



**CARDIOVASCULAR RESPONSES TO AUTONOMIC STRESSORS IN YOUNG ADULTS BELONGING TO HYPERTENSIVE FAMILY**

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**ABSTRACT**

Hypertension is major risk factor for cardiovascular disease as well as stroke. In present era, stress leads to autonomic dysfunction; which act as aggregating factor for development of hypertension. The present study was carried out in 1<sup>st</sup> year medical students. To assess the effect of stressors, we have studied change in Mean Blood Pressure (MBP) and Heart Rate (HR) by inducing autonomic stressors by cold pressure test and Valsalva maneuver in young healthy adults as indicator of autonomic dysfunction in hypertensive family as well as non hypertensive family. On the basis of present study the offspring of hypertensive parent may be advocated to change or bring modification in their lifestyles, to prevent or delay hypertension at a later stage in their life.

**Keywords:** Hypertension, cold pressure test, valsalva maneuver, Autonomic Function

**INTRODUCTION**

Hypertension is one of the recognized antecedents of cardiovascular disease<sup>1</sup> and stroke<sup>2</sup>. It is generally attributed to a normal cardiac output with increase peripheral vascular resistance<sup>3</sup>. Abnormal course of response to stressors is seen in most of the people who will later have permanent hypertension<sup>3</sup>. In the era of hectic time and a competitive life style, people are subjected to lots of stress in their day to day life. These stressors produce wide spread autonomic variations in our physiology. In order to assess the effect of stressors, we have studied change in Mean Blood Pressure (MBP) and Heart Rate (HR) by inducing autonomic stressors like cold pressure test and Valsalva maneuver in young healthy adults as indicator of autonomic dysfunction in hypertensive family as well as non hypertensive family.

**MATERIAL AND METHOD**

The present study was carried out in 1<sup>st</sup> year medical students of Shri M. P. Shah Medical College - Jamnagar, India by selection of 15 subjects of both gender, belonging to hypertensive family as cases and another 15 subjects were selected as control with no family history of hypertension. Resting HR and MBP were recorded. BP was recorded by mercury sphygmomanometer. Change in HR and MBP induced by cold pressure test and valsalva maneuver were recorded during the test and in the recovery phase.

**Cold Pressure Test**

The subjects were explained detail about the nature of the test. With the subject in a sitting position, his right hand just below wrist was immersed in water at 4°C for 2 minutes and BP was measured in opposite arm of the subject. During immersion, 3 successive readings of MBP and HR were taken at 0, 1, 2 minute interval and again 3 readings were taken in the recovery phase at 0, 1, 2 minute interval.

**Valsalva Manoeuver**

The subjects were explained detail about the nature of the test. Again in sitting posture of subject, nose of subject was clipped after deep inspiration and the subject was asked to exhale the air in the rubber connecting tube of mercury sphygmomanometer and maintain mercury at the level of 40 mm Hg for approximately 45 seconds. MBP and HR were recorded before and after the test.

**RESULTS**

Our study results show that basal value of MBP and HR are slightly higher in cases as compared to control. In cold pressure test, rise in MBP and HR at the end of 2 minutes of test is significantly higher in both the groups, but cases shows significant increase in MBP and HR than control. In valsalva manoeuver significant increase in MBP and decrease in HR observed in both the groups. Result are tabulate in following Table 1 and 2 as well in Graph 1 and 2

**Table 1: Result of Valsalva Manoeuvre**

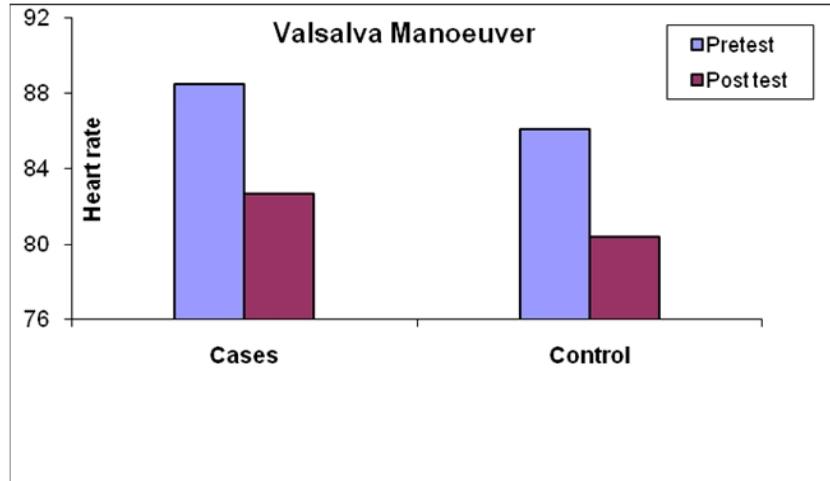
Test	Valsalva Manoeuver		
	Basal Value	During test	After test
Cases - MBP	88.4 ± 6.3	-	93.53* ± 7.1
HR	88.46 ± 5.8	-	82.66* ± 5.5
Control - MBP	86.98 ± 8.7	-	92.93* ± 5.5
HR	86.06 ± 5.6	-	80.40* ± 4.8

