

ARTERIAL HYPERTENSION PARTICULARITIES IN ELDERLY PEOPLE

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Abstract: Research done as part of the SOPHRD (POSDRU) Project /88/1.5/S/60370 financed through the European Social Fund in accordance with the Human Resources Development Operational Sectoral Programme 2007-2013. It is estimated that half of the population over 65, around the world, suffer from high arterial pressure. The progressive growth of the arterial rigidity, the diminution of responsiveness to beta adrenergic stimuli, the drawback of the baroreceptors function, the endothelial dysfunction together with the decline of the renal function while growing older are modifications characteristic to the old hypertensive people.

Cuvinte cheie:

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Arterial hypertension represents one of the major cardiovascular risk factors which can be influenced through therapeutic means. It is considered a paramount public health issue, with a continuously growing prevalence around the world and without a completely satisfying control. Arterial hypertension has a significant impact upon cardiovascular morbidity and mortality, being involved in the development of all atherosclerosis manifestations.

The national SEPHAR study (the Study of the Arterial Hypertension Prevalence and of the Cardiovascular Risk Evolution in Romania, 2006) confirms the raised hypertension prevalence in our country (40,1%), with a significantly higher percentage of the non-diagnosed hypertension compared to the previously diagnosed hypertension (22,9% vs. 17,2%).(1)

Growing older determines the occurrence of some structural and functional modifications of the cardiovascular system. Sometimes, it is difficult to separate the modifications due to the age from those due to high blood pressure in the case of the same old patient.(2) But we can surely state the fact that hypertension accelerates the cardiovascular modifications due to the age, while a correctly administrated anti-hypertensive therapy prevents or reduces these modifications.

At the cord level, in the old hypertensive people, a left ventricular hypertrophy is detected. The Framingham study shows that the left ventricular hypertrophy represents the most powerful risk indicator in the case of cardiovascular mortality.(3) It is acknowledged the fact that hypertension represents the most frequent cause of the left ventricular hypertrophy characterised by myofibrils outer space hypertrophy. We witness a growth of the myocardial rigidity with a diminution of the compliance and an implicit precocious filling of the diastole.

The increased atrial contraction determines the growth of the telediastolic filling, but at the same time, it leads to a dilatation of the left atrium.(4) All these modifications influence negatively the diastolic function of the left ventricle, as a first result of the left ventricular hypertrophy, thus protecting the ventricular diastolic dysfunction.(5) Its evaluation is accomplished through Doppler ultrasonography, by studying the Doppler mitral transvalvular flux.

Hypertension in the elderly is characterised by a low cardiac debit and frequency. At rest, the systolic function is preserved because an increased telediastolic volume leads to a normal ejection fraction. At effort, the cardiac frequency and debit are 20-30% smaller than those of a young subject.(6) While growing older, there is a reduction of the responsiveness to the beta adrenergic stimuli, conclusion also sustained by the fact that in the young people, in the case of beta blocking, the systolic function seems to be similar to that of the old people.(7)

At the level of the vascular system, there is a progressive growth of the arterial rigidity which triggers an enhancement of the systolic blood pressure, a diminution of the diastolic blood pressure simultaneously with a growth of the pulse pressure. These modifications appear especially at the level of the ascendant aorta and of its close branches where the relation collagen/elastin is higher.(8) The increase of the rigidity leads to the increase of the pulse wave velocity (PWV_pulse wave velocity), determined by the precocious return of the reflected retrograde wave exactly in the systole process. In the older subject, a normal diastolic pressure can be the consequence of the co-existence of an increased external resistance. It is well-known that the arterial pressure is in a direct relationship with the systolic volume, external vascular resistance and the rigidity of central arteries. The growth of the

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CLINICAL ASPECTS

central arteries rigidity leads to a raised systolic arterial pressure and a reduction of the diastolic arterial pressure, the decrease of the latter leading to the diminution of the perfusion diastolic gradient of the coronary artery with angina induction through this mechanism.

