Original Research Article

Association of Body Mass Index With Sympathetic Function by CPT in Males Adults

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Abstract

Background: As a result of expected rises in blood pressure and its relationship with BMI, Hundreds of thousands more myocardial infections and strokes are expected to result from the association of hypertension with cardiovascular risk.**Method:** Blood pressure, Cold pressure test and body mass index of the subject (n=120, age =18-25 years) was recorded following standard procedure. The blood pressure was recorded by auscultatory method. The dominating arm of the subjects was immersed in the cold water and after that immediately within 1 minute systolic and diastolic blood pressure was measured.**Results:** The finding of this study is sympathetic activity was increased in overweight and in obese as compared to normal body mass index after cold pressor test.**Conclusion:** The sympathetic activity was increased in overweight and in obese subjects as compared to normal body mass index after Cold pressor test.

Keywords: Blood Pressure, Body mass index, Cold pressor test.

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Introduction

Overweight and obesity research indicates that over the last few decades, the prevalence has been significant around the globe. One third of the world's population can be now identified as overweight, and all singing suggests a further rise in the years to come[1].

Most common causes of increased BMI is physical inactivity or disequilibration between calorie intake and energy utilization. Nowadays internet-based interventions (watching movies, playing video games and surfing the internet) also reduces physical activity to a great extent[2].The most significant determinants of hypertension have been established as obesity and overweight[3-5]. According to Framingham Study 10 percent increase in body mass index explains 7 mmHg increases in the general population's systolic blood pressure[6].

In response to some discomfort, the cold pressor test tests cardiovascular function. The indicator of potential hypertension is an irregular response to CPT[7].Heart rate and blood pressure are affected by temperature. The CPT is used to determine the physiological response of a person to environmental stimuli. The improvement in BP after the CPT helps to determine stress- related autonomic cardiovascular function[8] many processes, such as the nervous system, endocrine system, cardiovascular system, and immune system, are affected by stress. Stimulation of the sympathetic system is one of the immediate consequences of stress. This stress may be predisposed to different lifestyle disorders such as hypertension and diabetes mellitus later in life. CPT is a simple way to measure the stress response of the left ventricle [9] According to Kasagi et al. increased CPT reactivity is a predictor of potential hypertension[10]; a research carried out by Carroll et al. in response to CPT, both systolic and diastolic BP showed an increase[11].According to Park et al. Overweight individuals had an elevated multi-unit postganglionic sympathetic nerve activity response to CPT[12].

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Material & Methods

This observational study was carried out over a period of 12 months at the Department of Physiology, TeerthankerMahaveer Medical College & Research Center, Moradabad.

Inclusion criteria

- Volunteers of 18-25 year age group were included in the study[13].
- BMI (18-30 kg/m^2)[13]

Exclusion criteria

- History of smoking / alcohol consumption, drug intake
- Any systemic illness
- Bone injury in dominating hand[14].

Methodology

The present observational study was conducted among 120 volunteers. This study began after approval by Institutional Ethical Committee. Before starting the study, written informed consent was obtained from each participant. The measurement of blood pressure and cold pressure test, the participant was asked to sit comfortably for 5 minutes before measuring the blood pressure. The cuff was tied over the dominating upper arm 2-3 cm. Then the

bell of stethoscope was lightly pressed above the brachial artery, compressing air pump, mercury level was raised up to 40-50 mmHg over the systolic level as determined by palpatory method. Gradually pressure was released until a clear beating sound was heard and the BP was recorded by auscultatory method[15].The dominating arm of the subject was immersed in the cold water (2^0C) and after that immediately within 1 minute systolic blood pressure and diastolic blood pressure was measured[16].

Results

Table 1: Comparison of SBP in different group of BMI before and after sympathetic stimulation by using CPT (n=120)

		CPT SBP(Grouped)			Total
		Normal	Pre-hypertension	Stage I Hypertension	
BMI	Normal	17	51	2	70
	Overweight	1	13	2	16
	Obese	2	23	9	34
Total		20	87	13	120

Table 1 shows the comparison of SBP in different groups of BMI before and after sympathetic stimulation by CPT. In normal BMI 17 subjects was normal 51 subjects were elevated pre-hypertensive and 2 subjects were stage 1 hypertensive. In overweight 1 subject was normal 13 subjects were elevated pre-hypertensive and 2 subjects were stage 1 hypertensive. In obese 2 subjects were normal 23 were elevated pre-hypertensive and 9 subjects were stage 1hypertensive

Table 2: Comparison of DBP in different group of BMI before and after sympathetic stimulation by using CPT (n=120)

		CPT DBP(Grouped)				Total
		Normal	PreHypertension)	Stage I Hypertension	Stage II Hypertension	
BMI	Normal	24	42	4	0	70
	Overweight	2	12	2	0	16
	Obese	5	19	7	3	34
Total		31	73	13	3	120

Table 2: shows the comparison of DBP with different groups of BMI before and after sympathetic stimulation by CPT. In normal BMI 24 subjects was normal 42 subjects were elevated pre-hypertensive and 4 subjects were stage 1 hypertensive. In overweight 2 subjects were normal 12 subjects were elevated pre-hypertensive and 2 subjects were stage 1 hypertensive. In obese 5 subjects were normal 19 subjects were elevated pre-hypertensive 7 subjects were stage 1 hypertensive and 3 subjects were stage 2 hypertensive.The association of body mass index with blood pressure after sympathetic stimulation by cold pressor test in 120 volunteer subjects. The findings of this study are sympathetic activity was increased in overweight and in obese as compared to normal body mass index after cold pressortes.

Discusion

A study done by Bramlage P *et al.* in 2004 they noticed that the BP levels were constantly elevated in obese participants. In normal BMI subjects were 34.3%, in overweight subjects 60.6%, in 1 grade obesity 72%, in 2 grade obesity 77.1%, and in3 grade obesity 74.1%[17]. Our finding also blood pressure level was increased in overweight and obese participants than the normal weight.According to Nayak M *et al.* in 2014 Adult males had a stronger positive association than females between BMI and autonomic reactivity. Compared to the middle-aged population, the body mass index is associated with autonomic reactivity in the younger population. The Sympathetic activity was measured by cold pressure test[18].Our study also correlated with Nayak M *et al.* the body mass index was directly correlated with autonomic reactivity in male young adults. After giving the sympathetic stimulation by cold pressure test blood pressure was increased in obese subjects.According to Santos FDD *et al.* conducted a research on 166 adolescent's age groups of participants 14-17 years, from both sexes. In Public school Triunfo, Pernambuco province, Brazil. They observed that adolescents with a higher BMI had significantly higher SBP, while in both sexes the SBP and DBP were significantly higher after CPT[19].

In our study, 120 male participants with age groups 18-25 years. The SBP and DBP were significantly increased in the adolescent subjects after the sympathetic stimulation by cold pressure test.

Conclusion

The present study was conducted among 120 healthy young male adults between the ages of 18-25 who were the campus students of Teerthaker Mahaveer University, Moradabad (U.P).The purpose of this study was to find out the association of body mass index with sympathetic function in young males adults.The findings of this study are sympathetic activity was increased in overweight and in obese as compared to normal body mass index after Cold pressor test.

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