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Management of high blood pressure in older-adults: aging, senescence and ageism

Gestión de la hipertensión arterial en adultos mayores: envejecimiento, senescencia y edadismo

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ABSTRACT

The gradual increase of blood pressure related to aging is a consenting phenomenon. Furthermore, the onset of high blood pressure (HBP) becomes an important health concern for older adults given the diverse challenges in treatment and management. Effective treatment could substantially impact quality of life. In this review, we describe the pathophysiologic pathways in which blood pressure could be influenced by aging processes, how we could better characterize the disease and how to give an initial approach in management within older adults. Giving an appropriate antihypertensive treatment must be focused on lowering mmHg as its advantageous properties are similar across all ages; however, in absolute terms, the acquired benefits are greater in older individuals than in young people. Current data suggests that antihypertensive medication should not be rejected, altered, or terminated only because of advanced age. While this may appear reasonable, ageism is an important social determinant to initiate antihypertensive, since it restricts its access solely because of advanced age. Clinical efforts should be performed to optimize strategies to improve blood pressure in older adults.

RESUMEN

El aumento gradual de la presión arterial relacionado con el envejecimiento es un fenómeno consentido. Además, la aparición de la hipertensión arterial (HTA) se convierte en un importante problema de salud para los adultos mayores, dados los diversos retos que plantea su tratamiento y gestión. Un tratamiento eficaz podría influir sustancialmente en la calidad de vida. En esta revisión describimos las vías fisiopatológicas en las que la presión arterial podría verse influida por los procesos de envejecimiento, cómo podríamos caracterizar mejor la enfermedad y cómo dar un enfoque inicial en el manejo dentro de los adultos mayores. La administración de un tratamiento antihipertensivo adecuado debe centrarse en la disminución de los mmHg, ya que sus propiedades ventajosas son similares en todas las edades; sin embargo, en términos absolutos, los beneficios adquiridos son mayores en los individuos de edad avanzada que en los jóvenes. Los datos actuales sugieren que la medicación antihipertensiva no debe ser rechazada, modificada o interrumpida sólo por la edad avanzada. Aunque esto puede parecer razonable, el edadismo es un determinante social importante para iniciar la antihipertensiva, ya que restringe su acceso sólo por la edad avanzada. Se deben realizar esfuerzos clínicos para optimizar las estrategias para mejorar la presión arterial en los adultos mayores.

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INTRODUCTION

The dramatic increase in life expectancy along with a decrease trend in global birth rates recorded in recent years, had conditioned aging worldwide. There has been a significant demographic growth within population aged 60 years and older.[1] Along with the shift in aging, there has been an epidemiological transition where globally it has been experienced a downward of Chronic Communicable Diseases (CCD) and an increase for up to 80% of the global burden disease attributable to Chronic non-Communicable Diseases (CnCD), particularly cardiovascular diseases (CVD).[2] Therefore, there is an increasing need to study, comprehend and treat CVD risk factors in older adults. High blood pressure

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(HBP) (defined as a blood pressure > 140/90 mmHg) continues to be a highly growing health problem in older adults due to its high reported prevalence between 30 to 80%. Moreover, its impact within older population impairs life expectancy and quality of life, leading to recent public health policies that sought to prioritize its appropriate management. Despite all the efforts, HBP continues to be highly underrated condition as it usually misinterpreted as a progressive elevation of systolic blood pressure related to aging. This misrelated conception could explain why elderly population does not receive an adequate management. It has been reported that older population usually does not receive sufficient treatment, or does not achieve treatment goals, therefore, reducing quality of live. It is imperative to avoid diverse complications related to HBP in the elderly, such as acute cerebrovascular diseases.[3] Here, we described the pathophysiologic pathways in which blood pressure could be influenced by aging processes, how we could better characterize the disease and how to give an initial approach in management within this population.

Ageism

Ageism is the term that has been adopted worldwide when older adults does not appropriately receive all the potential benefits of an adequate antihypertensive treatment due to age-conditioned inequities in health care attention. Ageism has been closely related to social discrimination within vulnerable and socially disadvantaged groups. For contextualizing the effect, it is worldly to mention some of the conditionings of discrimination. Commonly, adult self-identify with each other as belonging to the same group due to diverse social and cultural characteristics (E.g., gender, nationality, ethnic group, age, social status, education, economy, political preferences) that constitutes their main social core. The need of self-identification or belonging to a social group has been widely studied as a phenomenon across all ages. This condition is also noticeable in older adults, regardless their economic status. Older adults still need for a comprehensive social support network comprised of close-relatives, friends, or trusted persons. Nevertheless, this phenomena of self-identity within a social group could induce to exclude or even discriminate individuals who do not share common characteristics. Discrimination extends beyond simple cognitive or emotive domains to become a dangerous way of coexisting, implying that anyone who is not a member of a social group faces lesser standards.

