



Trends in the prevalence of antihypertensive drug treatment in the Beijing Longitudinal Study of Aging[☆]



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ABSTRACT

Objective: This study aimed to explore the epidemiological characteristics of antihypertensive drug use by community residents in Beijing, China.

Methods: Based on well-established statistical sampling techniques such as cluster, stratification, and random selection, 2832, 1828, and 2277 elderly residents aged ≥ 60 years in Beijing in 2000, 2004, and 2007, respectively, were included. The trend in antihypertensive drug use by elderly patients with hypertension was analyzed.

Results: The proportion of patients using angiotensin converting enzyme inhibitors (ACEIs) or β -blockers increased, while the proportions of both male and female patients using Chinese single-pill combination decreased. The proportion of relatively young patients using ACEIs or β -blockers increased, as did the proportion of relatively old patients using calcium channel blockers (CCB), ACEIs, or β -blockers. The proportions of both relatively young and relatively old patients using Chinese single-pill combination decreased. The proportion of urban patients using ACEIs, or β -blockers and the proportion of rural patients using CCBs or diuretics increased, while the proportion of both urban and rural patients using Chinese single-pill combination decreased.

Conclusion: During the 7-year study period in Beijing, the proportion of patients using CCBs, ACEIs, diuretics, or β -blockers increased, while the proportion of patients using Chinese single-pill combination decreased. Our results provide important data for the limited evidence on the trend of prevalence of antihypertensive drug use in China.

1. Introduction

Hypertension is a progressive cardiovascular syndrome with a variety of causes, including cardiovascular risk factors that can lead to changes in heart and blood vessel function and structure. Therefore, hypertension, as a chronic disease, has negative effects on human health and is the main cause of cardiovascular-disease related deaths, further increases disability-adjusted life year and death (Forouzanfar et al., 2017). By 2025, an expected 15.6 billion hypertensive adults and a hypertension prevalence of 29.2% are expected (Kearney et al., 2005). A recent meta-analysis in Lancet found that blood pressure lowering could reduce vascular risk and comorbidities (Ettehad et al., 2016). At

present, prevention and treatment of hypertension require improvement, and the rate of blood pressure control is still very low; therefore, efforts to improve the rate of blood pressure control should become a top priority.

The main objective of the treatment of hypertension is to reduce the overall risk of long-term cardiovascular disease and cardiovascular disease-related mortality, which is closely related to the degree of blood pressure reduction (Ryu, Bayasgalan, Kimm, Nam, & Ohrr, 2016; Turnbull, 2003; Yue, Zhang, & Li, 2016). Researches indicate that the relative hazard ratio associated with a 10 mmHg higher initial systolic blood pressure were 1.26 for total mortality, 1.22 for stroke (Staessen et al., 2000), moreover, each 5 mm Hg lower diastolic blood pressure

Abbreviations: CCB, calcium channel blockers; ACEI, angiotensin converting enzyme inhibitor; CSC, Chinese single-pill combination

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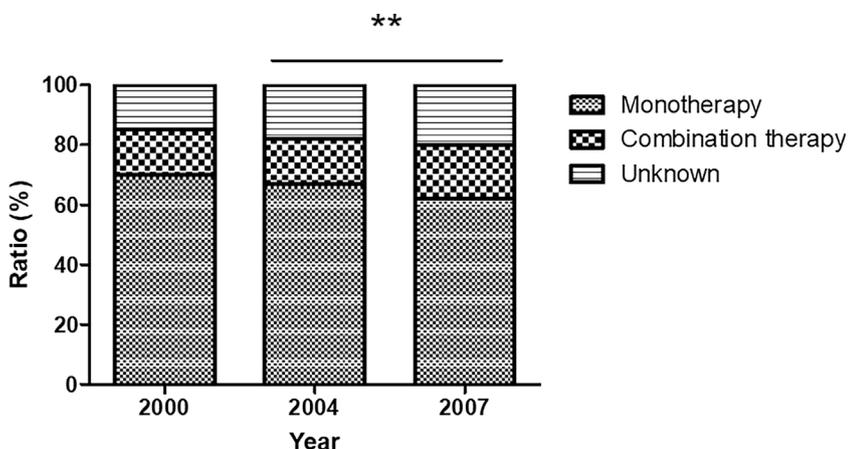
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was associated with lower risk of non-haemorrhagic stroke (0.61) and lower risk of haemorrhagic stroke (0.54) (Eastern Stroke Coronary Heart Disease Collaborative Research, 1998). However, because of the presence of other systemic diseases, arterial stiffness, and poor vascular elasticity in elderly patients, the target blood pressure can be challenging to attain, therefore, European Society of Hypertension recommended to base treatment decisions on comorbidity in the elderly (Kjeldsen et al., 2016). In the clinical setting, the six categories of commonly used oral antihypertensive drugs include calcium channel blockers (CCBs), angiotensin converting enzyme inhibitors (ACEIs), angiotensin II receptor antagonists (ARBs), alpha blockers, β -blockers, and diuretics. A study shows that patients starting on combination therapy had an 11% cardiovascular risk reduction with respect to those starting on monotherapy (Corrao et al., 2011), so a combination of antihypertensive drugs has been the standard modern antihypertensive treatment strategy. Furthermore, in addition to elevated blood pressure, elderly patients with hypertension also often have heart, brain, kidney, and other systemic diseases. Therefore, the treatment of hypertension in the elderly is not limited to only blood pressure but also includes the prevention and treatment of complications, to improve the quality of life of patients with hypertension. In the present study, we conducted a survey of elderly patients with hypertension in 2000, 2004, and 2007 to explore the epidemiological characteristics of antihypertensive drug use by community residents in Beijing.

