

HYPERTENSION - A MARK OF METABOLIC SYNDROM IN ADOLESCENTS

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Abstract

Essential hypertension, an independent cardiovascular risk factor, becomes a disease of adolescent. Because of the tracking phenomenon hypertension in adolescent is a risk factor for adult's hypertension. The aim of this screening was to evaluate hypertension's prevalence in a group of 712 adolescents aged 15-19 years and to establish the relation with other cardiovascular risk factors. Hypertension's prevalence was 10,1% slightly higher in boys. Risk factors that had a strong influence in hypertension's prevalence are smoking, cholesterol level, obesity and the presence of the disease in parents. Primary hypertension becomes the dominant etiology in adolescents, and the prevalence of hypertension in childhood and adolescence depends strongly on the values considered normal. Primary hypertension in adolescents is related to cardiovascular risk factors.

Introduction

The positive relationship between systolic, diastolic blood pressure and cardiovascular risk is well-known for a long time; this relationship is strong, continuous, gradual, independent, very consistent and highly predictive even if ischemic heart disease is present or absent. Because hypertension is highly prevalent the disease is a major issue of public health [1, 2, 3]. In adult high values of blood pressure are correlated with the risk for myocardial infarction, stroke, renal disease; hypertension is an independent and very important cardiovascular risk factor.

Lately there are important results about diagnosis and evaluation of hypertension in children and adolescents. Regarding the etiology, for a long period of time the only

type of hypertension was the secondary form. In the last two decades, there are greatly and important changes in etiology of hypertension in adolescents – gradually primary hypertension becomes dominantly [4].

High values of blood pressure in childhood and adolescence is a risk factor for hypertension in adult; there are studies about the tracking phenomenon of hypertension from childhood to adulthood [5, 6].

Not only a great prevalence of hypertension is a problem for adolescents, but also the associated comorbidities: dominant is the obesity which becomes epidemical [7].

In adolescents, primary hypertension is mild, subjects are always overweight or obese with a positive family history for hypertension or cardiovascular disease.

The aim of our study is to evaluate essential hypertension's prevalence and to establish the relationship between hypertension and other cardiovascular risk factors: smoking, hypercholesterolemia, family history and obesity.

Method

In our screening we included students from 9-12 grades in a highschool in Oradea – 721 students – 390 (54,1%) girls and 331 (45,1%) boys aged 15-19 years. For all of them we evaluated: height, weight, body mass index, blood pressure and cholesterol levels.

The adolescents were invited to answer the questions included in a questionnaire composed of two parts:

- one about lifestyle: nutrition, smoking, physical activity
- one about family history [8].

The normal values and hypertension were defined according to the Fourth Report about diagnosis, evaluation and treatment of hypertension in childhood and adolescence [9].

Results

Prehypertension incidence was 13,7% and for hypertension it was about 10,1%. (Figure 1.)

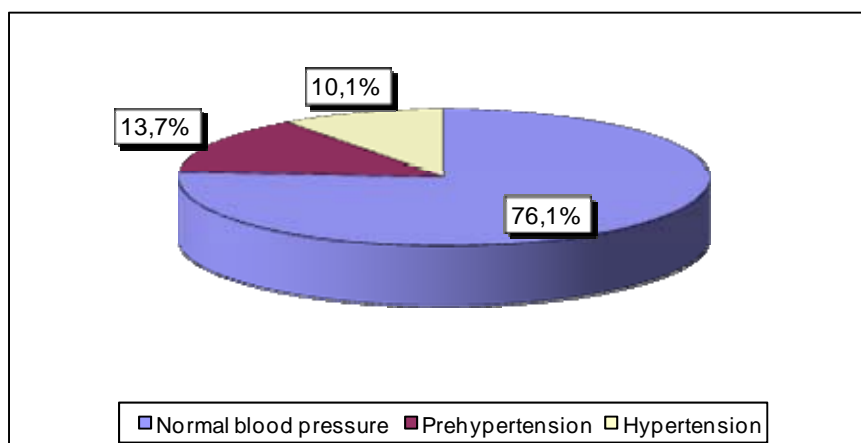


Figure 1. Incidence of prehypertension and hypertension

Regarding the incidence of hypertension according to the gender of the subject this is highly prevalent in boys, but the difference is not statistically important – 11,2% in boys and 9,2% in girls.

Smoking is an independent risk factor for hypertension. In adolescents smoking or nonsmoking status seems not to be related with hypertension (Table 1.)

