ABSTRACT

Objectives: We aimed to determine the effect of yoga on vascular function in elderly with increased pulse pressure (PP) and to explore the yoga induced mechanism of control of blood pressure (BP) in elderly.

Methods: An open parallel arm randomized controlled study design was adopted. The participants were elderly subjects with PP>60mmHg (n=60). Subjects with Systolic BP > 159 mmHg and Diastolic BP > 99 mmHg was one of the major exclusion criteria. Yoga group (n=30) was assigned for yoga training and control group (n=30) for brisk-walk with stretching exercise for one hour in the morning for 6 days in a week for twelve weeks. The following parameters were tested before and after intervention: Arterial stiffness measures: Brachial-ankle pulse wave velocity (baPWV), Carotid-femoral pulse wave velocity (c-f PWV), augmentation index (AIx@75), arterial stiffness index at brachial (bASI) and tibial arteries (aASI); Endothelial function indices: Total serum nitric oxide concentration (NOx), augmentation index (AIx@75); Heart rate variability (HRV) measures: Low frequency (LF), high frequency (HF) and LF/HF ratio; Oxidative stress measure: serum malondialdehyde (MDA) concentration; and antioxidant capacity: serum superoxide dismutase (SOD) activity, erythrocyte reduced glutathione (GSH), serum ascorbic acid or vitamin C.

Results: We found a significant decrease in c-f PWV by 7.89% (p<0.001), baPWV by 7.74% (p<0.001), aASI@75 by 15.09% (p<0.001), LF by 3.07% (p=0.012), LF/HF ratio by 13.46% (p<0.001), SBP by 9% (p<0.001), PP by 16.71% (p<0.001) and MAP by 5.08% (p<0.001), and significant increase in HF by 12.65% (p=0.008) and NOx by 23.26% (p=0.001) in the Yoga group, whereas no significant difference was observed in control group. Yoga had also significantly reduced serum MDA level (p<0.001) and enhanced SOD activity (p=0.007), serum GSH (p=0.002) and vitamin C (p=0.002). While in control group, we observed a significant increase in serum MDA level (p=0.04) and reduction in serum vitamin C level (p=0.015) with no significant difference in the SOD activity and GSH level.

Conclusion: These findings suggest that yoga module tested in the present study is an effective physiological means to control hypertension along with arterial stiffness in elderly. Yoga also induces beneficial changes in endothelial function, cardiac autonomic nervous system, oxidative stress and antioxidant defense.