ORIGINAL RESEARCH PAPER

Volume-8 | Issue-2 | February-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

IS YOGA AS AN ADJUNCT BENEFICIAL FOR ATHEROSCLEROTIC HEART DISEASE PATIENTS

Physiology

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ABSTRACT

BACKGROUND: Atherosclerotic cardiovascular diseases are the most frequent cause of mortality and morbidity around the world. This study primarily aims to observe the effect of regular practices of yoga and self-discipline on serum uric acid, creatinine, fibrinogen, HbA1C and adiponectin in coronary artery disease patients.

METHOD: In present study 258 patients both male and female having coronary artery disease were selected randomly from Department of Cardiology, KGMU, Lucknow. Subjects were randomly divided in to two Groups-Yoga group and Non-Yoga group,129 patients in each group. Out of these total 258 patients 208 completed the study protocol. The yogic intervention consisted of five days in a week (35-40 min/day), till six months in Physiology department KGMU, Lucknow. Biochemical testing was done of both groups before yogic intervention and again after 6 months of yogic intervention.

RESULT: In present study, uric acid ($p<0.01$), creatinine ($p<0.02$), fibrinogen ($p<0.04$) were changed significantly while Glycosylated hemoglobin ($p<0.10$), and adiponectin ($p<0.15$) levels does not change significantly.

CONCLUSION: Reduction of serum uric acid, creatinine, fibrinogen, HbA1C and increase in serum adiponectin level after regular practices of yoga. Therefore, yogic practices included in this study are beneficial for the patients of coronary artery disease.

KEYWORDS

Yoga, Coronary artery disease, uric acid, fibrinogen, adiponectin

INTRODUCTION

Atherosclerotic cardiovascular diseases are the most frequent cause of mortality and morbidity around the world. Hyperinsulinemia, hypertension, dyslipidemia and android shaped obesity are fundamental risk for CAD. The prevalence was approximately three times higher in the urban papulation compared to the rural in both sex and the prevalence rates increased as subjects grew older.

The term Yoga derived from the Sanskrit word "YUG" which means union. Yoga is a science of strengthening and improving the physical, mental and spiritual state of human being. It is a non-pharmacological, non-invasive and cost-effective method to improve the quality of life.[1]The disciplines pertaining to yoga the physical aspect of life, focus at improving the health of human being by augmenting the strength of the body.

Yogic techniques include the pranayama or breathing exercise, asana or specific posture and meditation.[2] Both long term and short term yogic practice are associated with reduction of serum basal cortisol level and catecholamine secretion. Yogic practice decreases sympathetic activity, with an increase in parasympathetic activity. There is reduction in metabolic rate and oxygen consumption and also salutary effect on cognition activity and cerebral neurophysiology after yogic practices. Yoga practice also improving serum cholesterol level, serum TSH[3] and it could be an effective replacement for exercise in treating type-2 diabetes as a complementary therapy due to the moderate intensity and maximized benefits.[4]

Ornih et al were the first to document the beneficial effect of lifestyle change in reversing the CHD. Manchanda et al showed encouraging result with their yoga lifestyle intervention in their study.[5] Physical activity and yogic practice to reduce one's risk for cardiovascular disease are strongly recommended in the consensus statement by the American college of sport medicine and the Center for disease control and prevention. This study primarily aims to search out the effect of practice of yoga on serum creatinine, uric acid, adiponectin, plasma fibrinogen, and SGPT level in CAD patients.

MATERIALS AND METHODS

This study was done in the Dept. of Physiology, KGMU, Uttar Pradesh, Lucknow. Subjects visiting the Dept. of cardiology, KGMU having CAD included in the study. The Research Ethics Committee approved this study. After taking singed informed consent by each subjects, anthropometric measurements were taken. Each subject was randomly divided into two groups such that equal numbers were recruited into each group using a random number generator: Medication + Yoga (interventional group) and only Medication (control group). A statistician generated the randomization scheme with block of size four for up to 295 patients. These numbers were written on identical envelopes containing yoga and non-yoga. After randomization all patients in two group number in each group were n=129. Medication like b-blocker, statins, aspirin, clopidogril, ACE inhibitor or Alfa receptor blockers were given to both the groups. 208 subjects completed the study protocol. Yoga sessions were guided by trained and well-educated instructors selected by a committee. All the necessary facilities were provided to the participants like Jal Neti pot, airy room, yoga mats etc in each yoga sessions. Subjects were continuously motivated for yoga practice. Therefore, the patients flow was continued during study. Patients who dropped the study did not differ significantly in sex and age. Before study all the subjects maintain their regular routine activities and not to start any new physical activities for that duration.