Historical context of ageism

Historically, a sense of belonging to a group has been used to promote positive features (E.g., coherence and teamwork), but it has also been used to promote discrimination encouraging wars, enslavement, exploitation, and even annihilation. The attempts to fight discrimination could be found within the French Revolution in 1794 which was a direct precedent to eradicate slavery and stated in the Declaration of the Human Rights and the Citizens. The fight against discrimination continued with the foundation of the feminism movement in New York in 1848; although, social inequalities for women have not yet been fully achieved in diverse features, such as health care. Regardless all the efforts that have been made since 1794, there are still well-known discriminatory behaviors, such as racism, machismo, homophobia and in recent years, ageism.[4] Nevertheless, ageism often is more common and even unnoticed than racism or gender discrimination.[5]

Definition of «old age»

Older age has been arbitrary defined with diverse thresholds related to life-expectancy within each country. Elderly has been defined as adults who exceeds 60 years in low-and middle-income countries and 65 years within high-income countries. However, recent guidelines from the American College of Cardiology (ACC) and the American Heart Association (AHA) mentions that older adults should be considered subjects between 65 to 79 years and ancient as subjects > 80 years old.[6,7] Within this concept, it was wrongly accepted that every adult, given its advanced

age, should have receive antihypertensive treatment with decreased intensity. Instead, a more comprehensive and expertise approach is that every clinical decision should be based on the senescence of older adults. Senescence happens at different speeds in different people and is usually non-synchronous on tissues, and systems. Therefore, senescence could be a more useful concept for clinicians as the condition that determines the type of treatment prescribed. Nevertheless, some authors questioned this approach. The HYVET trial, a landmark study in elderly hypertensive patients, does not seem to support the concept of senescence, although they declare to not include frail patients.

Senescence is closely related to fragility with diverse criteria required to classify and define it. However, for daily clinical practice and to simplify its application in older person living with HBP, fragile is defined with at least two of following five criteria: 1) over 80 years of age, 2) unfeasibility to live independently, 3) frequent falls, 4) advanced cognitive impairment, 5) diseases that substantially limit hope and or quality of life.[8] For decision-making purposes, the consensus of the European Society of Hypertension-European Union Geriatric Medicine Society defines frailty as: «a person who live in nursing homes or who need daily assistance for their basic activities» which could represent up to 35% of adults > 80 years.[9]

Aging and blood pressure levels

Although diastolic blood pressure does not necessarily increase with age, systolic blood pressure does increase with aging. Although it has been observed that the average systolic and diastolic blood pressure is higher in men than in women, within women under 55 years, the systolic pressure exceeds discreetly compared to men. In Mexico, as demonstrated by the MMM19-Mexico study, the sex differences are more accentuated in men compared to women within increased ages.[10] The progressive elevation of systolic and diastolic blood pressure happens at different speeds according to everyone. HBP could be considered as an aging process due to progressively increases in blood pressure. We could illustrate this example within a 40-year-old person with systolic pressures of 160 mmHg that could have the same blood pressure as a 60-year-old adult. Nevertheless, it should not be interpreted that the gradual increase in blood pressure is related to aging and therefore be considered as a «normal» condition that does not require treatment. This inaccurate interpretation should raise alarm as all patients with high blood pressure reflects a higher risk of adverse cardiovascular outcomes.

Characteristics of high blood pressure in the elderly

Aging could modify antihypertensive strategies according to diverse conditions physiological conditions.

Increased vascular stiffness: with aging, there is a progressive stiffness due to structural impairments within middle layers at elastic arteries, a modification in vascular collagens, a phenomenon of interstitial fibrosis, and calcification within elastin fibers. Overall, increased vascular stiffness causes that distribution vessels become less distensible which forces the systolic pressure to increase. Consequently, this leads to an increase resistance in ventricular load displayed through an increased pulse wave and peripheral arterioles speed and a stronger rebound wave. The rebound wave conditions a further increase in systolic pressure within the final portion of the systolic cycle (systolic augmentation).[11] These phenomena generate hazardous damage for the arterial system, heart, and kidneys in older adults. Increased vascular stiffness makes a more turbulent blood flow and, consequently, promotes a reduction in organ perfusion and coronary flow; therefore, the heart's metabolism and oxygen consumption increase. In this supplement, you can read a more comprehensive explanation of this phenomenon called AVA (accelerated vascular aging).

Variability: the variability of blood pressure increases in older adults. It has been recognized that higher variability is an independent cardiovascular risk factor. There are diverse types of variability: cardiac bets, circadian rhythm, seasonal changes, and many others, which goes beyond the scope of this work.

Postural hypotension: autonomic dysregulation is a widespread phenomenon in older adults. This condition is highly prevalent in users of specific antihypertensives or in patients with diabetic neuropathy. A particular consequence of neuropathies is losing the sympathetic reflex, which raises blood pressure when standing up. Postural hypotension has been recognized as an essential conditioner of syncope in the older population and an independent risk factor for falls and cardiovascular complications.

Accelerated progression of kidney damage: renal function decreases as age increases: aging decreases glomeruli and glomerular filtration rate. In older adults, HBP stimulates impairments within renal functionality due to glomerulosclerosis, interstitial renal fibrosis, and microvascular damage (adverse remodeling of the kidney). Furthermore, there are deficiencies within the sodium/potassium-adenosine triphosphate membrane pump that causes an increase in intracellular sodium and ultimately lead to volume retention. These conditions are further worsened by secondary hyperkalemia due to a progressive decrease in renal tubular mass caused by microvascular damage related to aging.

