Implementing joint treatment guidelines to improve prescribing in general practice
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Chapter 4
Perceived barriers for treatment of chronic heart failure in general practice. Are they affecting performance?


Objective: The aim of this study is to determine to what extent barriers perceived by general practitioners (GPs) for prescribing angiotensin-converting enzyme inhibitors (ACE) inhibitors in chronic heart failure (CHF) patients are related to underuse and underdosing of these drugs in actual practice.

Methods: Barriers were assessed with a semi-structured questionnaire. Prescribing data were extracted from GPs' computerised medical records for a random sample of their CHF patients. Relations between barriers and prescribing behaviour were assessed by means of Spearman rank correlation and multivariate regression modelling at GP level.

Results: GPs perceived on average four barriers in prescribing ACE inhibitors or optimising ACE inhibitor dose. They prescribed ACE inhibitors to 45% and had previously initiated such treatment in an additional 3.5% of their patients, in an average standardised dose of 13.5 mg. Many GPs found it difficult to change treatment initiated by a cardiologist. Furthermore, initiating ACE inhibitors in patients already using a diuretic or stable on their current medication was perceived as a barrier. Titrating the ACE inhibitors dose was also seen as difficult by more than half of the GPs. No significant relationships could be found between the barriers perceived and ACE inhibitors prescribing. Regarding ACE inhibitors dosing, the few GPs who did not agree that the ACE inhibitor should be dosed as high as possible prescribed higher ACE inhibitor doses, and those that believed it is not useful to prescribe ACE inhibitors to very old CHF patients were prescribing lower ACE inhibitor doses.

Conclusion: Variation between GPs in prescribing ACE inhibitors for CHF can not be explained by differences in the barriers they perceive. Tailor-made interventions targeting only those doctors that perceive a specific barrier will therefore not be an efficient approach to improve quality of care.
Introduction

The prevalence of chronic heart failure (CHF) is increasing with the age of the population and leads to high mortality. Despite several landmark studies that showed that appropriate treatment can improve morbidity and mortality, management in general practice is still not optimal. Persisting major problems are underuse and underdosing of angiotensin-converting enzyme (ACE) inhibitors. General practitioners (GPs) perceive certain problems that could explain why they do not treat their CHF patients optimally. These problems can be classified as internal or external barriers. Internal barriers include lack of knowledge, e.g. not knowing the target dose of ACE inhibitors or lack of awareness of new recommendations, as well as certain attitudes, such as lack of confidence, doubts about benefits for very old patients, fear for adverse effects or reluctance to change the treatment when a patient is stable. External barriers may be related to organisational factors, including difficulties at the primary-secondary care interface.

It is often suggested that intervention programs for improving performance need to be targeted at the perceived barriers. However, it is not clear whether all such barriers are as relevant for not achieving optimal management. Lack of knowledge appears not to be very pertinent, since many GPs have adequate knowledge about ACE inhibitors but are still reluctant to prescribe them for their patients. Self-insight of doctors in their treatment decisions is limited, and they may not be fully aware of the factors influencing their performance. To our knowledge, no study has tried to assess the relationship between the GPs’ self-reported problems and their actual prescribing for heart failure. Better understanding of this relation may help to indicate areas in which an intervention could be most beneficial.

The aim of our study is to determine to what extent barriers that GPs perceive for prescribing ACE inhibitors in CHF patients are related to their actual prescribing.

Methods

Study population

This study was part of the baseline of a larger study conducted from September 2001 to May 2002 in the north of the Netherlands, evaluating two audit programs for peer review groups focusing on the treatment of CHF and treatment of hypertension in diabetic patients. A total of 95 GPs participated in the chronic heart failure program. Prescribing data were extracted from GPs’ computerised medical records for a random sample of their CHF patients. After identification of possible CHF patients from the records, the GPs were asked to verify the diagnosis. Because of the larger study, CHF patients with a co-morbidity of diabetes type 2 were excluded. GPs present at the audit meeting of their peer review group were
asked to complete a semi-structured questionnaire on their perceived problems with the recommended treatment for CHF.

Perceived barriers
A questionnaire was developed with statements of possible internal and external barriers towards prescribing ACE inhibitors in patients with heart failure as identified from the literature. These literature-based barriers included three general beliefs supporting the recommended treatment. Disagreement with these was considered an internal barrier. Six specific beliefs and attitudes opposing the general recommendations were presented, each also representing a possible internal barrier. Furthermore, two external barriers were included which were related to the sharing of responsibilities between primary and secondary care (Table 1). An open-ended question was added to identify any other barriers the GPs perceived with implementing evidence-based recommendations for CHF treatment. These self-reported barriers were categorised in nine issues by the first two authors.

