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Use of cardiovascular medicines in newly treated type 2 diabetes patients: A retrospective cohort study in general practice

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ABSTRACT

Aims: To describe the drug utilisation patterns of aspirin, antihypertensives, vasodilators, and statins in a cohort of newly treated type 2 diabetes subjects previously unexposed to CVD agents.

Methods: A population-based retrospective cohort study was conducted using a national pharmacy claims database of newly treated type 2 diabetes subjects aged 40 years or older. Data on the use of aspirin, antihypertensives, vasodilators, and statins 1 year after antidiabetic agent initiation were analysed. Poisson regression with a robust error variance was used to estimate adjusted relative risk (RRadj) and 95% CIs between socio-demographic and treatment factors on CVD agent use.

Results: Over a 2-year period (2008–2009), 6093 subjects were identified. One year after antidiabetic agent initiation, 82% of the study population received at least one CVD agent, with 54% receiving aspirin, 64% receiving antihypertensives, 6% vasodilators, and 62% receiving statins. Subjects aged 40–49 years were significantly less likely than those aged 60–69 years to receive CVD agents (RRadj 0.83, 95% CI 0.80–0.87). Over 40% of subjects received antihypertensives without aspirin and statins, while 30% of subjects on statins did not receive aspirin.

Conclusions: Substantial CVD agent utilisation was noted 1 year after antidiabetic agent initiation. Being aged younger than 60–69 years was associated with decreased utilisation of CVD agents.

1. Introduction

Cardiovascular disease (CVD) is the primary cause of morbidity and mortality in type 2 diabetes [1,2]. Our understanding of cardiovascular drug utilisation patterns in newly treated type 2 diabetes previously unexposed to CVD agents is limited, focussing primarily on older populations [3–6]. However, given the increasing prevalence of type 2 diabetes, the age of onset is occurring more frequently at younger ages [7]. In 2008, the Irish College of General Practitioners (ICGP) in conjunction with the Irish Endocrine Society and the Department of Health

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and Children published guidance on the integrated care of type 2 diabetes in Ireland [8] and recommended that patients with diabetes and hypertension receive lipid lowering drugs and aspirin, and that patients aged over 40 years with dyslipidaemia receive aspirin. The guidance represented the view of the ICGP, which is the professional body for general practice in Ireland. It was drawn largely from European guidelines and was the only Irish guidance available at the time of this study. While Irish studies have looked at the use of CVD agents in prevalent diabetes cases [9–12], no previous Irish study has specifically examined CVD agent use in a cohort of newly treated type 2 diabetes previously unexposed to CVD agents.

In view of the 2008 ICGP guidelines the aims of this study were to: (1) characterise the patterns of CVD agent utilisation in a cohort of newly treated type 2 diabetes patients aged 40 years and over previously treatment naive to CVD agents and (2) to investigate the association of age, gender, and initial antidiabetic agent on CVD agent utilisation.

2. Methods

2.1. Data sources

A retrospective, observational cohort study was conducted using subjects aged 40 years and older from the General Medical Services (GMS) scheme in the Irish Health Services Executive (HSE) Primary Care Reimbursement Services (PCRS) pharmacy database [13]. The GMS scheme is means-tested and provides free primary care for all eligible participants. The scheme is overrepresented by women, children and older adults (aged 65 years and older). During the study period prescription drugs were provided free of a charge under the GMS scheme, however a co-payment of €0.50 with a maximum monthly co-payment of €10 per household was introduced in October 2010. In addition to details of the drugs dispensed, the HSE-PCRS database records demographic details such as age and sex. The database records the quantities and strengths of all prescription drugs dispensed to participants under the GMS scheme. No information on clinical diagnosis or outcomes is available. The database records no other aspect of a participant's healthcare utilisation or linkage to other clinical records. This database has been previously used in studies examining medicine use in diabetes [9,12,14]. Ethical approval was not required as all analysis was carried out on anonymised data.

2.2. Study population

Newly treated subjects were identified over a 2-year period (2008–2009) and were followed for 1 year after treatment initiation. Newly treated subjects were classified as those receiving monotherapy with oral and non-insulin antidiabetic agents (WHO ATC code A10B) who had no antidiabetic agents dispensed in the preceding 12 months.

2.3. Exclusion criteria

Subjects initially prescribed insulin, or more than one oral or non-insulin antidiabetic agent, or a combination agent were excluded from the study as they could not be confidently identified as being treatment naive. Subjects who received CVD agents in the 12 months prior to antidiabetic agent initiation were also excluded.

2.4. CVD agent utilisation

Subjects receiving any of the following CVD agents in the year following antidiabetic agent initiation were included in the analysis (WHO ATC): aspirin (B01AC06,), statins (C10AA), vasodilators (C01D) and antihypertensives. Antihypertensive medicines consisted of the following (WHO ATC): beta-blockers (C07), calcium channel blockers (CCB) (C08), agents acting on the rennin–angiotensin system (C09) and diuretics (C03). The use of renin inhibitors (C09X) and lipid lowering drugs other than statins were not investigated due to small numbers. Dispensing dates for CVD agents were provided at the monthly level and were therefore taken as the last date of the month in which they were dispensed. The antidiabetic agent initiation date was provided as the exact date that antidiabetic agents were received.

3. Statistical analysis

Subject characteristics, antidiabetic agents, antihypertensive agents, statin and aspirin treatment patterns are described. The median the time to treatment initiation of CVD agents and inter-quartile range (IQR) is reported. Poisson regression with a robust error variance was used to estimate the adjusted relative risk (RRadj) of: (i) any CVD agent versus none, (ii) statins versus no statins, (iii) aspirin versus no aspirin, (iv) any antihypertensive agent versus no antihypertensives, (v) vasodilators versus no vasodilators, (vi) antihypertensive in combination with statins and aspirin versus antihypertensives only, and (vii) statins in combination with aspirin, versus statins only. These analyses were adjusted for the following variables of interest which were available within the database: sex, age and initial antidiabetic agent. Similar variables have found to be of significance in previous studies [3,10]. Metformin, males, and subjects aged 60–69 (as this age group contained the largest number of patients) were the reference groups. RRadj with 95% confidence interval (CI) are presented.

Analyses were performed using SAS, version 9.2, and significance at $p < 0.05$ is assumed.

4. Results

A total of 6093 subjects were included in the study. The majority of subjects were male (58%), aged 60–69 years (27%), and metformin was the most frequently prescribed antidiabetic agent (72%) (Table 1). Sulphonylureas were prescribed to 26%, while other antidiabetic agents were prescribed to fewer than 3% of subjects. Dipeptidyl peptidase-4 (DPP-4) inhibitors