Accelerated progression of cognitive decline: dementia is a significant concern within the elderly population with a huge personal, family, and social cost. The process of cognitive decline is related to aging, but uncontrolled high blood pressure and dyslipidemia are one of the most important modifiable risk factors for vascular dementia and Alzheimer's disease. Paradoxically, blood pressure drops after the onset of dementia. The presence of a no-night pattern of no decrease in outpatient blood pressure monitoring (ABPM) is associated with nearly three times the risk for cognitive impairment.[12]

High prevalence of secondary high blood pressure: secondary HBP should always be considered in older adults. Some situations to consider are when a patient has an abrupt hypertensive onset, is measured with severe high blood pressure or is having refractive antihypertensive treatment. It has been estimated that the prevalence of HBP in older adults is higher than general population. Studies made in autopsies revelated that up to 50% had renal arterial stenosis which is a main cause of secondary HBP. HBP related to another type of steroid is more frequent in the elderly; for example, glucocorticoids used in the elderly to treat rheumatic diseases could increase systolic blood pressure by 15 mmHg.[13] Furthermore, the prevalence of peripheral arterial disease could be up to 35 to 54%, 39% within patients with prior arterial occlusion of the lower limbs, and 38% in those suffering from an aortic aneurysm. All these conditions accelerate kidney damage along with the morbidity and mortality due to an accentuated risk for ischemic heart disease.[14]

Obstructive night apnea: could be considered as a cause of secondary HBP. Approximately 30% of hypertensive patients have this condition, and its frequency duplicates by every ten years of age.[15]

Thyroid disorders: the prevalence of hypothyroidism and hyperthyroidism within older patients living with HBP could be up to 3.8 and 3.6%, respectively. Conversely, primary aldosteronism is relatively rare condition observed within this population, with an estimated prevalence of 1% up to 11%.[16]

How to prescribe the treatment of high blood pressure in older adults: a summary of current recommendations

Overall, older adults without fragility should receive the same treatment indicated for any adult. Age alone is not more considered an accepted criteria to deny an older patient a antihypertensive treatment. The recent evidence has proven that adequate antihypertensive treatment decreases the risk for acute and chronic complications and improve quality of life. The treatment for non-fragile older patient follows the same recommendations posed for all adults:

1. The cut-off points for diagnosing high blood pressure are the same for as the rest of adults.
2. Prudent lifestyle modifications are considered as the first line coadjutant treatment along with antihypertensive management.

According to current guidelines, the first step to achieve are changes in lifestyle; however, in the older subjects, this is a challenge. Traditional changes (E.g., weight loss, low-sodium diet, exercise) are usually not easy to achieve and sometimes even contraindicated. Therefore, the first step of treatment is usually combined with antihypertensive management and with reasonable recommendations to modify lifestyle habits. According to the NICE guidelines, it is recommended that adult-aged 55 years should start with antihypertensive monotherapy using calcium antagonists. As a second option, a diuretic or a blocker of the renin-angiotensin system is recommended. However, there are still diverse gaps in the literature that encourage to accept that these antihypertensive could be more useful or safer within this population.

Age has been also described as an important modifier of the pharmacokinetic of antihypertensive medications. There are significant differences of absorption, distribution, renal or hepatic metabolism, decrease in receptors and major interaction with other drugs. These physiological changes observed in adults forced Canadian Hypertension Guidelines to withdrew diverse recommendations for old adults in 2017.[17] The fear that an intensive antihypertensive regime could increase the number of falls in the elderly is a frequent concern; however, the sprint study demonstrated that no significant differences were observed in patients submitted to intensive regimes.[18]

Take home messages

Antihypertensive treatment within older adults without significant impairments begins with fixed combinations based on blocker of the renin-angiotensin system. It has been suggested that an angiotensin conversion enzyme inhibitor or an angiotensin receptor blocker (A) in combination with a calcium antagonist (C) or a diuretic (D), could be an appropriate management considering the potential pharmacokinetic differences in older adults. If blood pressure goals are not achieved, the second step consists of the use of a triple combination of the three fundamental pharmacological classes (ACD). According to the ESC/ESH-2018 and ACC/AHA 2017 guidelines, frailty, stands for one of the few current indications to start antihypertensive monotherapy treatment. Using this approach, monotherapy should be stated using small doses in patients with reasonable life expectancy.[6,7] Compared to previous 2017 hypertension guidelines, different criteria were used to diagnose HBP, to initiate antihypertensive treatment, and recommended goals. According to the ACC/AHA 2017 guidelines, the goals in older adults were < 130/80 mmHg, which is the same threshold for general population. The most recent ESC/ESH 2018 guidelines mentioned that the goals would be a systolic blood pressure between 130-139 mmHg and a diastolic blood pressure of 70-79 mmHg. As with other adults, the non-frail elderly must reach pressure goals within three months. Because all the current evidence, we consider that the risk of not treating an older adult without threatened life conditions creates a high burden on quality of life, for we encourage to implement correct antihypertensive strategies.

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