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Prevalence, management and control of hypertension in older adults on admission to hospital

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ABSTRACT

Introduction: The aim of this study was to explore the prevalence and management of hypertension among older adults on admission to hospital and to assess the choice of antihypertensive pharmacotherapy in light of relevant comorbid conditions using the national treatment guideline.

Materials and methods: A retrospective cross sectional study of 503 patients aged 65 years or older admitted to a large metropolitan teaching hospital in Sydney Australia was conducted. The main outcome measures were prevalence of hypertension, blood pressure (BP) control, antihypertensive medication use and the appropriateness of antihypertensive medications.

Results: Sixty-nine percent (n = 347) of the study population had a documented diagnosis of hypertension and of these, approximately one third were at target BP levels on admission to hospital. Some concerns regarding choice of antihypertensive noted with 51% of those with comorbid diabetes and 30% of those with comorbid heart failure receiving a potentially inappropriate antihypertensive agent.

Conclusions: Despite the use of antihypertensive pharmacotherapy, many older adults do not have optimal BP control and are not reaching target BP levels. New strategies to improve blood pressure control in older populations especially targeting women, those with a past history of myocardial infarction and those on multiple antihypertensive medications are needed.

1. Introduction

Hypertension is a major risk factor for cardiovascular disease and carries a high health burden in terms of morbidity and mortality. The prevalence of hypertension increases with age, and it is estimated that older adults over the age of 65 years account for 70% of all adult hypertension in developed countries (Logan, 2011; Pimenta and Oparil, 2012). While the prevalence of hypertension in older adults is high, there is robust evidence regarding the benefits of good blood pressure (BP) control within this population, in terms of reduced mortality and morbidity (Wing et al., 2003; Bulpitt et al., 2011; Dahlöf et al., 1991; Alhawassi et al., 2015). A recent Cochrane review examining 15 clinical trials looking specifically at pharmacotherapy for hypertension in older patients found that treating those aged 60 years or older with mild to moderate hypertension reduced both all cause mortality and cardiovascular morbidity and mortality in older people (Musini et al., 2009).

Notwithstanding the benefits of managing hypertension and the ongoing discussion about what constitutes optimal hypertension management in older patients there is a paucity of data regarding actual management of hypertension in older populations in practice. Few studies have examined current prevalence or management for hypertension in older patients, and those that have been conducted often pre-date the current evidence regarding the benefits of managing hypertension in older adult population

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(Cranney et al., 1999; Fotherby et al., 1992). In the studies that have been conducted, there is some indication that management of older patients may be suboptimal. Studies in both Europe and the United States (US) have reported considerable under treatment of older patients with hypertension (Primatesta and Poulter, 2004; Lochner et al., 2012).

Transitions of care, such as hospitalization, allow for a review of chronic conditions and medications. Medication review and/or reconciliation on admission to hospital provide a complete medication history for each individual (Watt and Colquhoun, 2009). Therefore, taking the best possible medication history during the admission procedure not only provides valuable information for clinical decision-making throughout the admission, but also provides insight into the management of conditions and prescribed medications prior to hospitalization. The aim of this study was to explore the prevalence and management of hypertension among older adults on admission to hospital and to assess the choice of antihypertensive pharmacotherapy in light of relevant comorbid conditions using the national treatment guideline.

2. Methods

2.1. Patient selection and data collection

Patients aged 65 years and over, admitted to the Royal North Shore Hospital in Sydney Australia. between January 1st 2010 and December 31st 2010 were eligible for inclusion in the study. The Royal North Shore Hospital is a 600 bed tertiary metropolitan hospital located in northern Sydney, Australia. To allow for adequate medical documentation, only admissions with duration of at least 48 h were included in the sample. Patients admitted outside the study period, those for whom the medical records could not be accessed and those aged less than 65 years of age were excluded.

