

LETTER TO THE EDITOR

COLD PRESSOR RESPONSE IN NORMAL AND MALNOURISHED CHILDREN

Sir,

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There have been various reports indicating involvement of the central and peripheral parts of ANS in malnutrition. Involvement of CNS in patients with severe undernutrition was shown by Fishman et al. in 1969 (1). Heinrich in 1982 (2) showed that inadequate nutrition produces ANS dysfunction. More recently, Sethi et al. (3) and Tandon et al. (4) have shown electrophysiological evidences of sensory impairment. Also, sweat production in malnourished children has been reported to be less than in normal or in children recovered from malnutrition (5). It was attributed not to poor skin blood flow as the peripheral blood flow in response to a heat stimulus is greater in the malnourished child. It was thought to be due to a defect in the ANS. A study conducted by Krishnamurty et al. in 1987 (6) compared the immediate cardiac response to lying down in normal and malnourished children. It was observed that the malnourished group had a lower standing to lying ratio as compared to the control group. This suggests a possible autonomic deficiency in malnourished children.

In our laboratory, we have conducted this study on 30 normal children aged 5 to 10 years (mean 6.8 years) and 30 malnourished children also aged 5 to 10 years (6.8 years). The malnourished children

had body weight below 2 standard deviations of age and sex specific National Centre for Health Statistic Centre (NCHS) Standards (7). The test was performed under thermoneutral conditions and at the same time of the day in all subjects. Subjects were allowed to acclimatize themselves to the experimental and environmental conditions. During this period, detailed history and medical examination was carried out to rule out any other cause of autonomic dysfunction in the subjects.

Cold pressor response (CPR) was then carried out on all the subjects as per the method of Le Blanc et al. (8). Resting BP was recorded with the subject seated comfortably. The subject was then asked to immerse his hand in cold water and the temperature was maintained at 4 to 6°C through out the procedure. BP measurement were made from the other arm at 30 sec interval for a period of 2 minutes. After this the subject was allowed to remove his hand from the water.

Maximum increase in systolic and diastolic BP was recorded. For each variable group, mean and standard deviation of the mean were calculated, Inter-group mean differences were tested for significance by Student's t-test.

TABLE I : Showing BP values before and after Cpt in control and malnourished children.

Control						Malnutrition					
Before		After		CPR		Before		After		CPR	
SBP	DBP	SBP	DBP	SBP	DBP	SBP	DBP	SBP	DBP	SBP	DBP
112.53	72	126.73	86.73	14.2	14.6	103.73	69.83	122.53	84.43	13.8*	14.6
±	±	±	±	±	±	±	±	±	±	±	±
6.66	4.61	7.21	5.39	2.43	2.79	6.69	3.77	6.81	4.44	2.25	2.3

SBP : Systolic Blood Pressure

DBP : Diastolic Blood Pressure

*P<0.05

The results showed that the resting systolic blood pressure was significantly lower in the malnourished group (P<0.05) although the diastolic blood pressure did not show any such difference. Following the cold pressor test, both the control and malnourished group showed significant increase (P<0.001) in the systolic BP and diastolic BP in response to CPR. But in comparison to the control group, the mean rise in systolic BP was significantly lesser (P<0.05) in the malnourished group; while the mean increase in diastolic BP was not significant.

The cold pressor changes measures

changes in BP in response to a painful stimulus, generated by placing the hand in cold water (2, 9, 10). Since the increase in BP following the cold pressor test is attributed to an activation of the sympathetic nervous system, the decrease in CPR seen in malnourished children in our study, may be suggestive of sympathetic impairment in such children.

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REFERENCES

1. Fishman MA, Madyastha P, Prenskey AL. The effect of undernutrition on the development of myelin in the rat CNS. *Lipids*. 1971;6:458.
2. Heinrich WL. Autonomic insufficiency. *Arch Intern Med* 1982; 142: 339-344.
3. Sethi A, Vaney N, Tandon OP. Sensory nerve conduction during cold pressor response in human. *Indian J Med Res* 1994; 99: 279-282.
4. Tandon OP, Murali MV, Krishna Iyer PU. Brainstem auditory evoked potentials (BAEPs) in malnourished infants and children. *Brain Dysfunction* 1989; 2: 273-278.

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5. Kahn E, Rand MD, Walker ARP. Pediatrics. Springfield 1954; 14: 659.

6. Krishnamurthy N, Chakrabarty AS, Vishnu Bhatt B, Bharti S. Immediate cardiac response to lying down in normal and malnourished children. *Ind J Med Res* 1987; 86:529-532.

7. Hamill PVV, Drizd TA, Johnson CL. Physical growth. National Center for Health Statistics Percentiles. *Am J Clin Nutr* 1979;32: 607.

8. Le Blanc J, Dulac S, Cote J, Girad B. Autonomic

nervous system and adaptation to cold in man. *J Appl Physiol* 1975;39: 181-186.

9. Sovourey G, Barnvol B, Caravel JP, Feurestein C, Bitle JH. Hypothermic general cold adaptation induced by local cold adaptation. *Eur J Appl Physiol* 1996; 73: 237-244.

10. Sovourey G, Guinet A, Besuard Y, Garcia N, Hanniqnet AM, Bitlel JH. Ceneral and local cold responses in humans after 2 weeks at high altitude. *Eur J Appl Physiol* 1997;75: 28-33.

form of the equation... quadratic or a cubic... standard deviation (RSD) or a standard... of estimate (SEE) is also needed to evaluate... how well the regression equation fit the... data they describe. These values will also... help in defining the normal range of values... value a 1.645 SEI for SEE. A large... of RSD for SEE) will therefore... equation unless in predicting lung function... due to a very large normal range... such analysis is provided. The authors... recommend use of these... prediction of lung function... population.

We read with interest the study by... and colleagues in a recent issue of this... journal. The authors have derived... a equations for the prediction of... functions in south Indian... children however, they have not addressed... the key role of the ability of these equations... to correctly predict normal values for various... parameters. The square of the correlation... coefficient (R²) reflects the proportion... of variation in observed data explained... by the independent variables in the... regression equation. It is of importance in this... respect. A low R² value means that the... regression equation is of little clinical utility... in its present form and needs to be revised... either by the introduction of more... independent variables, or by changing the

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REFERENCES

1. American Thoracic Society. Standardized spirometry in children. *Am Rev Respir Dis* 1981; 124: 1202-1212.

2. Ashutosh V, Aggarwal S, Jain Y. Prediction equation for lung function in south Indian children. *Indian J Physiol Pharmacol* 1997; 41: 250-256.