Choice of first antihypertensive – are existing guidelines ignored?

Ifeanyi Okechukwu, Azra Mahmud, Kathleen Bennett & John Feely

Department of Pharmacology & Therapeutics, Trinity College Centre for Health Sciences, St James's Hospital Dublin 8, Ireland

What is already known about this subject

- Recommended treatment guidelines for hypertension have been developed to assist GPs' decisions about appropriate therapies.
- The British Hypertension Society's (BHS) 2004 guidelines recommend initial drug choice based on age, and avoidance of β -adrenoceptor blockers in diabetes.

What this study adds

- Prescribing of first-line antihypertensives in Ireland appears guided by age, but mainly for those under 55 years.
- Adherence to the guidelines was in part related to patient gender.
- Presence of concomitant diabetes had a greater influence on the choice of therapy than age of patient.

Correspondence

Dr K. Bennett, Department of Pharmacology and Therapeutics, Trinity College Centre for Health Sciences, St James's Hospital, Dublin 8, Ireland.

Tel.: +353 18961303

Fax: +353 14539033

E-mail: okechuki@tcd.ie

Keywords

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Aims

To determine adherence to hypertension guidelines in relation to age and diabetes.

Methods

The Irish HSE-PCRS prescribing database identified patients initiating antihypertensive monotherapy in 2005. Logistic regression predicted the likelihood of therapy according to guidelines.

Results

The odds ratio (OR) of receiving therapies according to the guideline recommendations in those <55 years vs. ≥ 55 years was 1.31 (95% CI 1.26, 1.37). Diabetics were more likely than nondiabetics to receive antihypertensives other than β -adrenoceptor blockers (OR 2.97, 95% CI 2.74, 3.21).

Conclusions

Our findings show some adherence to the guidelines in relation to age but selective prescribing of antihypertensives for diabetics.

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Introduction

Hypertension is a major public health problem and the most common treatable risk factor for cardiovascular diseases particularly in patients aged over 50 years [1, 2]. Treatment guidelines defined as 'systematically developed statements to assist practitioner and patient

decisions about appropriate health care for specific clinical circumstances', may improve the quality of health and reduce medical costs [1].

As most diagnosis and management of hypertension takes place in primary care, general practitioners' (GPs) adherence to recommended guidelines in the initial

treatment of hypertension is important for blood pressure reduction and the prevention of related cardiovascular risks. The existing guidelines from the British Hypertension Society (BHS) in 2004 [2] for the choice of the initial treatment of hypertension recommend that, in the absence of compelling reasons to use or avoid a particular agent patients under 55 years should be commenced on A (ACE inhibitors/angiotensin receptor blockers (ARBs)) or B (β -adrenoceptor blockers) whereas those 55 years or older should be commenced on either C (calcium channel blockers) or D (diuretics). The guidelines also recommend that β -adrenoceptor blockers should be used with caution in those with diabetes (except with coronary heart disease). These guidelines were endorsed nationally in Ireland in 2004 by the Irish College of General Practitioners and National Medicines Information Centre (NMIC) [3] which publishes medical educational updates and guideline recommendations to all GPs in Ireland. The aim of this study was to determine adherence to the BHS 2004 guidelines in relation to age and diabetes in primary care in Ireland.

Methods

We used the Irish Health Service Executive Primary Care Reimbursement Services (HSE-PCRS) national prescribing database from July 2004 to December 2005 for the study. The HSE-PCRS scheme is a means tested scheme for those under 70 years of age, free for all over 70 years and provides free health services to about 30% of the Irish population. The scheme accounts for approximately two-thirds of prescribing in general practice, with over representation of women and the elderly. No diagnostic data are available.

All prescription items are coded using the WHO Anatomical Therapeutic Chemical (ATC) classification system [4] and basic demographic information (age and sex) are recorded in the database. We identified all patients aged 25 years and over receiving their first prescription of any antihypertensive monotherapy (ATC codes C03AA, C03BA, C03CA, C03D, C07A, C08, C09A, and C09C) between January and December 2005. New prescriptions were defined as those not having received any antihypertensive therapy in the previous 6 months. To identify patients receiving only antihypertensive treatment, we excluded those concurrently prescribed nitrates or aspirin for ischaemic heart disease; coprescription of ACE inhibitors, loop diuretics and any of the β -adrenoceptor blockers licensed for use in heart failure in Ireland (bisoprolol (ATC code C07AB07), carvedilol (ATC code C07AG02) and nebivolol (ATC

code C07AB12)). Patients with diabetes were identified as those receiving insulin or oral hypoglycaemic therapies (ATC code A10).

Statistical analysis

All analysis was carried out using the SAS statistical software package version 9.1 (SAS Institute Inc., Cary, NC). Logistic regression was used to calculate the odds ratio (OR) of receiving either 'AB' or 'CD' categories of antihypertensive agents for each age category adjusting for gender and the likelihood of receiving any of the four antihypertensive monotherapies in the subgroup of patients that were also receiving antidiabetic therapies. Results are expressed as percentages, OR and 95% confidence intervals (CI). Significance at $P < 0.05$ was assumed.