There were 5815 admissions during the study period which met the inclusion criteria, to reach our required sample size of 503 admissions a systematic sampling frame of every 9th admission was used. A systematic sampling frame of every 9th admission throughout the study period was used to ensure that admissions were distributed evenly throughout the year and overcome any potential seasonal clustering. Seasonal variation in cardiovascular disease has been well documented (Khan and Halder, 2014; Marti-Soler et al., 2014). Systematic sampling, also known as interval random sampling, is an economical probability sampling method in which a random selection is made for the first participant and then subsequent participants are selected using a fixed interval until the required sample size is reached (Daniel, 2012). Systematic sampling ensures the sample is spread across the entire population, or in this case, across the entire calendar year, minimizing potential seasonal variation (Daniel, 2012). For patients with multiple admissions during the study period, only the first admission in the study year was included in the study and the next consecutive admission included where relevant.

2.2. Study design and covariates

This was a retrospective cross sectional study using medical record audit data. Data were extracted from the medical records by a single trained researcher using a pre-defined case record form. Data collected included demographic information, medical history including documented information on relevant comorbidities, prescribed medications on admission, BP control on admission and documented hypertension diagnosis of either current or with a documented history. Comorbidities were defined as those documented in the medical record using the Charlson Comorbidity Index to calculate age adjusted Comorbidity Burden. Documented diagnoses of renal disease and chronic kidney disease were defined as chronic renal disease for the purposes of this research.

2.3. Blood pressure control

Patients were considered to be at target BP control if they met the current Australian National Guideline for the Management of Hypertension (National Foundation of Australia, 2008). Comorbidities (chronic kidney disease, diabetes, peripheral arterial disease, Stroke and transient ischaemic attacks) were taken into consideration for BP targets as specified by the guidelines.

2.4. Antihypertensive medications

Details of antihypertensive medication use on admission, prior to any changes being made by the hospital medical team, were collected. Antihypertensive medications were defined as those medications recommended for the management of hypertension according to the current National Guideline for the Management of Hypertension (National Foundation of Australia, 2008). Medicines were coded according to the World Health Organization Anatomic Therapeutic Chemical (ATC) classification system (WHO Collaborating Centre for Drug Statistics Methodology, 2017). Antihypertensive medications included Angiotensin Converting Enzyme Inhibitors (ACEI) and Angiotensin II Receptor Blockers (ARB, ATC C09), Calcium Channel Blockers (CCB, ATC C08), Beta-Blockers (BB, ATC C07) with the exception of sotalol (C07AA07), thiazide and thiazide-like diuretics (ATC C03A, C03B and C03E) including and other antihypertensives (ATC C02), namely methyldopa, moxonidine, prazosin, terazosin, clonidine and hydralazine. Fixed-dose combination products were considered as two separate medications.

2.5. Choice of antihypertensive agent and comorbid conditions

Choice of therapy was explored by examining the association between antihypertensive medication and related comorbidities. Related comorbidities were those mentioned in the National guideline current at the time the study was conducted (National Foundation of Australia, 2008). The proportion of patients receiving one or more antihypertensive therapies recommended in the current treatment guideline as potentially beneficial for each relevant comorbid condition was determined as was the proportion patients receiving one or more antihypertensive medications considered potentially harmful as per the current guideline.

2.6. Statistical analysis and sample size calculation

Data were entered into a custom-designed Microsoft Access database and analyzed using the Statistical Package for the Social Sciences (SPSS) software (IBM SPSS Statistics version 20). Univariate analyses using the Student's t-test, Mann Whitney U test or Pearsons chi-squared test were used to assess difference in demographics and disease characteristics between patients with and without a documented diagnosis of hypertension. A two-tailed probability value of <0.05 was considered to be statistically significant for all analyses.

Based on previous work, the prevalence of hypertension in the study population was estimated to be between 60 and 70% (Egan et al., 2010). To determine the point prevalence within a 2% margin of error assuming a confidence level of 95% a sample size of 322–368 was required.

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