

LETTER TO THE EDITOR

IDENTIFICATION OF SUSCEPTIBILITY TO HYPERTENSION
BY THE COLD PRESSOR TEST

Sir,

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It is now an established fact that primary and secondary hypertension and related cardiovascular disorders have a familial predisposition. Keeping this in mind, we subjected a group of asymptomatic normotensive college students of either sex (n = 12) to the cold pressor test to assess their cardiovascular reactivity. These individuals were selected on the basis of a positive family history of hypertension with or without related cardiovascular disorders (eg. ischemic heart disease). The control group consisted of similar group of college students (n = 12) but with no history of hypertension in the family. The cold pressor test causes cold stress which leads to sympathetic activation and thereby raises the blood pressure (1). This rise in blood pressure is also possibly contributed by release of some other factors like endothelin-1, prostaglandins and angiotensin II (2, 3). When the painful stimulus of cold stress is removed and the body is allowed to rest there is usually complete recovery within a short period of time (4). Our hypothesis was that the autonomic response during and after cold pressor test should be more pronounced in the individuals who have a family history of hypertension.

To perform the cold pressor hand test, a thick walled thermocol box measuring 38 cm × 26 cm × 18 cm, closed from all sides (by fixing its lid with the help of an adhesive), was used. A hole was made in the center of the top of the box to allow entry to one hand of the subject. Another small hole was made at the corner of the

top of the box for a laboratory thermometer.

Before starting the experiment the box was filled a mixture of ice and water and the laboratory thermometer was placed such that its mercury bulb was immersed in the mixture of ice and water. The temperature inside the box was maintained between 2° to 3°C throughout the experiment. A mercury sphygmomanometer was used to measure the blood pressure by auscultatory method.

The subjects chosen for this study were college students of 18 to 19 years of age. A brief history of the subjects was taken with main emphasis on the family history of hypertension. All the subjects were studied between 3 pm and 5 pm. All the subjects were Indians by race.

The study protocol consisted of first recording resting values of the heart rate and blood pressure. Sphygmomanometer cuff was kept tied for next measurement of B.P. Right hand of the subject was immersed in the mixture of ice and water for 1 minute and at the completion of one minute, B.P. and heart rate were measured and the subject was asked to take out his/her hand out of the box. The subject's hand then was immersed in lukewarm water for half a minute and he/she was allowed to rest. Five minutes after C.P.T., heart rate and B.P. were measured.

Statistical analysis was performed using the unpaired 't' test for between group comparisons and the paired 't' test for within group comparisons.

TABLE I: Heart rate and blood pressure response to the cold pressor test in normotensive individuals with a positive family history of hypertension.

	Resting		At 1 minute of cold pressor test		At 5 minutes after the cold pressor test	
	Study group	Control	Study group	Control	Study group	Control
Heart Rate (beats/min)	81.1±6.73	82.2±8.97	89.6±6.97	89.7±8.74	82.8±7.80	79.7±8.48
Systolic BP (mm Hg)	114.5±8.45	109.2±5.36	126.5±7.24	124.3±8.77	116.8±7.16*	107.1±5.75
Diastolic BP (mm Hg)	73.0±7.60	70.8±4.04	88.3±8.08	81.7±8.04	76.7±7.40**	70.83±4.04
Mean BP (mm Hg)	86.5±8.0	83.6±3.52	100.0±7.33	95.8±7.37	90.2±7.13**	82.9±3.90

All values are Mean ± SD.; *P<0.05; **P<0.001.

The resting levels of heart rate, systolic BP, diastolic BP and mean BP of the study group were not significantly higher than those of the control group ($P>0.05$). Similarly the heart rate and blood pressure values during cold pressor hand test of the study group were not significantly higher than those of the control group during the test. Though the traditional statistical methods give a clear idea about the significance of the obtained values, some more sensitive methods like latent growth curve modeling have been claimed to be superior to traditional statistical method (5).

Our findings were significant when we compared the recovery blood pressures (systolic, diastolic and mean blood pressures) with the resting blood pressure

(Table I). In the study group itself the recovery values of systolic and diastolic BP were significantly higher than their own resting values ($P<0.05$ for systolic BP and $P<0.001$ for diastolic BP, Table I). Similarly mean BP values in the study group 5 minutes post CPT were also significantly higher than their own resting mean BP values ($P<0.001$, Table I). All these findings indicate a slower recovery in the study group whereas control group obtained complete recovery 5 minutes after the CPT.

This study may suggest a possible role of prolonged effect of stress on blood pressure in those with familial predisposition to primary hypertension and usefulness of cold pressor test in detecting individuals at high risk for developing hypertension in their future life.

VIVEK VERMA*, S. K. SINGH AND S. GHOSH

*Department of Physiology,
Pramukh Swami Medical College,
Karamsad (Dist. Anand - 388 325)*

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