart failure, which rises to 3.1% if adults who are symptomatic with borderline abnormal ejection fractions (40–50%) are added. The latter suffer a significantly worse prognosis than people with an ejection fraction above 50%. In addition, 1.8% of adults suffer LVSD, of whom 1% also suffer symptoms and are therefore included within the rates quote for heart failure. As if this burden of disease was not significant enough, heart failure will get more common, for two main reasons. The first is that despite rates of myocardial infarction declining, infarction remains very common and rates of survival are increasing. Heart failure is an inevitable sequel in a high proportion of survivors (25% over 10 years). Secondly, heart failure is essentially a disease of the elderly with a prevalence of 3% in those aged 65–74 years, 7% in those ages 75–84, and 15% in those over 85. As our populations increasingly age, the consequences in terms of heart failure are self evident.

As well as being very common, both conditions are characterised by very poor prognosis and quality of life for patients, and are responsible for among the highest healthcare costs for single conditions. Prognosis is so poor that heart failure can be effectively considered a malignant disease, with mortality rates equivalent to colorectal cancer and worse than breast or prostate cancer (table 1).

Since outcomes in heart failure, and indeed LVSD, are linked to the stage of disease, then both early and accurate diagnosis are needed to guide appropriate treatment strategies. However, despite the need for accurate diagnosis, many doctors, especially in primary care, currently rely on diagnosing heart failure on clinical grounds alone, without further investigation. There are many factors that contribute to these deficits in diagnostic triage.

CURRENT PRACTICE IN THE DIAGNOSIS OF HEART FAILURE AND CONSEQUENCES FOR CARE

There is considerable evidence of physician misdiagnosis in heart failure. Studies that have explored the validity of a diagnostic label of heart failure in primary care, report high rates of misdiagnosis when patients are assessed against objective criteria, with rates of accuracy quoted of 50%, 25%, and 32%. In only 26% of patients referred to a rapid access heart failure clinic with suspected heart failure was the diagnosis established after investigation.

However, these data, on low rates of confirmed heart failure among patients with a diagnostic label, provide only a partial picture. Most studies use the strict criteria recommended by the working group on heart failure of the European Society of Cardiology (ESC)—namely, appropriate symptoms plus clinical signs of fluid retention plus evidence of cardiac structural abnormality—and report on LVSD heart failure only. Patients with asymptomatic left ventricular dysfunction or symptomatic atrial fibrillation but no signs of fluid retention are therefore excluded. Some of these patients will have "heart failure".

In the ECHOES study, in addition to the 25% of patients with a label of heart failure who did meet the ESC working party criteria, there were an additional 23% of patients with typical symptoms and atrial fibrillation (half of whom had a normal echocardiogram) and 12% of patients with symptoms and a borderline ejection fraction of 40–50%. It may, therefore, have been appropriate for the primary care physicians to identify a cardiac explanation for symptoms such as fatigue or breathlessness. Furthermore, under diagnosis of heart failure is not confined to the primary care physician, with only 31% of patients being offered echocardiography by hospital physicians following referral with possible heart failure in one study. Diagnosing heart failure is difficult for all clinicians.

In addition to the obvious problems associated with delayed, missed, or erroneous diagnoses, there is a secondary effect upon treatment of heart failure. The under treatment of the condition, both in terms of under use and under dosing of therapies, is well documented. This performance gap between research findings and clinical practice is repeated in almost any successful intervention. Furthermore, the problem is not confined to primary care physicians since hospital specialists also fail to adopt evidence based interventions rapidly.

Most studies have also indicated that identifying barriers to change in physician behaviour is a further important prerequisite to adoption of evidence based practice. In the case of angiotensin converting enzyme (ACE) inhibition in heart failure this is probably a major issue, since data suggest that primary care physicians, while being aware of the evidence for treatment benefits with ACE inhibitors in heart failure, have exaggerated concerns over the safety and tolerability of these agents in their patients.

EXISTING INVESTIGATIONS FOR HEART FAILURE DIAGNOSIS

Given the burden of illness associated with heart failure, it may become appropriate for clinicians to adopt a more

Table 1 Survival rates of heart failure and common cancers

<table>
<thead>
<tr>
<th></th>
<th>1 year</th>
<th>2 years</th>
<th>3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer</td>
<td>88</td>
<td>80</td>
<td>72</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>75</td>
<td>64</td>
<td>55</td>
</tr>
<tr>
<td>Heart failure</td>
<td>67</td>
<td>41</td>
<td>24</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>18</td>
<td>8</td>
<td>6</td>
</tr>
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Abbreviations: ACE, angiotensin converting enzyme; BNP, brain natriuretic peptide; ECHOES, echocardiographic heart of England screening; LVSD, left ventricular diastolic dysfunction

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aggressive stance to case finding, especially among patients at most risk (such as those with hypertension, established coronary heart disease, or diabetes). However, before initiating treatments in such patients, clinicians should more readily seek objective evidence of cardiac structural abnormalities.