MBP (in mmHg), HR (per minute), \*P value significant

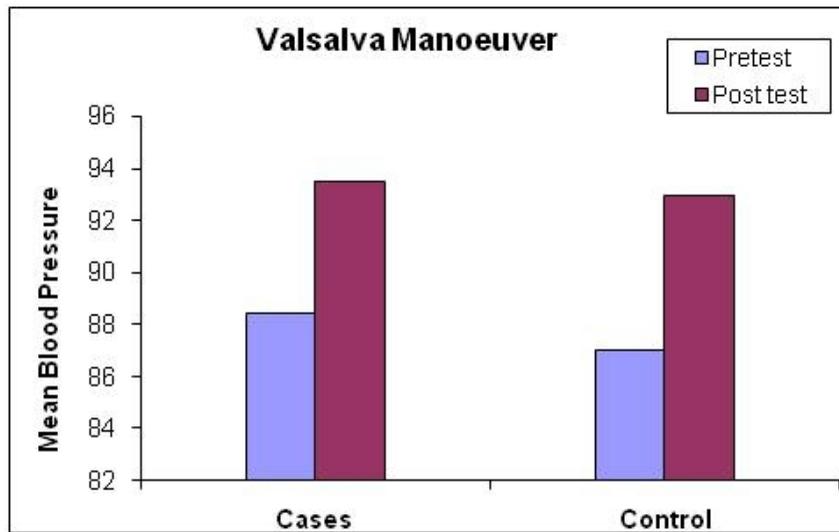
Table 2: Result of Cold Pressure Test

Test	Cold Pressure Test						
	Basal Value	During test			After test		
		0	1	2	0	1	2
	Min.	Min.	Min.	Min.	Min.	Min.	
Cases - MBP	88.4 ± 6.3	91.78 ± 6.3	93.79 ± 6.1	99.01* ± 5.7	93.26 ± 6.6	90.32 ± 6.5	86.06 ± 6.6
HR	88.46 ± 5.8	90.66 ± 5.6	93.33 ± 6.3	100.8* ± 7.1	93.53 ± 7.1	88.4 ± 6.2	83.4 ± 6.1
Control - MBP	86.98 ± 8.7	89.73 ± 8.1	92.47 ± 7.9	92.93* ± 5.5	91.19 ± 7.1	88.67 ± 7.7	83.92 ± 7.8
HR	86.06 ± 5.6	86.06 ± 4.9	88.93 ± 4.7	94.98* ± 7.7	88.6 ± 5.0	84.3 ± 4.4	80.4 ± 4.8

MBP (in mmHg), HR (per minute), \*P value significant



Graph: 1



Graph 2

**DISCUSSION**

Earlier studies have proved that hypertension is a familial problem; it is generally attributed to a normal cardiac output with increase in peripheral vascular resistance<sup>3</sup>. Results similar to present study have been reported recently by Gayatri *et al*<sup>4</sup>. This increase in peripheral vascular resistance has been found to follow a transient vasoconstriction in the vascular tree in most of the cases. This vascular hyper reactivity may predispose to hypertension, which may be inherited<sup>5,6</sup>. So, after application of stress increase in MBP was probably brought about through one of the following mechanisms,

- Increased total peripheral resistance while cardiac output remains unaltered or decreased.
- Simultaneous increase in cardiac output and peripheral resistance<sup>3</sup>.

**CONCLUSION**

Present studies clearly suggest increase risk of hypertension in offspring of hypertensive parents. So, they should bring modification in their lifestyles, to prevent or delay hypertension at a later stage in their life

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