2. Materials and methods

2.1. Subjects

Data for these analyses were obtained from the Beijing Longitudinal Study of Aging (Ma et al., 2015). Baseline data were based on sample data from the fourth census of Beijing, China. The sample of elderly people was selected from mountainous (Huairou District), rural (Daxing District), and urban (Xuanwu District) areas in Beijing using stratified random, random, and cluster sampling. The study was approved by the Xuanwu Hospital's Committee on Ethics of Human Experiments.

2.2. Measurements

Staff members were trained by specialized persons. Blood pressure was measured using a mercury column blood pressure meter. Each blood pressure gauge was calibrated before the investigation, and the investigators regularly checked the sphygmomanometer performance and calibration. Interviewers personally visited each participant at home, measured their blood pressure, and administered a comprehensive questionnaire to collect hypertensive medical history, medication history, and family, lifestyle, economic, and health status.

Antihypertensive drugs were in five major categories: CCBs, ACEIs

Fig. 1. Classification of antihypertensive drugs used of elderly hypertension in the year 2000, 2004 and 2007. Data were from the 2832, 1828, and 2277 residents aged ≥ 60 years in communities in Beijing, China in 2000, 2004, and 2007, respectively. 742 (318 men, 424 women), 583 (256 men, 327 women), and 781 (304 men, 477 women) elderly people with hypertension, respectively, were included. ** indicates that compared to 2004, the ratio of combination therapy in 2007 significant increased ($P < 0.01$).

(including ARBs), β -blockers, Chinese single-pill combination (CSC), and diuretics. The definition of the CSC including various traditional Chinese herbal medicine as a monotherapy.

2.3. Statistical analysis

All statistical analyses were performed using SPSS software, version 11.5 (SPSS, Inc., Chicago, IL, USA). The trend in antihypertensive drug use by elderly patients with hypertension was analyzed using χ^2 tests. A P value < 0.05 was considered statistically significant.

3. Results

From the 2832, 1828, and 2277 residents aged ≥ 60 years in communities in Beijing, China in 2000, 2004, and 2007, respectively, 742 (318 men, 424 women), 583 (256 men, 327 women), and 781 (304 men, 477 women) elderly people with hypertension, respectively, were included. Of these patients, the proportion of patients who forgot the category of antihypertensive drugs or those who were under treatment by antihypertensive drugs regularly in the past three years but with no treatment during these two weeks was 14.7%, 18.5%, and 19.8% in 2000, 2004, and 2007 respectively. Monotherapy is still the vast majority of treatment, and the prescription of combination antihypertensive treatment increased in 2007 (Fig. 1).

3.1. Trend in antihypertensive drug use

Fig. 2 shows the proportion of patients with hypertension using

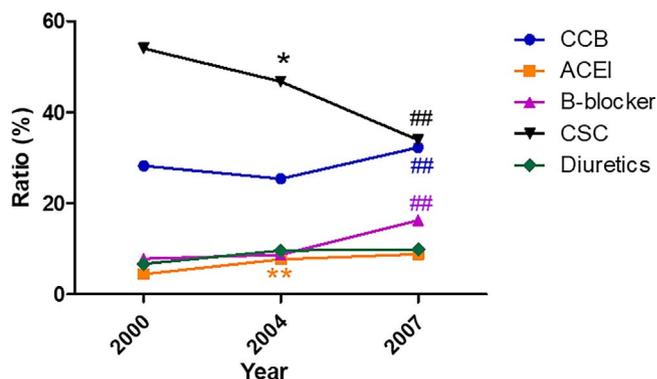


Fig. 2. The distribution of antihypertensive drugs used of elderly hypertension in the year 2000, 2004 and 2007. * Compared to 2000, $P < 0.05$; ** Compared to 2000, $P < 0.01$; # Compared to 2004, $P < 0.05$; ## Compared to 2004, $P < 0.01$. Abbreviations: CCB, calcium channel blockers; ACEI, angiotensin converting enzyme inhibitor; CSC, Chinese single-pill combination.

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