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PREHYPERTENSION A NEW DISEASE?

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Abstract:
***Aim**: Evaluation of lipid profile and anthropometric parameters particularities in prehypertension patients **(Systolic pressure**: 120–139mm Hg and **Diastolic pressure:** 80–89 mm Hg).*
***Material and_Methods**: Two lots of patients were investigated: the first lot comprising 73 patients with prehypertension (44 males and 29 female) and the second made up of 70 patients (31 males and 39 females) with hypertension in stage 1 (according to JNC7 2003 - **Systolic pressure**: 140–159 mm Hg and **Diastolic pressure** 90–99 mm Hg).*
***Conclusion:** We can conclude that a modification in the patient life style (sustained physical activity and balanced diet) can prevent an advance of this condition from prehypertension stage to stage 1 of hypertension).*

***Key words:** prehypertension, lifestyle modifications.*

1. Introduction

Prehypertension is an American classification for cases where a person's blood pressure is elevated above normal but not to the level considered to be hypertension (high blood pressure). Prehypertension is considered to be blood pressure readings with a systolic pressure from 120 to 139 mm Hg or a diastolic pressure from 80 to 89 mm Hg.Most people will become hypertensive as they age. More than half of people over age 60 and approximately three-fourths of people over age 70 have hypertension. It is age related. The Framingham Heart Study reported the lifetime risk of hypertension to be close to 90% for men and women who did not have hypertension at age 55-65 and who lived to age 80 – 85.

Data from the 1999 and 2000 National Health and Nutrition Examination Survey (NHANES III) estimated that the prevalence of prehypertension among adults in the United States was approximately 31 percent [1]. The prevalence was higher among men than women (39 and 23 percent, respectively) [5]. On the basis of the NHANES 2005-2006 data, an estimated 25% of the US population aged 20 years or older has prehypertension, including over 32 million men and 21 million women [7].

The mechanisms responsible for increased cardiovascular disease risk in individuals with prehypertension, even after adjustment for known concomitant risk factors, are probably related to a combination of elevated blood pressure *per se,* as suggested by the work of Lewington et al [6] and to the concomitant presence of cardiovascular risk factors, measured and unmeasured, that investigators did not

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adjust for in their multivariable analyses, as noted in the analysis of WHI data [5]. For example, compared with the 16,002 women with normal blood pressure (mean blood pressure 109/69 mmHg) enrolled in the WHI, the 23,596 women with prehypertension (mean blood pressure 130/78 mmHg) were older (62.6 years versus 60.7 years), had a higher BMI (28.9 kg/m^2 versus 26.9 kg/m^2), had a higher prevalence of diabetes mellitus (3.0% versus 1.8%) and a higher prevalence of high cholesterol (10.2% versus 8.3%). Together, these observations underscore the importance of global cardiovascular risk assessment in patients with prehypertension to optimize preventive and therapeutic strategies for these individuals.

A primary risk factor for prehypertension is being overweight. Other risk factors include a family history of hypertension, a sedentary lifestyle, eating high sodium foods, smoking, and excessive alcohol intake. Blood pressure levels appear to be familial, but there is no clear genetic pattern. Home monitoring of blood pressure can be used to monitor and track prehypertensive patients. People using home blood pressure monitoring devices are increasingly also making use of blood pressure charting software. These charting methods provide print outs for the patients physician and reminders on checking blood pressure.

Blood Pressure Measurement

In accordance with American Heart Association guidelines, BP was measured with a mercury sphygmomanometer in an office setting; the first and fifth phases of Korotkoff sounds were used for systolic and diastolic BP. Appropriate cuff sizes were chosen for each subject's arm circumference. BP was measured 3 times by skilled, trained physicians after subjects had rested for 15 minutes in the sitting position, and the average of the measurements was recorded. Physical examination included measurement of height (centimeters) and weight (kilograms), and a resting 12-lead ECG was recorded.

Prehypertension itself doesn't often have complications. If you have prehypertension, it's likely to worsen and develop into hypertension. The term "prehypertension" is often used by doctors to signal that it's time to begin making lifestyle changes or, if you have certain conditions such as diabetes, taking medications to stop your blood pressure from rising.

Subjects with prehypertension are more obese and have higher levels of triglycerides and LDL cholesterol and lower levels of HDL cholesterol than their counterpart subjects with normal BP [4]. Furthermore, during follow-up, subjects with prehypertension are more susceptible to developing true hypertension and coronary atherosclerosis [3, 9]. Thus, it is clear that subjects with prehypertension are at a considerably high CV risk and require some type of intervention to reduce the risk.

A person may participate, within a volume, with a paper as first author and one as co-author. The Ph.D. coordinators may be co-authors for several papers of their doctoral students, if they contributed to their development.

The paper will be written in British English, using Times New Roman (TNR, Microsoft Word). We strongly advise to use this template and insert the text of the paper directly within this file.

2. Material and Methods

Two lots of patients were investigated: the first lot comprising 73 patients with prehypertension (44 males and 29 female) and the second made up of 70 patients (31 males and 39 females) with hypertension in stage 1 (according to JNC7 2003 - **Systolic pressure**: 140–159 mm Hg and **Diastolic pressure:** 90–99 mm Hg).