Table 1. Incidence of hypertension related with smoking behavior

	Nr.	%
Smokers (n=227)	23	10,1
Nonsmokers (n=494)	50	10,2

The intensity of smoking behavior was assessed by the number of cigarettes daily smoked-prevalence of hypertension is directly related with this (Figure 2).

Positive family history has a great influence on hypertension's prevalence which is 2,5 fold higher when one parent is hypertensive and 3 fold higher when both of them have the disease comparative with those whose parents have a normal blood pressure (Table 2).

There is a particular correlation between cholesterol's level and hypertension (Table 3).

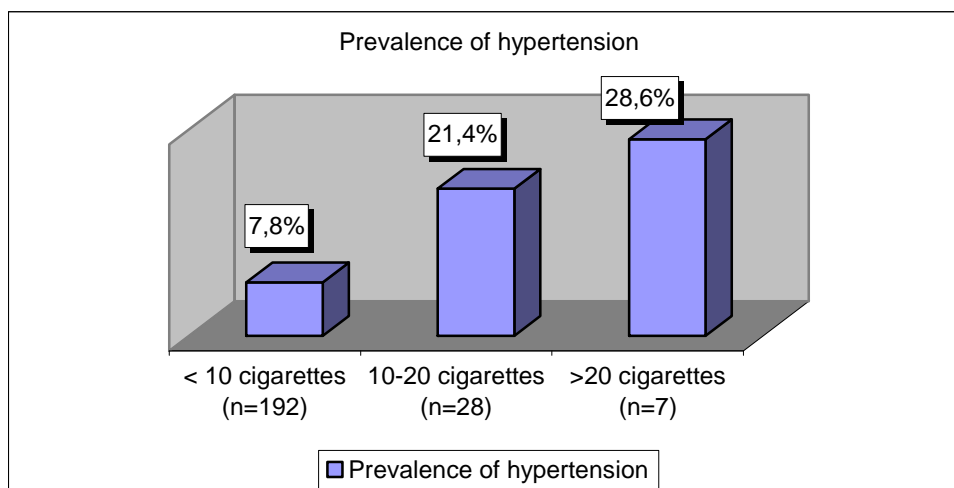


Figure 2. Prevalence of hypertension and smoking intensity

Table 2. Prevalence of hypertension and positive family history for the disease

Parent's blood pressure level	Nr.	%
Mother (n=75)	10	14,1
Father (n=31)	6	19,5
Mother and father (n=28)	7	23,7
Normal blood pressure(n=547)	42	7,9

Table 3. Prevalence of hypertension and cholesterol's level

	Girls with hypertension		Boys with hypertension	
	Nr.	%	Nr.	%
Chol<170 mg%	29	8,4	27	9,6
Chol>170 mg%	7	15,6	10	20,0

Incidence of hypertension is 1,9 fold higher in hypercholesterolemic girls and 2,1 fold higher in boys with elevated level of cholesterol. So, hypercholesterolemia is a risk factor for hypertension.

Relationship between obesity and hypertension is present in our screening and it is represented in Table 4. – hypertension is more frequent in overweight and obese adolescents.

Table 4. Prevalence of hypertension and weight

	Girls	Boys
	Normoponderals	
Normal blood pressure	57,7	42,3
Hypertension	53,5	56,5
	Overweight and obese	
Normal blood pressure	48,9	51,1
Hypertension	47,9	52,1

Discussions

Hypertension's prevalence in childhood and adolescents is 1 to 13%, even 17% [4, 10] according to the values considered as normal, number of determinations, and the period of time for the investigation.

Probably our results are higher than the real frequency because we didn't exclude the white coat effect, possible secondary forms of

hypertension, and we determined blood pressure's values only twice.

Prehypertension considered as an equivalent for "high normal" in adults is mandatory for lifestyle changing.

We can explain that hypertension is more frequent in boys because they are smoking frequently and obesity is prevalent among boys.

Smoking in adolescents doesn't always last for a long period of time, so this habit doesn't have a great influence in hypertension's prevalence in smokers and nonsmokers. Prevalence of hypertension is determined by the number of cigarettes daily smoked because of the acute effects of this behavior [11].

Our results show that family history contribute to hypertension's prevalence in a proportion of 20 to 60-70% [13].

Relationship between cholesterol level and blood pressure emphasizes the physician's obligation to screen hypertensive adolescents' lipid profile [14, 15].

Obesity and hypertension are strongly linked: hypertension is a mark of metabolic syndrome frequently in adolescents [16, 17].

Conclusions

1. Primary hypertension becomes the dominant etiology in adolescents.

2. Prevalence of hypertension in childhood and adolescence depends strongly on the values considered normal.

3. Primary hypertension in adolescents is related to cardiovascular risk factors.

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