Results

A total of 48 394 patients aged >25 years (male : female 19 017 : 29 377) receiving their first antihypertensive therapy in 2005 were identified, including 6966 (14.4%) receiving antidiabetic therapies. The results are summarized in Table 1. The most widely prescribed agent in the nondiabetic group ($n = 41\,428$) was diuretics (30.7%, $n = 12\,731$) followed by β -adrenoceptor blockers (25.8%, $n = 10\,705$; 39% of this atenolol). The 'AB' category for those under 55 years was composed mainly of β -adrenoceptor blockers (61.6%) whereas for those ≥ 55 years, it was mainly ACE inhibitors/ARBs (55.8%). Conversely, diuretics were the predominant drug class in both age groups for the 'CD' category (63.3% and 63.2%, respectively). Patients under 55 years were more likely to receive 'AB' vs. 'CD' class of drugs compared with those 55 years and over (OR 1.51, 95% CI 1.45, 1.58). The odds ratio of receiving therapies according to the guideline recommendations in the under 55 years vs. 55 years and over was 1.31 (95% CI 1.26, 1.37). Males under 55 years were more likely to receive recommended therapies compared with males 55 years and over (OR 1.36, 95% CI 1.27, 1.47). Conversely, females 55 years and over were slightly more likely to receive recommended therapies compared with females under 55 years (OR 1.15, 95% CI, 1.10, 1.21).

Patients receiving antidiabetic therapies were more likely than nondiabetics to receive antihypertensive therapies other than β -adrenoceptor blockers (OR 2.97, 95% CI 2.74, 3.21). ACE inhibitors/ARBs were the most frequently prescribed class of drugs in diabetic patients (Table 1).

Discussion

Our study showed adherence to the guidelines in the initial choice of antihypertensives in relation to age but

Table 1

Choice of first antihypertensives by age and diabetes (expressed as % of age group or diabetes)

Drug class	Group without cardiovascular comorbidities and diabetes		
	Under 55 years (n = 12 745)	55 years or over (n = 28 683)	Sub-group receiving antidiabetic therapy (n = 6 966)
ACE inhibitor/ angiotensin receptor blockers	T: 2 863 (22.5%)	T: 7 718 (26.9%)	T: 3 253 (46.7%)
	M: 1 311 (10.3%)	M: 3 118 (10.9%)	M: 1 831 (26.3%)
	F: 1 552 (12.2%)	F: 4 600 (16.0%)	F: 1 422 (20.4%)
β -adrenoceptor blockers	T: 4 589 (36.0%)	T: 6 116 (21.3%)	T: 732 (10.5%)
	M: 1 604 (12.6%)	M: 2 313 (8.1%)	M: 384 (5.5%)
	F: 2 985 (23.4%)	F: 3 803 (13.2%)	F: 348 (5.0%)
Calcium channel blockers	T: 1 942 (15.2%)	T: 5 469 (19.1%)	T: 1 197 (17.2%)
	M: 825 (6.4%)	M: 2 143 (7.5%)	M: 607 (8.7%)
	F: 1 117 (8.8%)	F: 3 326 (11.6%)	F: 590 (8.5%)
Diuretics	T: 3 351 (26.3%)	T: 9 380 (32.7%)	T: 1 784 (25.6%)
	M: 871 (6.8%)	M: 3 188 (11.1%)	M: 822 (11.8%)
	F: 2 480 (19.5%)	F: 6 192 (21.6%)	F: 962 (13.8%)

T = Total; M = Male; F = Female.

predominantly in those under 55 years compared with those 55 years and over. There was relatively more use of the 'AB' class of drugs overall, with greater use of β -adrenoceptor blockers in younger age and diuretics in females. However, the high use of ACE inhibitors/ARBs in diabetics, although not explicit in British [2] but recommended in local [3] guidelines, compared with a recommended low use of β -adrenoceptor blockers suggests that the GPs choices may be guided more by the presence of concomitant clinical conditions.

Comparing our results with similar studies that have evaluated initial drug choices in hypertension, the first-line drug choices in those with diabetes were similar to those observed elsewhere in Europe. Greving *et al.* [5] reported that diabetes was the most important predictor of use of ACE inhibitors and ARBs as initial treatment in the Netherlands.

The overall pattern of drug choices from our study was similar to those observed in the UK in 2001 [6], except that in the current study there was a greater use of ACE inhibitors and ARBs in the older age group. The similarity may be explained by the fact that Ireland and the UK have similar practice cultures. Also, a study on first choice in Grampian, Scotland [7] in 2001/2002 showed a 53% adherence to the 1999 BHS recommendations. In Italy, ACE inhibitors have been reported to be prescribed widely as first-line treatment followed by calcium channel blockers and attributed more to pharmaceutical market forces than to the adoption of any specific guidelines by the GPs [8]. There was no signifi-

cant change in the prescribing pattern of antihypertensives in Ireland [9] before and following the 2004 BHS guidelines [2].

Campbell *et al.* [10] demonstrated that extensive educational interventions aimed at improving hypertension management will ultimately improve practice, and by implication improve health. Although our National Medicines Information Centre and the Irish College of General Practitioners have educational update programmes, there may be a need for more academic detailing and observed feedback at the individual practice level to improve the adherence to guidelines.

Our lack of information on diagnosis in the prescribing database is a limitation which may have resulted in the inclusion of patients receiving antihypertensive therapies for other indications. However, we have excluded patients with ischaemic heart disease or heart failure by identifying coprescriptions of drugs prescribed in these conditions. Our method of identifying those with diabetes, while missing some controlled on diet alone, is otherwise robust as shown previously [11]. Also, we have only included prescriptions for antihypertensive monotherapy which reduces the likelihood of prescribing for other indications.

Given the limited adherence to the guidelines, these results suggest that other factors including drug promotion by pharmaceutical companies and lack of feedback on prescribing may influence the choice of antihypertensive therapy. Also, the presence of concomitant disease is a much greater incentive to follow guidelines.

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