Original Research Paper

Volume - 14 | Issue - 11 | November - 2024 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Physiology

ISOMETRIC HANDGRIP EXERCISE TEST FOR UNMASKING HYPERTENSION IN THE OFFSPRINGS OF HYPERTENSIVE PARENTS IN TERTIARY CARE CENTRE.

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ABSTRACT **Background:** Hypertension is a condition in which blood pressure is elevated. It causes serious medical problems in adults and has been found to be predictive of cardiovascular mortality and morbidity. **Objective:** The aim of the present study was to unmask the underlying hypertension if present in the descendants of hypertensive parents and to compare it with age-matched controls of normotensive parents. **Methods:** Fifty medical students who were in the age group of 17-24 years, with a family history of primary hypertension either single parent or both parents, were recruited for the study and the results were compared with those of Fifty age-matched medical students with no familial history of hypertension. **Results:** The systolic Blood Pressure was significantly higher in Group I during Isometric Handgrip exercise test compared to Group II individuals. **Conclusion:** Early diagnosis and management of hypertension is needed to decrease mortality and morbidity. Furthermore, identifying the risk factors for hypertension in young age is vital for prevention and early management of this disease.

KEYWORDS :

INTRODUCTION:

World Health Organisation (WHO) defined hypertension as an increase in the blood pressure of ≥140/90 mm Hg measured on three separate occasions. Hypertension causes serious medical problems in adults and has been found to be predictive of cardiovascular mortality and morbidity[1]. As hypertension is a complex disease caused due to genetic susceptibility, environmental factors, and their interactions, clearly identifying the causative genes for hypertension has been challenging. In recent decades, many studies have demonstrated the influence of genetics on hypertension and the familial association of blood pressure (BP) in various populations [2]. Previous studies have reported a significant increase in BP and the prevalence of hypertension in children and adolescents [3,4,5]. Young individuals with elevated BP are at higher risk of developing hypertension and cardiovascular disease later in life (6)and prevention and early intervention are crucial for these individuals with elevated BP. Therefore, identifying familial associations of hypertension between parents and their offspring would enable us to stratify the relative risk of elevated BP in children and adolescents, leading to the prevention and early management of cardiovascular disease(7,8) .The aim of the present study was to unmask the underlying hypertension if present which follows physical stress, in the form of the isometric handgrip exercise test, in the descendants of hypertensive parents and to compare it with age-matched controls of normotensive parents.

MATERIALAND METHODS:

The present study was a cross-sectional study which was conducted in Tertiary care centre, Tamil Nadu, India. Ethical committee approval was obtained from the Institution. Informed consent was taken from all the medical students. Fifty medical students who were in the age group of 17-24 years, with a family history of primary hypertension either single parent or both parents, were recruited for the study and the results were compared with those of Fifty age-matched medical students with no familial history of hypertension. The medical students with a h/o any chronic illness, those who were on any medication and smokers were excluded from the study.

The subjects were divided into 2 groups:
Group I- study group with a family h/o hypertension
Group II- control group with no family h/o hypertension

The procedure of the isometric handgrip exercise test was explained to all the students who participated in the study. Before the test, the subjects were allowed to rest for 10 minutes in a quiet room to reduce the anxiety.

The resting blood pressures of all the subjects were measured with the help of a Digital sphygmomanometer . Systolic Blood Pressure (SBP) and the Diastolic Blood Pressure (DBP) were measured.

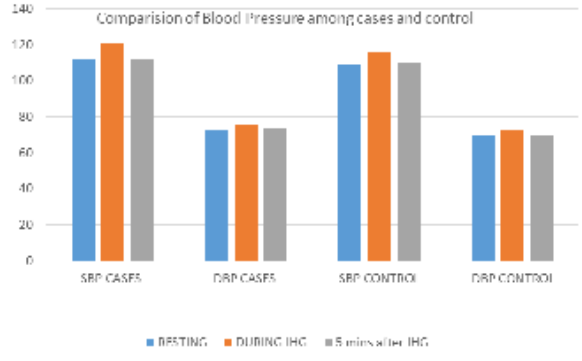
The isometric handgrip exercise was done in both study and control groups. The subjects were asked to hold the handgrip spring dynamometer in the right (or dominant) hand to get a full grip of it. The handles of the dynamometer were compressed by the subject by putting in maximum effort for 1 minute. This whole procedure was repeated thrice with 30 seconds rests in between, to prevent fatigue. During the test, the blood pressure was recorded from the non-exercising arm. The blood pressure was again recorded 5 minutes after the completion of the exercise.

The results were analyzed by ANOVA with SPSS, version 21.0 by using the unpaired 't' test.

RESULTS:

The systolic Blood Pressure was significantly higher in Group I during Isometric Handgrip exercise test compared to Group II individuals.p<0.001.

SUBJECTS	CONDITIONS	SBP(mmHg) Mean ± SD	DBP(mmHg) Mean ± SD	P-VALUE
GROUP I(n=50) study group with a family h/o hypertension	RESTING BP	112.2±2.5	72.6±1.4	<0.001
	DURING IHG	120.6±4.3	75.8±2.0	
	5 min after IHG	112.4±3.9	73.4±2.6	
GROUP II(n=50) control group with no family h/o hypertension	RESTING BP	109.4±3.94	69.88±1.83	<0.001
	DURING IHG	115.72±3.04	73.00±1.83	
	5 min after IHG	109.8±3.88	70.12±1.91	



Ihg- Isometric Handgrip Exercise .p Value Of <0.001 Recorded Between Study And Control Group Which Is Statistically Significant.

DISCUSSION:

In the present study, we investigated the association of BP and hypertension between offspring and their parents. Additionally, the odds of having hypertension among offspring approximately doubled

or quadrupled when either or both parents had hypertension, respectively, compared to offspring without parents with hypertension(9,10). **Lopes hf et al** concluded that resting blood pressure higher in normotensive subjects of hypertensive parents is due to increased sympathetic activity before the exercise (11).**ferrier et al** also found that plasma norepinephrine levels before exercise and an elevated rate of the spillover of norepinephrine to plasma in the offspring of hypertensive parents(12). **Krzeminski k et al** showed significant increases in both the systolic and the diastolic blood pressures with the isometric handgrip exercise (13).**yamada y et al** reported that the baroreflex inhibition of the muscle sympathetic nerve activity was reduced in normotensive adolescents with a family history of hypertension. A reduced reflex sympatho-inhibition could lead to the development of hypertension due to an increase in the sympathetic vasomotor tone(14).

From a clinical perspective, hypertension in young age has been increasing in many countries . Therefore, early diagnosis and management of young hypertension are needed to decrease mortality and morbidity and the overall health care demand of these patients(7). Furthermore, identifying the risk factors for hypertension in young age is vital for prevention and early management of this disease. Applying prevention methods such as reducing obesity, watching one's diet, and increasing physical activity might be a highly cost-effective medical policy considering the potential advantages .

CONCLUSION:

From this study we could see the close relationship of blood pressure and hypertension between offspring and their parents . Further studies are required to investigate other factors which are responsible for development of hypertension in offspring of hypertensive parents. By early diagnosis and intervention with Lifestyle modification the prevalence of hypertension in the offspring of hypertensives can be reduced at the earliest.

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