Five ml of peripheral overnight fasting blood was collected from all individuals before yogic intervention and again after 6 months of the study. Serum was separated at room temperature by centrifuge machine (3500-4000 rotation/min). Serum creatinine, adiponectin, plasma fibrinogen, uric acid, and SGPT levels were measured after overnight fasting (12 hr after meal). EDTA vial were used for the glycosylated hemoglobin. Citrate vial was used for fibrinogen levels. Under the supervision and guidance of yoga experts and faculty, subjects performed yoga practice. The yogic practice was Jal Neti once a weak. Jal Neti is a process of cleaning the nasal passage with salt water. Shavasana, Bhujangasana, Shashankasana, Ushtrasana, Hasthutthanasana, Sidhasana, Nadi Shodhan pranayama with Om Chanting was also done. Total duration of these practices was 5 days/week (35-40 min/day), in the morning for six months. Yoga practice was done in the Dept. of Physiology KGMU Lucknow UP.

Analyses of the results were done by using independent t test between the differences in initial values and values after 6 months in both intervention and in control group; significance was noted at $p=0.05$. The two groups were compared on these scores using one-way ANOVA. P value of $p<0.05$ was taken to be significant.

RESULT

Out of 258 patients eligible for the study only 208 completed six month's study protocol. Table-1 summarizes demographic characteristics of study participant. Table -2 summarizes pre and post-intervention change in the variables. In this study there were

adiponectin, plasma fibrinogen, glycosylated hemoglobin, uric acid, serum creatinine and SGPT levels estimated for comparing interventional effect. Table-2 shows the change in the creatinine level and uric acid after yogic intervention it was decreased significantly p<0.01and p<0.02. There was not much difference was observed in SGPT, adiponectin, plasma fibrinogen, glycosylated hemoglobin.

Table-1 Demographic Profile Of The Subject

SI.	Variables	Total subjects n=258	Control group n=129	Intervention group n=129
1	Male	207	104	103
2	Female	51	25	26
3	Age	57.74± 10.49	56.40 ±10.88	59.09 ±9.94
4	BMI	25.09 ±4.32	25.19 ±4.78	24.98± 3.83
5	WHR	0.98± 0.07	0.98 ±0.08	0.98 ±0.06

Table-2 Comparison Between The Difference In Scores At Baseline And After 06 Months

Variables	Time interval	Control group (n=103)	Intervention al group (n=105)	P value
Uric acid mg/dl	Baseline v/s 6 months	0.29± 1.24	0.71± 1.29	0.01*
Serum creatinine mg%	Baseline v/s 6 months	0.07± 0.27	0.16± 0.28	0.02*
SGPT IU/L	Baseline v/s 6 months	0.12± 6.91	1.76± 5.76	0.06
Glycosylated hemoglobin %	Baseline v/s 6 months	0.31± 1.28	0.54 ± 0.69	0.10
Adiponectin µg/ml	Baseline v/s 6 months	0.79± 2.35	1.35± 3.04	0.15
Plasma fibrinogen mg/ml	Baseline v/s 6 months	0.04 ± 0.76	0.23± 0.75	0.04*

DISCUSSION

Increasing prevalence of cardiovascular disease indicates that difference in lifestyle and diet characteristics and conventional risk factors may be important.[6,7] In the present study the effect of yogic practices was seen on the different variables in the coronary artery disease patients. Present study indicates improvement of overall health and physical fitness after yogic practices. There is many evidence that yogic practices offer a safe and cost effective intervention for CAD. Patients with advance CAD have also benefited from yoga.[8]

The body mass index, a weight and height index is the international measure of obesity. Indians have a low average BMI 20-30 (kg/m2) and low rates of obesity which is association with higher prevalence rate of cardiovascular disease. Yoga are helpful to reduce the boy weight and BMI. Yoga also induce a mild oxidative stress that stimulate the expression of certain antioxidant enzyme. This is mediated by the activation of redox sensitive signaling pathway.[9]

