

## Study of Heart Rate and Blood Pressure Response to Cold Pressor Test in Normotensive Overweight and Normotensive Normal Weight Individuals

Madhu Bhatt\*, Anirban Bhattacharya\*\*

Armed Forces Medical College, Pune, India

E-mail: vishnugsmenon@gmail.com

### Background

Obesity is a known risk factor for hypertension. The mechanism behind obesity induced hypertension is not clear but has been proved to be associated with autonomic dysregulation in these individuals, which can be screened through various cardiac autonomic function tests like the Cold Pressor Test (CPT). But a major portion of the overweight population in India consists of non-obese overweight individuals and being weight as such has not been defined as a risk factor for hypertension. By studying Heart rate and Blood Pressure responses to CPT in Normotensive non-obese overweight individuals and comparing them with that of Normotensive normal-weight individuals, it can be better understood.

### Aims & Objectives

To understand the level of autonomic dysregulation and hence the risk of developing hypertension in the non-obese overweight individuals.

### Material & Methods

This is a comparative study done in a clinical setting over a period of 6 weeks. The study population consists of males aged between 18 to 30 who were arranged into two groups of 16 each; test group consisting of normotensive non-obese overweight individuals (BMI between 23 to 24.9 kg/square metres) and control group consisting of normotensive normal-weight individuals (BMI between 18 to 22.9 kg/ square metres). After explaining the study protocol and obtaining informed consent; the subjects were subjected to CPT (5 degree Celsius for 1 min till Wrist Joint). The heart rate and

Blood pressure changes in control and test groups were recorded in the pre-task, task and post-task periods with each individual in supine position and the cuff of the Sphygmo-manometer tied to right arm. The response to CPT which is the difference between the task and pre-task values is studied individually as well as compared with each other for both the groups. The data collected was subjected to statistical analysis for significance both within and between two groups.

### Results

The difference between the pre-task and the task for Systolic BP (SBP), diastolic BP (DBP) and heart rate (HR) in the test group was 19.33 mmHg, 13.64 mmHg and 5.10 bpm respectively with  $p < 0.001$  in each of the cases. The difference between the pre-task and the task for SBP, DBP and HR in the control group was 14.54 mmHg ( $p < 0.001$ ), 5.61 mmHg ( $p = 0.005$ ) and 6.27 bpm ( $p < 0.001$ ) respectively. The mean differences of SBP, DBP and the HR between Test and Control group were 4.79 mmHg ( $p = 0.003$ ), 8.03 mmHg ( $p < 0.001$ ) and -1.18 bpm ( $p = 0.246$ ) respectively.

### Conclusions

The Test group of non-obese overweight subjects showed significant rise in the blood pressure especially the DBP when compared to the control group of normal-weight subjects. This indicates the presence of Autonomic dysregulation in the former upon the pressor test, thus proving that they have a greater risk of developing persistent autonomic dysregulation and hence hypertension in the future than the individuals with normal weight.