Actual treatment
Actual treatment data were extracted from computerised medical records by trained abstractors who visited the GPs’ practices. A random sample of up to 10 CHF patients per GP was identified. In most of the practices that were not single-handed, lists of the GP’s personal patients were used. In 3 practices, one GP shared the responsibility for the same patients with a partner. In such cases, prescribing decisions for these patients were assigned to both GPs reflecting their joint prescribing policy.

Data collected for the patients included age, gender, date of CHF onset, specialist referrals, and current medication. For each GP, the percentage of patients currently or previously treated with an ACE inhibitor was calculated as outcome variable, as well as the average dosing of the ACE inhibitor currently prescribed. The ACE inhibitor dosages were first converted to standardised dosages according to target daily doses for heart failure as recommended in the Dutch desk reference book. This method of standardisation, which has been used before, uses 20 mg of enalapril as reference dose. Based on the conversion, enalapril 20 mg equivalents are captopril 150 mg, ramipril 10 mg, quinapril 20 mg, lisinopril 20 mg, fosinopril 40 mg, and perindopril 4 mg. This conversion is an alternative for the more commonly used defined daily dosage (DDD) method, which can not be applied in this case since the DDDs for ACE inhibitors are based on their use for hypertension.

Data analysis
To assess the relationship between the GPs’ perceived barriers and their prescribing behaviour analyses were conducted on GP level. Firstly, the number of
different barriers perceived was related to the percentage of patients prescribed an ACE inhibitor and the average standardised ACE inhibitors dose prescribed with Spearman rank correlations (?). This non-parametric statistic was used since the number of barriers perceived did not have a normal distribution. Two sub-analyses were conducted to assess whether relations differed for internal versus external barriers, and for literature-based versus self-reported barriers. Secondly, we looked at the relationship between individual barriers and ACE inhibitors prescribing. Univariate analyses were conducted to identify possible relevant factors, especially in specific patient groups. The data were further explored by means of scatter plots to identify possible outliers or subgroups that could mask possible relationships. A multivariate regression model was used to assess the relevance of the various barriers for explaining differences in ACE inhibitors prescribing. Finally, the complete data analysis was repeated for the subgroup of patients who had not been referred to a cardiologist in the year prior to data collection. This was decided when it became clear that a substantial number of patients had been referred in the last year, and one might expect that treatment initiated by the specialist confounds the analysis.

Results
Fifty-eight GPs completed the questionnaire, and prescribing behaviour was measured for 43 of them, resulting in an overall response rate of 45% (Figure 1). The GPs participating in this study were mainly male (88%), and on average 47 years old (SD 6.9), which was not significantly different from the non-responding GPs. Prescribing behaviour was assessed for 339 of their patients (Figure 1). At that moment, the GPs prescribed an ACE inhibitor to an average of 44.9% (SD 15.9) of their CHF patients in an average standardised dose of 13.5 mg (SD 6.6). Another 3.5% of the patients had been using an ACE inhibitor prior to the study period, including 7 patients that had stopped using ACE inhibitor because of various side effects and 5 who had stopped without a documented reason. Including these patients, the GPs prescribed or had previously prescribed an ACE inhibitor to 48.6% of their patients (SD 17.9). This was not significantly different from GPs who did not complete the questionnaire. Angiotensin-II-antagonists were prescribed to 6% of the patients. All but two GPs considered ACE inhibitors as standard therapy for all CHF patients, and most GPs agreed that ACE inhibitors should be dosed as high as possible (Table 1). On average, the GPs perceived four barriers in prescribing ACE inhibitors or optimising ACE inhibitors dosage. All 43 GPs perceived at least one barrier; 41 GPs perceived at least one internal barrier, and 37 GPs perceived at least one external barrier.
Relationship between number of barriers and ACE inhibitors prescribing

No relationship appeared to exist between the number of barriers and the ACE inhibitor prescribing (Table 2). No significant correlations were found between the total number of barriers perceived by the GPs and the percentage of patients receiving an ACE inhibitor ($\chi^2 = 0.02$) or the average ACE inhibitor dose prescribed ($\chi^2 = -0.08$). Also, no significant relationships were found with the number of internal or external barriers, nor with the number of literature-based or self-reported barriers.