Creatinine and Uric Acid are the end products of protein metabolism. There was reduction in creatinine p<0.02 and serum uric acid levels p<0.01 in yoga group when compare with non-yoga group, in this study. Despite of taking all possible efforts regarding monitoring medication, there was a non-significant increase in creatinine and SGPT level in non-yoga group. Where as in patients who stuck to the regular practice of yoga along with medication showed reduced serum uric acid and creatinine level. On the other hand, finding of Gore M.M. et al.2006 did not corroborate with the finding of present study.[10] Kesari et al.2006 found that after yogic practices the creatinine clearance levels raised significantly in yoga group subjects.[11] Level of these substances are increased in urine and decreased in blood after yogic practice. It means that there is a hypo metabolite state during the period of yogic practice. The increase in urinary level is not due to increase in metabolism but due to increase in GFR. GFR also depends upon renal blood flow. It is said that parasympathetic dominance over sympathetic is observed in cases, practicing yoga which by its action on afferent arterioles may also add to increase in blood flow and therefore increase in GFR.

Adipose tissue secretes many bioactive chemicals that directly involved in the development of obesity related disease[12,13] and associated with CAD.[14,15] Low serum Adiponectin has been associated to CKD16. It has been also a risk factor for cardiovascular events.[17,18]

The result of this study show elevation in serum adiponectin levels in the interventional group as compared to control group though difference was not statistically significant (p=0.15). There are various physiological mechanisms of adiponectin by which it could play a role in atherogensis.[16] It may involve in regulation of many of inflammatory processes and in lipid metabolism, which are contributing to atherosclerosis.[19] The improved adiponectin from yogic practice has been supposed to be due to parasympathetic predominance, increased baroreflex sensitivity and decreased arterial tone and peripheral resistance.

High plasma Fibrinogen level is considering as a major cardiovascular risk factor. There was a reduction in Fibrinogen levels in the interventional group as compared to control group which was statistically significant (p=0.01). In a residential 3-month yoga and meditation training programme, subjects living on a low fat vegetarian diet, reduction in fibrinogen level was seen significant.[20] The association between inflammation and atherosclerosis has been confirmed, and studies have shown that the plasma level of acute phase reactant such as C reactive protein and fibrinogen are significantly increased in most patients with acute coronary syndrome.[21] It has been established from the research that yoga induces a state of blood hypercoagulability.

Glycosylated hemoglobin reflects long term glycemic control. The relationship between HbA1c and cardiovascular disease has not been adequately characterized. HbA1c concentration is related to increase mortality and cardiovascular disease even in nondiabetic persons.[22,23] There was a decline in level of glycosylated hemoglobin in the intervention group while in control group it was not significantly different p=0.10. Glycosylated hemoglobin reflects long term glycemic control. HbA1c is a more accurate and stable measure than fasting blood glucose levels.[24] It was reported a positive association between a one-unit increase in Glycosylated hemoglobin and coronary heart disease mortality (relative risk 1.2) on the basis of a cohort study.[25]

CONCLUSION

Reduction of uric acid, creatinine, fibrinogen, HbA1c and elevation in the level of adiponectin levels after regular practice of yoga is beneficial for cardiovascular patients. Therefore, regular practices of yoga included in this study are helpful for the patients of CAD.

ACKNOWLEDGEMENTS

We express our sincere thanks to Department of Ayurveda, Yoga, Unani, Shiddha and Homeopathy (AYUSH), Ministry of Health and Family Welfare, GOI, for financial support.