3. Results

The structure of prehypertension lot (**Systolic pressure**: 120–139mm Hg and **Diastolic pressure:** 80–89 mm Hg): 73 patients with 44 (60%) males and 29 (40%) females. The second lot of patients with hypertension in stage 1 (according to JNC7 2003 - **Systolic pressure**: 140–159 mm Hg and **Diastolic pressure:** 90–99 mm Hg) comprising 70 patients with 31 (44%) males and 39 (56%) females. (Fig.1)

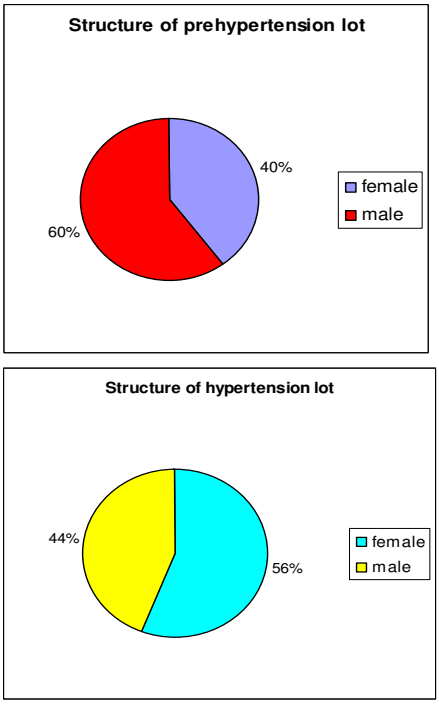

Fig.1. *Structure of the two lots*

The investigated anthropometric parameters were body mass index (BMI) and Waist-hip ratio (WHR) for measure the abdominal obesity.

The World Health Organization (WHO) regards a BMI of less than 18.5 as underweight and may indicate malnutrition, an eating disorder, or other health problems, while a BMI greater than 25 is considered overweight and above 30 is considered obese [8]. (Table 1).

Categories of BMI Table 1

Underweight	from 16.0 to 18.5
Normal	from 18.5 to 25
Overweight	from 25 to 30
Obese Class I	from 30 to 35
Obese Class II	from 35 to 40
Obese Class III	over 40

WHR has been found to be a more efficient predictor of mortality in older people than waist circumference or body mass index (BMI) [10]. If obesity is redefined using WHR instead of BMI, the proportion of people categorized as at risk of heart attack worldwide increases threefold [11]. The body fat percentage is considered to be an even more accurate measure of relative weight. Of these three measurements, only the waist-hip ratio takes account of the differences in body structure. (Table 2)

The Waist-to-Hip Ratio and the Health Risk Table 2

Male	**Female**	**Health Risk Based on WHR**
Close to 0.9	Close to 0.7	Ideal – Very low Risk
0.95 or below	0.80 or below	Low Risk
0.96 to 1.0	0.81 to 0.85	Moderate Risk
1.0+	0.85+	High Risk

Using BMI we find some differences between male and female: in prehypertension male 65% are overweight and obese; in hypertension female 64% are overweight and obese.

But the conclusion for all patients (male and female) is that in prehypertension lot more than 50% are overweight and obese like in hypertensive lot. (Fig. 2)