We witness the myocardial ischemia of the elderly induced by any other cause but not the micro-vascular affection or the severe endothelial dysfunction.(9) Another effect of the enhanced arterial rigidity is also represented by the impossibility, in many cases, to measure correctly the arterial pressure. The arteries cannot be completely compressed, thus, the values which appear on the sphygmomanometer are higher than the real ones that is arterial pseudo-hypertension. With the age, there is also a diminution of the vasodilatation response with repercussions on the tonus of the vascular neat musculature.(10) To these modifications, the endothelial dysfunction also contributes, which occurs as a result of the lowering of nitric acid production. As an indicator of the arterial rigidity we have the determination of the ankle-arm sign (the difference between the systolic arterial pressure at ankle level and that at arm level) and the determination of the pulse wave velocity (PWV).(11,12)

The normal values of the ankle-arm indication are of 1-1,29; values higher than 1,3 indicate uncompressible, rigid arteries. The velocity of the pulse wave at the age of 20 is situated around the value of 5m/s growing with age till 20m/s around the age of 80.(7)

At renal level, both the rate of the glomerular filtration and the sanguine flux are reduced, the microproteinuria being a common element in the old hypertensive people.(13,14) Microalbuminuria seems to be the marker of the renal involvement in hypertension and represents the proteinic renal excretion between the limits of 30-300 mg/24 hours.(15,2)

The diminution of the baroreceptors function and as a result, the severe impairment of the growth of the mediated baroreflex systemic vascular resistance, frequently determines orthostatic and post-meal hypotension in the hypertensive elderly.(16) As a consequence of this phenomenon, there is an increased precaution while administrating drugs that induce orthostatic hypotension, mainly the alpha blockers.

The cerebral vascular stroke is closely connected to hypertension, fact proven by numerous trials which demonstrated a significant reduction of the morbidity caused by cerebral vascular stroke, as a result of diminishing the pressure values.(17) It is interesting to mention the study made by Skoog and his collaborators, which proved that raised arterial pressure values precede the installation of the Alzheimer's disease in the elderly.(18) After monitoring 99 men from Uppsala, an important relationship between arterial pressure values at the age of 50 and the cognitive function at the age of 70 was demonstrated, and that is: low arterial pressure at the age of 50 leads to a better cognitive function over the age of 70.(19) The study SYST_EUR (using a calcium blocker, an inhibitor of the angiotensin conversion enzyme and/or a thiazidic diuretic) showed a 55 % reduction of the relative lunacy risk (vascular or Alzheimer) after 8 years of anti-hypertensive treatment.(20)

Exposed to the risk of developing cerebral vascular stroke or myocardial ischemia are also the extreme Dipper hypertensive elderly (with $a > 20\%$ diurnal index) or the non Dipper ones (with $a < 10\%$ diurnal index), the diurnal index being the relation between the diurnal and nocturnal arterial pressure values (systolic, diastolic and average). In the normotensive people, the average tensional values during the active interval (diurnal) compared to those determined during the sleeping interval (nocturnal) reflect a diminution of 15-25%.(21) It is important to outline that the majority of the trials that had as

subjects hypertensive old persons conclude that hypertension must be treated and brought to values under 140/90 mm hg in the patient who does not have other associated co-morbidities. In the case of the elderly who associate hypertension with other co-morbidities, the therapeutic decision must be strictly individualised.

A routine diagnosis of hypertension in the elderly must by no means include the exclusion of the pseudo-hypertension provoked by increased arterial rigidity, of the white coat hypertension, of the orthostatic hypotension episodes and of the secondary hypertension.(24) The large variability of the tensional values remains an issue if we take into consideration the consequences at clinical level; the tensional lowering in orthostatism or post-meal, exaggerate hypotensor response to the anti-hypertensive drugs, exaggerate tensional growth at stress.(2)

The anti-hypertensive treatment must take into consideration both obtaining some adequate tensional values but also the fact that hypertension is associated to other independent risk factors with a role in the prediction of cardiovascular events. These factors are represented by the left ventricular hypertrophy, hyperlipemia insulin resistance.(22)

According to the randomised controlled placebo studies, there is no doubt that the old persons benefit from anti-hypertensive therapy regarding reducing cardiovascular morbidity and mortality, no matter whether they suffer from systole-diastolic hypertension or isolated systolic hypertension.(23) The isolated systolic hypertension represents 65% of the cases of hypertension in the elderly.(24) The SHEP trial (Systolic Hypertension in the Elderly Program) demonstrated that treating patients over 60 years old, having the systolic arterial pressure over 160 mm hg but with normal values for the diastolic arterial pressure, reduced the non fatal infarct by 33%, the left ventricular insufficiency by 54 % and the cerebral vascular strokes by 36% over a studying period of 4,5 years.(25)

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CLINICAL ASPECTS

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