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Special consideration in the management of hypertension among elderly

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1. Introduction

Hypertension is defined as blood pressure (BP) above 140/90 mmHg, or taking anti-hypertensive medications. This is the most-prevalent modifiable risk factor for cardiovascular disease. Also we are living in the era of aging and the elderly (usually age ≥ 65 years) are growing rapidly. The proportion of the elderly is 13% in USA, 23.4% in Japan, 25% in Canada, and 16.6% in UK. Most babies born since 2000 in developed countries such as France, Germany, Italy, the UK, the USA, Canada, and Japan are likely to celebrate their 100th birthday if life expectancy continues to increase. The prevalence of hypertension increases markedly with advancing age. Since elderly people have different clinical and pathophysiological conditions from adult population, special considerations are required. I will summarize related several issues and provide potential strategy to control elderly hypertension in this lecture.

2. Special consideration

2.1 Pathophysiology

After left ventricle ejects blood, a pressure (pulse) wave is generated and travels from the heart to the periphery at a speed. This pulse wave velocity (PWV) depends on the elastic properties of the conduit arteries. Once the propulsive pulse wave meets any point of arterial tree, it returns back to the aorta and left ventricle. In young people, conduit arteries absorb the propulsive power and the wave become slower. So the reflected pulse arrives back in diastolic period, causing diastolic boosts. On the other hand, in elder people, the conduit arteries are stiff and the propulsive power is not controlled, making faster pulse wave. The faster pulse wave causes early reflection in the late systolic period, making late systolic boosts. This increases systolic pressure, but decreases diastolic pressure, causing increased pulse pressure. The afterload of left ventricle increases and cardiac workload is increased. This special conditions are the fundamental mechanism of isolated systolic hypertension, which is the specific feature of elderly hypertension.

2.2 Polypharmacy

Polypharmacy, the concomitant use of a variety of prescription and over-the-counter drugs, is common among the elderly. On average, elderly individuals take more than six different prescription medications. Multiple comorbidities result in prescription of multiple medications including NSAIDs, corticosteroids, and psychotropic medications which can increase BP.

2.3 Multiple Comorbidities

2.3.1 Chronic Kidney Disease (CKD)

CKD, defined as decreased kidney function (estimated glomerular filtration rate < 60 ml/min/1.73 m²) or kidney damage (albuminuria) that persists for 3 months or more, is common in elderly people. Between the ages of 30 and 85 years, renal mass, and particularly cortical mass, is estimated to decline by 20–25%. CKD can be either a cause or a consequence of hypertension. Fluid retention, activation of the renin–angiotensin–aldosterone system, increased sympathetic-nervous-system activity, and concomitant use of medications, such as NSAIDs that impair renal salt and water handling, contribute to the development and maintenance of hypertension in elderly patients with CKD. After the filtration capacity decreases, the risk of polypharmacy increases.

2.3.2 Atherosclerotic renal artery stenosis (ARAS)

The prevalence of ARAS increases with age. Hemodynamically important ARAS can contribute to BP elevation by limiting renal blood flow, leading to sodium and water retention, as well as by stimulating renin synthesis and release, with consequent activation of the renin–angiotensin system. ARAS is important because of its strong association with widespread atherosclerotic vascular disease and cardiovascular events. However, the evaluation and treatment of patients with suspected ARAS

are problematic because anatomic lesions are not always related to renal ischemia or the pathogenesis of hypertension, and therefore indications and choice of treatment are controversial.

2.4 Different BP target

In 2011-2017, several guidelines recommended the target BP less than 140/90 mmHg in older persons younger than 80 years and to 140-150/<90 mmHg in adults aged 80 years and older. Although SPRINT trial provides very important information on the efficacy and safety of strict BP control even in elderly adults with hypertension, further studies, particularly using Asian population should be exercised to generalize the results. Further, the target diastolic blood pressure in elderly persons should also be answered in future studies.

2.5 Selection antihypertensive drugs

Except for the major effect of beta blockers in post-myocardial infarction and a minor protective effect of calcium channel blockers in stroke, all major antihypertensive drug classes including diuretics, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, beta blockers, and calcium channel blockers caused a similar reduction in coronary events and stroke for a given reduction in blood pressure. Therefore, the choice of specific antihypertensive drugs in the treatment of elderly persons with hypertension depends on efficacy, tolerability, presence of specific comorbidities and cost. If patients have diabetes or CKD, angiotensin-converting enzyme inhibitor or angiotensin receptor blocker are preferred. Beta blockers should be used to treat elderly patients with complex ventricular arrhythmias, heart failure, angina pectoris, prior myocardial infarction, or atrial fibrillation.

3. Conclusion

Hypertension is extremely prevalent among elder population. Because of the risk of polypharmacy, assessment of the concomitant use of medications that interfere with BP control, especially NSAIDs, as well as secondary causes of hypertension is essential in the evaluation of elderly patients with hypertension. Medical treatment of hypertension in the elderly population reduces cardiovascular morbidity and mortality. However, unclear definitions of elderly hypertension and different treatment goals among several guidelines are the remaining major problems and should be solved with future researches.