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Cardiac Performance During Practice of Yogasanas

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Abstract

Systolic time intervals were studied to assess the left ventricular performance of the heart in five advanced practitioners during the practice of five Yogasanas, consisting of forward and backward bending, chest stretching, shoulder standing and head standing postures. Ear densitogram, electrocardiogram and phono-cardiogram were recorded with a four channel recorder. Systolic time intervals were calculated and analysed before, during the maintenance and after each asana. The study revealed that there were no significant changes in ventricular functions during the practice of the above yogasanas.

Key words -
Yogasanas,
Systolic time intervals,
Stroke volume,
Left ventricular function

Left ventricular performance of heart is being studied using systolic time intervals [1], [2], [3]. Since ancient times in the East yogasanas (postural exercises) are put to use for the maintenance of good health, to cure certain psychosomatic disorders and to merge into pure supreme conscious state [4], [5], [6], [7], [8]. In recent years the yogic treatment has been recommended all over the world to help certain psychosomatic disorders [9], [10], [11], [12].

Yogasanas may cause deleterious effects on heart if not practiced properly, probably by altering the loading or pumping capabilities of the heart [4], [6]. The literature survey revealed that no such study was carried out to know the changes in the ventricular functions during practice of yogasanas. Hence the present study.

Material and Method

Five experienced yoga practitioners who were healthy and devoid of any cardiovascular diseases were the subjects for the present study. They were in the age range of 22-25 years and were practising yogasanas regularly as per the standard procedures [13] for the last five years and were used to staying in any one of the presently selected asanas without any difficulty or discomfort for more than five minutes. The asanas were: Paschimothanasana (forward bending of head towards knee), Halasana (forward bending of legs towards head), Bhujangasana (chest stretching posture), Sarvangasana (shoulder standing) and Sirsasana (head stand posture). The basal systolic time intervals (STI) were

measured before the stay in an asana in supine posture; during the stay in a particular asana for 2 minutes and after the stay again in supine posture. Only one asana was studied on any particular day and repeated three times by giving sufficient time interval between the tests to get proper basal recording. Five such recording sessions were carried on different days for different asanas for each practitioner. Using four channel recorder with a paper chart speed of 100mm/sec, ear densitogram (EDG) electro-cardiogram (ECG) and phonocardiogram (PCG) were recorded. The STI were calculated using suitable procedures [14]. They were the extra mechanical systole (QS2), pre-ejection period (PEP) and left ventricular ejection time (LVET). Then the PEP/LVET ratio was calculated. The stroke volume was calculated using a worked out formula [15] considering heart rate from the ECG tracings. These results were analysed statistically using student's t-test to know the significance.

Results

Changes in heart rate, stroke volume and PEP/LEVT ratio are tabulated and shown in Table 1. The heart rate changes were found to be insignificant during the stay in all asanas excepting Bhujangasana, wherein a significant in-crease is seen during the stay compared to pre asana resting values. The stroke volume changes were insignificant during the stay in all asanas excepting a significant decrease in Halasana after one minute stay; however continued stay did not show a significant change at the end of two minutes. The PEP/LVET ratio changes during the stay in all asanas were insignificant.

Table Ia - Cardiac performance during practice of yogasanas

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Values are mean ± SD

The post-asana period changes in all these parameters were found to be insignificant.

Discussion

The systolic time interval values were found to be in the range of those of earlier reports [16], [17]. The pre-ejection period is related to the time required for the left ventricular pressure to rise from its end-diastolic to aortic diastolic levels, which is an indication of the isovolumetric contraction period. It is found to be less affected by changes in the heart rate as in case of Bhujangasana, though there was a significant increase in the heart rate, PEP was not affected. This is in accordance with the study [18] during exercise. The left ventricular ejection time is the time during which the left ventricle ejects the blood into aorta. Hence any change in PEP and LVET will indirectly affect the cardiac contractility and indicate its contractile state. Like the earlier reports [16], [17], [18] the LVET changes were found to be affected by heart rate, so, the PEP/LVET ratio values were calculated to indicate the cardiac contractility. However, the ratio values were found to be insignificant in all asanas. The stroke volume

changes excepting a decrease in Halasana in the first minute stay, which did not persist till the second minute, were found to be insignificant in all the asanas.

Hence, the present study reveals that the regular practice of these yogasanas will not be producing any adverse side effects on the functioning of the heart. However these findings cannot be extrapolated to the beginners or to those on short term practice as the study was conducted on senior practitioners who might have adapted to these asanas due to regular practice for more than five years.

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