To this end, primary care physicians should have open access to echocardiography, with interpretation of the imaging by an appropriate specialist. Unfortunately, however, availability of this non-invasive test is often limited. A recent survey of a random sample of primary care physicians across six European countries showed that only between 5% (Netherlands) and 37% (UK) of doctors had direct access to echocardiography (Table 2).15 Concerns are expressed that providing primary care physicians direct access to echocardiography would result in inappropriate utilisation. However, a trial of open access echocardiography considered only 12% of referrals as “inappropriate”.20

Are there alternatives in primary care to echocardiography? Symptoms and signs may indicate the possibility of heart failure, but are not reliable for establishing the diagnosis.22 Chest x-rays are often cited as useful in diagnosis, but a normal result does not exclude heart failure.22 The main option in primary care is believed to be an ECG, since a normal recording will, in most cases, exclude left ventricular dysfunction.23, 24 However, lack of skills in interpretation of ECGs seriously undermine the utility of this test in primary care, since referral of the recording for specialist opinion is usually still required. This adds to cost and delay. Even in the best hands, the ECG can only act as a “rule out test”, requiring confirmatory imaging of positive tests.

Table 2 Primary care physician perceptions of tests routinely used in diagnosis of heart failure and the reported proportion of patients on ACE inhibitors compared to actual prescribing on CardioMonitor data (EuroHF study)<sup>*</sup>

<table>
<thead>
<tr>
<th>Test</th>
<th>Britain (n=111) (%)</th>
<th>Netherlands (n=41) (%)</th>
<th>France (n=28) (%)</th>
<th>Germany (n=40) (%)</th>
<th>Italy (n=41) (%)</th>
<th>Spain (n=13) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECG</td>
<td>73 (66)</td>
<td>19 (46)</td>
<td>27 (96)</td>
<td>40 (100)</td>
<td>41 (100)</td>
<td>12 (92)</td>
</tr>
<tr>
<td>Chest x ray</td>
<td>105 (95)</td>
<td>39 (95)</td>
<td>24 (86)</td>
<td>33 (83)</td>
<td>38 (93)</td>
<td>13 (100)</td>
</tr>
<tr>
<td>Echocardiography</td>
<td>30 (27)</td>
<td>3 (7.5)</td>
<td>18 (64)</td>
<td>25 (63)</td>
<td>30 (73)</td>
<td>5 (39)</td>
</tr>
</tbody>
</table>

Patients reported to be on ACE inhibitors (%) | 54  | 52  | 61  | 62  | 62  | 47  |
Patients actually on ACE inhibitors* (%) | 43  | 38  | 41  | 26  | 25  |

*CardioMonitor data.

In summary, although there is evidence of heart failure misdiagnosis by primary care physicians when using clinical signs and symptoms alone, the error rate may be rather less reported since a significant majority of patients demonstrate at least borderline abnormalities in cardiac function or could be classified as heart failure on less stringent criteria. Furthermore, if misdiagnosis is a problem for primary care physicians, then enhanced access to diagnostic support is necessary.25–27

The evidence confirms the view that heart failure is a complex disorder requiring a mix of objective evidence of structural cardiac problems alongside careful clinical assessment, plus objective imaging of the heart by an expert.

Comparison of patients with heart failure and patients with cancer of a similar (poor) prognosis are worth repeating. Susppected cancer results in rapid referral of patients (in the UK within two weeks) to specialist centres, which have immediate access to a wide range of expensive diagnostic procedures to determine diagnosis and staging. In proven cases, the interval between diagnosis and definitive management is short. Ongoing treatments, which are almost entirely aimed at improving mortality usually at considerable cost to morbidity, are well utilised. The contrast with services available to patients with heart failure, with a 50% overall five year survival, are stark.