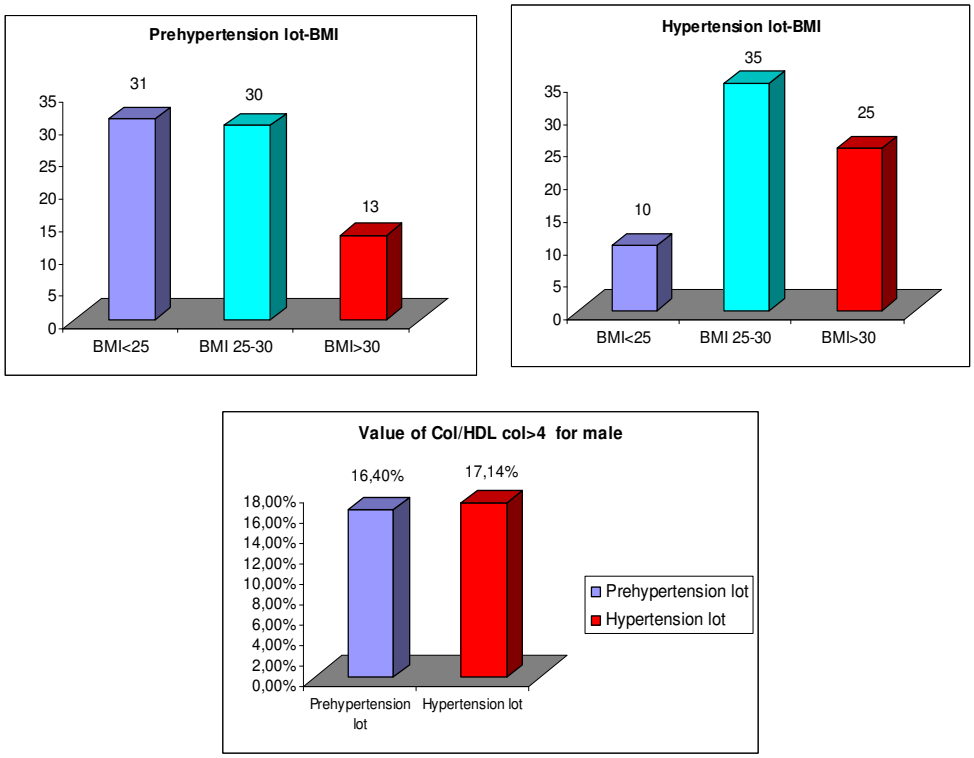

Fig. 2. *Distribution the patients according BMI in the two lots*

In the subgroup of males we find WHR over normal values in a similar proportion in both lots (hypertension and prehypertension): 13.7 % vs 17.1%. (Fig. 3)

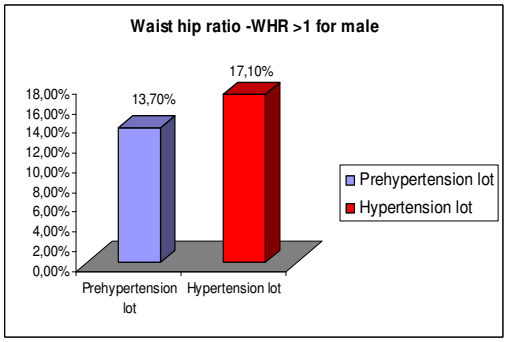

Fig. 3. *Risk value of WHR for male*

For lipid profile high chol /HDL-chol ratio and high trygliceride value appears predominant to male hypertensive and prehypertensive in the same proportion. (Fig. 4)

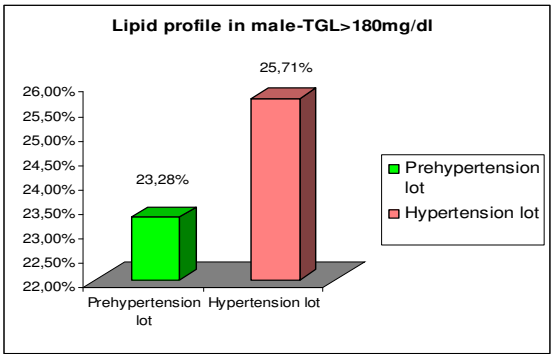

Fig. 4. *Lipid profile in the male sublot*

High trygliceride values with the prehypertension male subgroup are comparable to the value of the hypertension male subgroup. Concerning the female patients modifications of the lipidic profile are significant statistically only for the hypertension ones value of the hypertension male subgroup.

4. Conclusions

We can conclude that a modification in the patients life style (sustained physical activity and balanced diet) can prevent an advance of this condition from pre-hypertension stage to stage 1 of hypertension.

Interestingly, several studies have shown that pre-hypertension is common, even in young healthy subjects, and that it is associated with metabolic syndrome and other CV risk factors. Subjects with pre-hypertension are more obese and have higher levels of triglycerides and LDL cholesterol, and lower levels of HDL cholesterol than their counterpart subjects with normal BP. In the PAMELA study, the prevalence of type 2 diabetes, impaired fasting blood glucose, and hypercholesterolemia increased progress-sively from "optimal" to "normal", "high normal", and elevated office systolic or diastolic BP. These data suggest that the prevalence of metabolic syndrome and type 2 diabetes rises as BP levels increase. Thus, it is possible that the heavy burden of CV disease in pre-hypertension is driven by the high prevalence of other CV risk factors, such as type 2 diabetes and metabolic syndrome.

Changing style of life is not an easy task. It is however recommended for prehypertensive subjects: keeping an appropriate weight, physical activity and stress management techniques are very important, and nutrition as well is of utmost importance. Vegetables rich in potassium and magnesium, as well as whole grain foods may reduce the chance to develop hypertension. To lower the risk of prehypertension progressing to hypertension, modification of lifestyle or behaviors is necessary. Careful monitoring for signs of end-organ damage or progression to hypertension is an important part of the follow-up of patients with prehypertension. The major indication for pharmacologic antihypertensive therapy is progression to hypertension. The goal blood pressure for these conditions is currently less than 120/80 mm Hg.

The question whether we should treat patients whose BP is at high-normal level and who are with low or moderate cardiovascular risk is to be solved. Some clinical trials (TROPHY, PHARAO) suggest that keeping BP at low level with RAS blockade (ARB or ACEI) may inhibit development of hypertension. It is not clear that other types of antihypertensive drugs (e.g. BBL, diuretics) could have the same effect, or, on a long run, these types of therapies could prevent more cardiovascular outcomes.

Concerning prognosis without any lifestyle changes, prehypertension is not likely to progress to hypertension, or high blood pressure. A study showed that after two years, only 14% of adolescent boys and 12% of girls with prehypertension went on to developing hypertension (although the study used only a single measurement instead of two measurements) [2].

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