Literature-based barriers

With regard to initiating an ACE inhibitor, a substantial number of GPs (42%) reported that they were afraid of endangering a stable situation and reluctant to start an ACE inhibitor when a patient already received a diuretic (Table 1). The most important barrier regarding the ACE inhibitor dosing was the difficulty perceived with titrating this dose. A majority of the GPs (77%) found it hard to change treatment initiated by a cardiologist. The univariate analysis showed no significant relationships between the individual barriers and ACE inhibitor prescribing, and the scatter plots also revealed no patterns. Even GPs who believed it is not useful to prescribe ACE inhibitors to very old CHF patients did not have less patients of 85 years or older on these drugs. In the multivariate regression model, none of the specific barriers was related to the percentage of patients currently of previously receiving an ACE inhibitor. The model did not significantly explain the prescribing differences.
Table 1: Perceived internal and external barriers for prescribing ACE inhibitors for CHF, divided in literature-based and self-reported barriers (N=number of GPs reporting barrier)

<table>
<thead>
<tr>
<th>Internal</th>
<th>Literature-based barriers</th>
<th>N</th>
<th>Self-reported barriers</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not agree with:</td>
<td>I believe that the standard therapy for <strong>new</strong> CHF patients should be an ACE, irrespective of the severity of the disease</td>
<td>1</td>
<td>Starting, checking, and titrating ACE dose is difficult</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I believe that the standard therapy for <strong>known</strong> CHF patients should be an ACE, irrespective of the severity of the disease</td>
<td>2</td>
<td>Fears about adverse effects of ACE</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>I believe that ACE should be prescribed in as high a dose as possible for CHF patients</td>
<td>2</td>
<td>Not wanting to change treatment when patients are stable</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>I find initiating ACE difficult in CHF patients already using a diuretic</td>
<td>11</td>
<td>Doubts about usefulness of ACE, especially in elderly patients</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I find it difficult to frequently titrate the ACE dose in CHF patients</td>
<td>18</td>
<td>Difficulties with treating complex cases (comorbidity/polypharmacy)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I believe that CHF patients who are stable on their current medication, should not be put on an ACE</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I believe it is not useful to prescribe ACE to very old CHF patients</td>
<td>18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1 (continued): Perceived internal and external barriers for prescribing ACE inhibitors for CHF, divided in literature-based and self-reported barriers (N = number of GPs reporting barrier)

<table>
<thead>
<tr>
<th>Literature-based barriers</th>
<th>N</th>
<th>Self-reported barriers</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe that a cardiologist should initiate ACE therapy in CHF patients</td>
<td>3</td>
<td>Problems with patient compliance or motivation</td>
<td>5</td>
</tr>
<tr>
<td>I find it hard to change treatment initiated by a cardiologist</td>
<td>33</td>
<td>Problems in interacting with specialist care</td>
<td>9</td>
</tr>
<tr>
<td>Time constraints</td>
<td></td>
<td>Difficulties with screening for undertreated heart failure patients</td>
<td>1</td>
</tr>
<tr>
<td>Difficulties with screening for undertreated heart failure patients</td>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>
Chapter 4

Surprisingly, the two GPs who did not agree that the ACE inhibitor dose should be as high as possible, prescribed higher doses than GPs who did agree with this recommendation. This barrier was significantly associated in the multivariate model explaining differences in ACE inhibitor dosages (beta 0.42, p=.03), even after exclusion of the two outliers. The GPs who agreed that it is not useful to prescribe ACE inhibitors to very old CHF patients were prescribing lower ACE inhibitors doses (beta 0.34, p=.04).

Self-reported barriers
The most common self-reported barrier concerned the sharing of responsibilities with specialists (Table 1). According to several GPs co-management with a cardiologist made it difficult to change the therapy, and some GPs felt the cardiologist interfered too much. Furthermore, eight GPs mentioned possible adverse effects of ACE inhibitors as a barrier towards prescribing. A few GPs mentioned problems with patient motivation as a barrier. Addition of the self-reported barriers to the multivariate model did not significantly alter any of the findings.