REFERENCES

1. Sh. Dide Rast, Z. Hojjati, R. Shabani. The Effect of Yoga Training on Blood Glucose, Insulin and Resting Heart Rate in Type II Diabetic Females. Res. J. Sport. Sci. 2014;2 (1):15-21.
2. Taimni I.K. The science of yoga. Madras, The Theosophical Publishing House;1961
3. Nilakanthan S, Metri K, Raghuram N, Hongasandra N. Effect of 6 months intense Yoga practice on lipid profile, thyroxine medication and serum TSH level in women suffering from hypothyroidism: A pilot study Journal of Complementary and Integrative Medicine, 2014-0079
4. Venugopal V. Potential Role of Yoga in Secondary Prevention of Type 2 Diabetes: A Mini Review. J Diabetes Metab Disord Control 2016, 3(8): 00094
5. Manchanda et al. Retardation of coronary atherosclerosis with yoga life style intervention. JAPI2000; 48:687-94
6. Singh RB,Niaz MA Ghosh S et al Epidemiology study of coronary heart disease and its risk factor in an elderly urban population of north India. J Am Coll Nutr 1995; 14:628-34
7. Beegom R,Sinh RB. Prevalence of coronary heart disease and its risk factor in south and north India. Acta Cardiol 1995; 50:227-40
8. Yoendra J, Yoendra HJ, Ambardekar S, Lele RD, Shetty S, Dave M et al. Beneficial effect of Yoga life style on reversibility of ischemic heart disease: caring heart project of International Board of Yoga. J Association Physicians Inia 2004; 52:283-9
9. Reid MB Redox modulation of skeletal muscle contraction: what we know and what we don't. Journal of Applied Physiology. 2001; 90:724-31
10. Gore M.M. Immediate effect of asana on urinary pH acid excretion and creatinine Yoga Mimamsa, Vol.XXXXVIII No.2006;1&2:43-50
11. Kesari Mg, Vaishwanar PS, Deshkar BV. Effect of Yogasana and Pranayama on urea clearance and creatinine Clearance-Values Yoga Mimamsa, Vol.XXXXVIII No.2006;1&2:38-43
12. Zhan Y, Proenca R, Maffei M, Barone M, Leopold L, Friedman JM. Positional cloning of the mouse obese gene and its human homologue. Nature 1994; 372:425-32
13. Shimomura I, Funahashi T, Takahashi M, Maeda K, Kotani K,Nakumura T et al. Enhanced expression of PAI-1 in visceral fat: Possible contributor to vascular disease in obesity .Nat Med 1996;2:800-3
14. Maruyoshi H., Kojima S., Otsuka F., Funahashi T., Kaikita K., Sui Yama S., et al. Hypoadiponecteinemia is associated with coronary artery spasm in men. Circ J 2005; 69:1154-56
15. Fujita K, Nishizawa H, Funahashi T, Shimomura I, Shimabukuro M. Systemic oxidative

stress is associated with visceral fat accumulation the metabolic syndrome. Circ J 2006; 70:1437-42
16. Kumada M Et al. Association of Hypoadiponectinemia with coronary artery disease in men. Arterioscler Thrombo Vasc Biol. 2003; 23:85-89
17. Efstathiou SP et al. Plasma adiponectin levels and five-year survival after first ever ischemic stroke. Stroke.2005;36:1915-19
18. Pischon T, Girman CJ, Hotamisligil GS, Rifai N, Hu FB, Rimm EB. Plasma Adiponectin Level and risk of myocardial infraction in men. JAMA.2004;291:1730-37
19. Dietrich R Hermann B,Winfrie M,Wolfgang K.Adiponectin,risk of coronary heart disease and correlations with cardiovascular risk markers, European Heart Journal.2005;26:1640-46
20. Shmidt T, Wija A, Von Zur Muhlen A, Brabant, Waner T O. Changes in cardiovascular risk factor and hormones during a comprehensive residential three month Kaiya yoga training and vegetarian nutrition. Acta Physiol Scand Suppl1997; 640:158-62
21. Biasucci LM, Liuzzo g, grillo RL, Caligiuri g, Rebuzzi Ag, Buffon A Et al. Elevated levels of C reactive protein at discharge in patient with unstable angina predict recurrent unstability. Circulation 1999;99(7):855-60
22. De Vget F, Dekker JM, Ruhe HG, et al. Hyperglycemia is associated with all cause and cardiovascular mortality in the Hoorn population: the Hoorn Study.Diabetologia.1999;42:926-31.
23. Khaw KT Wareham N Luben R et al. glycated hemoglobin, diabetes, and mortality in men in Norfolk cohort of European Prospective Investigation of cancer and Nutrition EPIC- Norfolk BMJ.2001;322:15-18.
24. Goldstein DE, Little RR Lorenz RA Malone JI, Nathan DM, Peterson CM et al. Tests of glycaemia in diabetes. Diabetes Care.2003;6 Suppl 1: S106-8
25. Moss SE, Klein R, Klein Beet al. The association of glycaemia and cause specific mortality in a Diabetes population. Arch Intern Med 1994; 154:2473-9