POTENTIAL ROLE FOR NATRIURETIC PEPTIDES IN HEART FAILURE DIAGNOSIS

One potential diagnostic aid for the future, of particular relevance to the primary care setting, is the assessment of patients by brain natriuretic peptide (BNP) assay, although current data on BNP validity are conflicting. One study reported BNP had a sensitivity of 97%, specificity of 84%, positive predictive value of 70%, and negative predictive value of 91% in patients with recent onset symptoms referred to a rapid access heart failure clinic.22 More recent work from a large generalisable population of adults has reinforced the potential value of natriuretic peptide assays, both for BNP and NT-proBNP. For NT-proBNP in the diagnosis of heart failure, a level of >36 pmol/l had a negative predictive value of 99.7%, and an area under receiver operator characteristic (ROC) curve of 91% (95% confidence interval (CI) 87% to 95%). For BNP in the diagnosis of heart failure, a level of >21 pmol/l had a negative predictive value of 99%, and an area under ROC curve of 87% (95% CI 83% to 92%).

Therefore, both BNP and NT-proBNP assays do appear to have value in the diagnosis of heart failure in a community setting, with similar sensitivities and specificities. High negative predictive values indicate their chief utility would be to rule out heart failure in suspected cases with normal natriuretic peptide concentrations. Prospective trials of the assays in symptomatic primary care screening should be conducted.

CONCLUSIONS

REFERENCES

QUESTION AND ANSWER SESSION

Question: Would you share your thoughts about the critical indications for β blockers in this population?

Professor Hobbs: I think its unequivocal that data have shown that they have an important role, certainly in patients with stage II and III heart failure and for one β blocker for patients in severe heart failure as well. This role is both in terms of enhancing the prognostic benefit of ACE inhibitor but importantly also in improving quality of life. The difficulty is the way you initiate treatment: obviously these matters are complicated and require time and repeat visits to stabilise patients. I think it is those factors that are inhibiting people from initiating treatment. In primary care you have the additional difficulty in terms of the licensed restrictions for β blockers in that one needs to be perceived as somebody who specialises in heart failure in order to initiate treatment. So I think there are barriers but they are surmountable barriers, given clear protocols for initiation.

Question: When you do tests and you have two groups of patients—those who have a positive diagnosis in terms of the tests, and another group that have been diagnosed because of their symptoms but all the tests are negative—do you have any feel for the outcome in the second group?

Professor Hobbs: No. Most of the trials to date that have looked particularly at the natriuretic peptides have basically looked at one of these assays that hold enough promise in relatively select populations (but now increasingly generalisable populations) to explore how they might be used in clinical practice. What we do need, frankly, is more focused research into how these tests might be more appropriately used. For example, we really do need a trial for natriuretic peptides in populations considered at high risk—the question is whether you can use them as screening tests and also whether you use them in patients with established symptoms to triage to echocardiography. Really we need to do these separate studies to determine what their most useful role is, and it probably is going to be in risk stratification.

Professor Philip Poole-Wilson: I would like to come to the defence of primary care physicians and raise the issue of whether we are tilting at windmills. In an analysis of the GP Research Database where there are tens of thousands of patients with heart failure, where a primary care physician makes a diagnosis of definite heart failure, the outcome is exactly the same as you see in large epidemiological studies—that is, the GPs are probably right, and you don't need an echocardiogram to diagnose an obvious case of heart failure. There then is a group where the diagnosis is uncertain and some of that group, I think, may well be uncertain even after these tests. But there is then a group where heart failure is not synonymous with a large heart—there may be other complex abnormalities of the left ventricle, or in some the echo may fail to detect an abnormality and that is where we need to focus in the screening and not in cases that are blindingly obvious and where the primary care physician almost certainly gets the diagnosis right.

Professor Hobbs: One of the problems of working in primary care is working with undifferentiated problems that may represent a great spectrum of disease. The one major problem in heart failure—which is a syndrome and not a single disease entity—is being fairly certain what is causing it because that is going to determine the best treatment strategy. You are often going to be treating patients who have multiple symptoms and are on multiple medications. Even in cases where you can be certain of the diagnosis you still want to confirm this—you might confirm the cause and you want to have more reassurance that you can help patients to tolerate the treatments long enough for them to get the benefit. As we know with some of these treatments, they're probably taken quite temporarily and there is a huge potential for patients to discontinue medication. Therefore, I think that confirming the diagnosis is important for patients as well as doctors—the more certain they are that the treatments are likely to benefit them, the more likely they are to stay on therapy.
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*Heart* 2002 88: ii9-ii11
doi: 10.1136/heart.88.suppl_2.ii9

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