

Are angiotensin-converting enzyme inhibitors prescribed appropriately and at evidence-based doses?

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Focal points

- ACEIs are indicated in patients with heart failure, diabetes aged over 55 years or after myocardial infarction, if ACEI contraindications are not present
- Forty-five per cent of medical inpatients had one of these ACEI indications and some had several ACEI indications
- A quarter of medical inpatients in whom ACEI are indicated, inappropriately do not receive ACEI
- A quarter of inpatients inappropriately receive suboptimal ACEIs doses
- Overall a third of patients in whom ACEI were indicated received inappropriate ACEI prescriptions

Introduction

Angiotensin-converting enzyme inhibitors (ACEI) reduce mortality and morbidity in patients with congestive heart failure and myocardial infarction (MI) and in patients with diabetes over 55 years.¹⁻⁵ A dose-benefit relationship exists for ACEI in heart failure. Clinical guidelines recommend post-MI treatment with ACEIs continue long-term.⁴

This work aimed to assess the appropriateness of prescribing ACEIs in heart failure, myocardial infarction and diabetes, and whether appropriate ACEI doses were prescribed.

Method

Inpatients' notes were examined for the indications: congestive heart failure, myocardial infarction, diabetic patients over fifty-five years with cardiovascular risk factors or microalbuminuria. Cardiovascular risk factors, including hypertension, hyperlipidaemia, IHD, stroke, and contraindications to ACEIs, such as aortic stenosis or bilateral renal artery stenosis were also noted.

Acceptable reasons for suboptimal dosing were noted, including hypotension, dose titration increment within the past two weeks. Doses and ACEIs were noted from drug charts.

Prescribing was appropriate if ACEI was prescribed for patients with ACEI indications. ACEI prescribing was also appropriate if no ACEI was prescribed for patients with indications and contraindications were present. Prescribing was inappropriate if no ACEI was prescribed when indicated in the absence of contraindications.

The ACEI dose was appropriate if the dose was in line with clinical trial doses (e.g. ramipril 10mg daily)⁵ or if a suboptimal dose was prescribed but an acceptable reason was recorded.

Results

A total of 117 patients was seen, of whom 52 (44 per cent) had ACEI indications documented. Of these, 40 (77 per cent) received ACEIs or had contraindications recorded and thus received appropriate therapy (Table 1).

When doses were considered, 12 patients on ACEI received evidence-based doses and 10 had valid reason for suboptimal dosing, a total of 22 (73 per cent) prescribed appropriate ACEI doses. Eight (27 per cent) patients inappropriately received suboptimal doses. Considering inappropriate non-prescription of ACEIs and inappropriate doses, 20 out of 52 (38 per cent) patients received inappropriate ACEI therapy.

Appropriateness of ACEI prescribing was not different for males and females, cardiac and general medical patients, or number of indications present. Patients with heart failure were more likely to receive optimal ACEI doses (Chi-square $P=0.047$).

Table 1 Indications and appropriateness of prescribing ACEIs

Indication	Number of patients			
	Total	On ACEI	Appropriately not on ACEI	Inappropriately not on ACEI
Myocardial infarction	14	8 (57%)	1 (7%)	5 (36%)
Heart failure	28	18 (64%)	5 (18%)	5 (18%)
Diabetic over 55 with cardiovascular risk factors	21	12 (57%)	5 (18%)	4 (14%)
Diabetic with (micro) albuminuria	4	3 (75%)	1 (25%)	0 (—)
Total patients with ACEI indications	52	30 (58%)	10 (19%)	12 (23%)

Discussion

Almost half patients seen on medical, cardiac, surgical and acute care of the elderly wards had an ACEI indication and many had more than one. Although three-quarters of patients received appropriate ACEI prescribing, one-quarter of patients were prescribed ACEI at inappropriate doses.

Hypertension is also an ACEI indication but other drugs may be used. A combination of drugs at sub-optimal doses is considered more effective than monotherapy; therefore we excluded hypertension.

Some contraindications such as hypotension and hyperkalaemia are transient. Aortic stenosis varies from mild to severe, so may not be an absolute contraindication and prescribers may decide benefits outweigh risks in mild aortic stenosis. Similarly, one patient with bilateral renal artery stenosis was still receiving ACEI. However, the aim was to define objective, simple to use criteria of appropriate prescribing that can be easily applied to enhance prescribing quality and reduce morbidity and mortality.

References

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