

CARDIAC DYSAUTONOMIA IN LEPROMATOUS LEPROSY

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Cardio-vascular autonomic functions were studied in 20 patients with lepromatous leprosy and 20 healthy adult controls. Autonomic dysfunction was observed in the form of abnormal response in heart rate on standing 3 (15%), carotid artery pressure 7 (35%), Valsalva manoeuvre 5 (25%), and mental stress 3 (15%) in the leprosy patients. Response of blood pressure to standing and cold pressure test was seen in 2 (10%) and 7 (35%) patients respectively.

Key words : Lepromatous leprosy, Cardiovascular autonomic functions.

Leprosy is known to damage both somatic and autonomic nerves.^{1,2} The peripheral autonomic fibres are commonly involved simultaneously with the sensory fibres quite early in leprosy, as shown by the characteristic dryness and roughness of the skin and anhidrosis.³ In autonomic neuropathy, cardio-vascular reflexes may be impaired. There are only a few and conflicting clinical reports indicating autonomic dysfunction related to cardio-vascular reflexes in leprosy patients.^{2,4-6} The present study was therefore initiated to assess the cardio-vascular autonomic functions in patients having lepromatous leprosy in comparison with normal healthy adults.

Materials and Methods

The present study was conducted on 20 lepromatous leprosy patients (14 males and 6 females) and 20 normal adults (18 males and 2 females). The leprosy patients ranged in age from 21 to 60 years and the control group from 20 to 46 years. Each patient was subjected to a detailed interrogation particularly in relation to the duration of illness and the drugs taken. Diseases like diabetes mellitus, syphilis, ischaemic heart disease, hypertension, chronic alcoholism, amyloidosis and porphyria were excluded in all individuals by different laboratory investigations.

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No individual in either group was on any sympatholytic or parasympatholytic drugs.

Each subject was given rest for at least 20 minutes before the actual tests were carried out. Standard 12-lead electrocardiograms were taken and the heart rate was measured by continuous electrocardiographic recording using lead-II. Before every test, the heart rate was allowed to come down to normal. The tests performed on each individual were as follows : (1) Heart rate variability during deep breathing, (2) Tachycardia response to standing, (3) Carotid sinus pressure, (4) Valsalva manoeuvre, (5) Orthostatic adaptation of blood pressure, (6) Response to mental stress, and (7) Cold pressure test.

All results were statistically analysed using 't' test.

Results

The effects of various physiological tests on cardio-vascular function are shown in table I. No significant difference was seen in the basal blood pressure and heart rate in the patients and controls. The mean of difference between the maximum and minimum heart rates during deep breathing, of patients was not significantly more than that of controls.

The rate of maximum R-R interval of beat 30 to minimum R-R interval beat 15 after standing was taken as 30/15 ratio. Only 3 (15%) patients showed abnormal 30/15 ratio.

Table I. Results of various physiological tests on cardio-vascular autonomic functions.

	Patients Mean \pm SD	Controls Mean \pm SD
Basal heart rate (beats/min)	86.44 \pm 16.80	79.39 \pm 11.85
Basal blood pressure (mm Hg)		
Systolic	111.2 \pm 12.85	102.5 \pm 6.22
Diastolic	68.6 \pm 7.29	66.57 \pm 5.77
Heart rate variability during deep breathing (beats/min)		
Maximum heart rate	97.57 \pm 16.77	87.96 \pm 13.72
Minimum heart rate	85.51 \pm 15.25	77.37 \pm 12.34
Orthostatic adaptation of blood pressure (mm Hg)		
Systolic	110.1 \pm 13.25	101.8 \pm 6.72
Diastolic	71.8 \pm 7.31	65.5 \pm 6.04
Tachycardia response to standing (30 : 15 beat ratio)	1.05 \pm 0.03	1.14 \pm 0.12
Heart rates in mental stress (beats/min)	96.63 \pm 18.29	89.52 \pm 12.75
Carotid sinus pressure (beats/min)		
Right	82.99 \pm 17.97	75.52 \pm 11.78
Left	80.03 \pm 14.32	75.51 \pm 13.0
Valsalva manoeuvre/Valsalva ratio	1.31 \pm 0.12	1.53 \pm 9.33
Cold pressure test (mm Hg)		
Systolic	117.06 \pm 12.64	125.2 \pm 7.73
Diastolic	71.05 \pm 9.0	82.7 \pm 6.20

Response to both carotid artery pressure was normal in controls, while 7 (35%) patients showed abnormal response to right carotid artery pressure and 2 (10%) patients showed abnormal response to left carotid artery pressure in the form of increase or no change in heart rate. The mean heart rate changes during right and left carotid pressure was insignificantly less in patients than controls.

Valsalva ratio (the ratio of minimum heart rate after the manoeuvre to the maximum heart rate during the manoeuvre) of 1.10 or less was arbitrarily defined as abnormal and more than 1.20 was defined as normal. Two (10%) patients had Valsalva ratio less than 1.10 and 3 (15%) had more than 1.10 but less than 1.20.

Mental stress decreased the heart rate in 2 (10%) and there was no change in 1 (5%) patient both of which were abnormal.

The cold pressure test produced an increase in blood pressure in all the controls, while 7 (35%) patients did not show any increase in the blood pressure.

Comments

There was definite evidence of involvement of the cardiac autonomic control in patients having lepromatous leprosy. There have been studies demonstrating involvement of the sympathetic chain and vagus nerve in leprosy.⁷ Khanolkar⁸ emphasized the centripetal involvement of the nervous system in lepromatous leprosy and showed heavy infiltration of dorsal root ganglion and the sympathetic chain with acid fast bacilli. Jain et al⁴ studied 110 patients of various types of leprosy and showed an abnormal response to Valsalva manoeuvre in 9 patients. Variable loss of cardio-vascular autonomic functions in lepromatous leprosy has been observed by various workers.^{2,5,9} Sahasranam et al⁶ however, in their study of 10 patients of lepromatous leprosy observed no significant autonomic dysfunction. Involvement of cardiac autonomic function in lepromatous leprosy can be explained on the basis of associated infiltration of the cardiac sympathetic and parasympathetic fibres by *M. leprae*.

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