Analysis of patients not referred to a cardiologist
Cardiologist treatment could have confounded our analysis. Patients not referred to a cardiologist in the year prior to data collection were prescribed an ACE inhibitor less often than the 36% of patients that had been referred (44% versus 61% on ACE inhibitors, t-test = -2.2, p=.03). No significant difference was found regarding ACE inhibitor dosage. Analysis including only the non-referred patients, however, hardly changed our findings. Again no relationship was found between the number of barriers and ACE inhibitors prescribing. In the multivariate model there were no barriers significantly explaining differences in the percentage of patients currently or previously receiving an ACE inhibitor. One additional factor was found to be associated in the model explaining differences in ACE inhibitor dosages. GPs who believed that CHF patients stable on their current medication should not be put on an ACE inhibitor prescribed higher dosages of ACE inhibitors (beta -0.48, p=.02).
Table 2: Number of perceived barriers and average ACE inhibitors prescribing in CHF patients

<table>
<thead>
<tr>
<th>Number of barriers</th>
<th>N</th>
<th>% patients on ACE inhibitor</th>
<th>Standardised ACE inhibitor dose (mg)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>80.0</td>
<td>13.7</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>49.7</td>
<td>13.5</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>42.2</td>
<td>10.9</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>48.1</td>
<td>15.0</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>41.4</td>
<td>15.4</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>67.1</td>
<td>13.4</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>31.7</td>
<td>11.2</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>62.5</td>
<td>6.2</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>55.6</td>
<td>9.2</td>
</tr>
<tr>
<td>average = 4.1 (SD 1.86)</td>
<td>43</td>
<td>48.6</td>
<td>13.5</td>
</tr>
<tr>
<td>average internal barriers = 2.8 (SD 1.64)</td>
<td>41</td>
<td>48.5</td>
<td>13.5</td>
</tr>
<tr>
<td>average external barriers = 1.2 (SD 0.88)</td>
<td>37</td>
<td>47.1</td>
<td>12.9</td>
</tr>
</tbody>
</table>

* = based on a conversion using a standardised target dose of 20 mg
N = number of GPs

**Discussion**

In this study we found remarkably few relationships between perceived barriers and actual prescribing for CHF. The problems that certain GPs acknowledged, such as their reluctance to initiate ACE inhibitors in already treated CHF patients or the difficulties with gradually increasing the ACE inhibitor dose, were not reflected in their prescribing of these drugs. No matter what barrier is reported, it does not seem to affect the GPs’ management of CHF patients in general practice. The scatter plots between perceived barriers and ACE inhibitors prescribing also showed no meaningful patterns, indicating that our lack of finding any significant relationships can not be explained by having too low numbers or a few outliers in the study.

For some patients, GPs tried to initiate an ACE inhibitor but treatment had been stopped for various reasons. We included these cases in our analysis, thereby focussing on all attempts of a GP to start ACE inhibitors treatment in CHF patients. Many of the patients in our study were seen by a cardiologist in the year prior to data collection, which was found to be related to receiving more ACE inhibitors. However, subgroup analysis including only prescriptions for patients not recently referred to a cardiologist did not show any concealed relationships. In our study we took the overall prescribing of ACE inhibitors for CHF patients as primary outcome measure, expecting to find relationships between perceived barriers and the general prescription pattern. On a more specific level the
association might be stronger, for instance, GPs who believe that it is not useful to prescribe ACE inhibitors to very old patients could be expected to prescribe less ACE inhibitors especially in this subgroup of patients. However, even on this more specific level no significant relationship could be found. Our findings are in line with those from a recent explanatory study on effective management of type 2 diabetes, where no relationship was found between the number of recommendations followed by physicians and the presence of barriers perceived at patient level. Also in the IMPROVEMENT of heart failure study, physicians’ knowledge and attitudes did not seem to be predictive of appropriate ACE inhibitor treatment.

The low response rate might be considered as a limitation of our study. However, there is no indication that the relationship between the doctors’ perceptions and performance would be different for participating and non-participating GPs, and there was no difference regarding their prescribing of ACE inhibitors for CHF.

Another possible limitation is our use of medical records to measure the GPs’ prescribing behaviour for CHF patients. As is the case with more than 90% of Dutch GPs, the GPs in this study prescribe electronically, and these prescriptions are automatically stored in the medical records. Patients were selected as having CHF according to their GP, without independently confirming the diagnosis. This was done since our study sought to relate perceived barriers with current management for those patients who the GP considered as having CHF.

Interventions to improve quality of care often focus on education and addressing perceived barriers for optimal performance. The findings from our study imply that targeting only those doctors that perceive a specific barrier with a tailor-made programme will not be an efficient approach. Variation in the quality of care between GPs can not be explained by differences in the barriers they perceive. It might even be true that being aware of a barrier stimulates some doctors to be more active in dealing with that barrier. In future research on an extended population we will try to assess whether specific factors at patient or practice level may better explain differences in the quality of care, in order to find more efficient ways to optimise the treatment of patients with CHF.

References


