

SCOPE OF YOGA PRACTICES IN HEMATOLOGICAL AND BIOCHEMICAL ALTERATIONS

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ABSTRACT

For thousands of years, yoga an ancient holistic relaxation practice has been used as an effective therapeutic tool that counteracts the adverse clinical conditions of human beings. A host of bodily changes has been observed under the influence of yoga. Such practices are really helpful in numerous disorders including hypertension, obesity, anxiety, insomnia and aging itself and a number of other disorders. However, the underlying molecular mechanisms that explain these clinical benefits are still an enigma. The efficacy of yoga and meditation as an adjunct to routine management of various diseases and disorder is a great challenge in the present scenario. Ayurvedic knowledge of yoga is much more incompatible with its understanding of biochemical and hematological changes. Exploring the biochemical association with various yogic postures and practices will definitely improve the practice as therapeutic adjuvant and thus, will improve the quality of life.

Keywords: Yoga, Biochemical alterations, Hematological alterations.

INTRODUCTION

Yoga, is a practice of mental and physical exercise techniques, aiming to acquire good health in human beings. Holistic health, integrative treatment and mind, body medicine are some of the current buzz words in health care originated actually from yoga, which took its birth some 6000 years ago in India and is one of the elements of ayurvedic medicine as the healing science [1]. Yoga science is emerged as contemplation and also communion and yoking all powers of the body, mind, and soul to God. Yoga practices are gaining popularity and have the potential to make a significant contribution to the field of health sciences. Having a wide array of practice, all essentially including breathing exercises, physical postures and meditation, the science, and art of yoga is reaching new heights. Associated with a series of behavioral modifications that contribute to a healthy lifestyle, traditional yoga is a philosophy for living [2]. The practice improves mood and reduces stress utilizing mind/body strategies designed to promote good health that covers relaxation techniques, hypnosis, visualization, feedback, Qigong, Tai Chi, meditation, autogenic, cognitive behavioral therapy, group therapy, and spirituality. All these strategies are based on research conducted to establish if there is a link between the nervous, immune, and endocrine systems [3]. Recently, scientists have explored its consistent beneficial biochemical, physiological, psychological effects in human beings. Yoga based training normalizes the functions of the autonomic nervous system by maintaining both sympathetic and parasympathetic indices toward normal [4]. It is found that yoga has an immediate effect on the HPA axis (hypothalamic - pituitary axis) response to stress [4]. Though precise mechanism has not yet been established. Its being hypothesized that some yoga exercises via vagus stimulation, lead to a shift toward parasympathetic nervous system predominance. A significant effect of yoga has been noticed in decreasing the blood glucose level, the heart rate, and systolic and diastolic blood pressure [5].

A comprehensive and ancient holistic health system, yoga is a physical and mental discipline that forms part of ayurvedic medicine. Given the limited information available on the hematological and biochemical changes associated with the extended practice of yoga, studies on hematological and biochemical modulation in regular yoga practitioners need extensive research exposure to recommend the use of yoga as a complementary therapy in those cases where the above-mentioned parameters are altered.

Given an elaborated account of this article, it is not our intention to revisit many of the issues related to the topic, which have already

been covered in detail. Rather the article focuses on various yoga activities well studied to see the impact on various hematological and biochemical parameters among human subjects. Adjusting the balance of these various activities may provide the novel strategy to recommend the use of yoga as a complementary therapy in those cases where the above-mentioned parameters are changed. In light of this, the article will provide an overview of the various studies done in the direction.

YOGA AND BIOCHEMICAL ALTERATIONS

A number of studies conducted among normal and diseased subjects to see the effect of yoga on various biochemical parameters including renal and hepatic profile, glucose, uric acid total protein, and albumin. Madanmohan *et al.* have reported the effect of yoga practice in prevention and management of diabetic mellitus. He found a significant decrease in the fasting and postprandial glucose level. Total cholesterol (TC), triglyceride, and very low-density lipoprotein (LDL) were significantly decreased while high-density lipoprotein (HDL) was remarkably raised. Furthermore, all the lipid ratios were desirably raised [6]. In another group of noninsulin dependent diabetes mellitus patients, also significant reduction was observed in the frequency of hyperglycemic index [7]. In the year 2007, a study was done on metabolic syndrome patient. Fasting blood glucose and lipid profile were significantly improved [8]. According to Chhaya *et al.*, long-term yoga practice is shown to be associated with increased insulin sensitivity and attenuation of a negative relationship between body weight or waist circumference and insulin sensitivity [9]. From the outcome of these large numbers of studies done, it is obvious that yogic practices have some definite role in modifying the blood-related parameters of the subjects and thereby prevention of some disorders. Increased body weight and obesity are strongly linked with cardiac diseases including and ischemic heart diseases, hypertension, atherosclerosis. The role of yoga has been reported to be of great value in reduction of weight. All concerned biochemical markers including lipid profile are significantly controlled well within limit [10]. As the yogic practices do not bring about increased, rapid large muscle activity and energy expenditure, its beneficial effects in the management of dyslipidemia and obesity cannot be justified [6,11]. Patients with angiographically proven coronary disease in a randomized controlled study, after 1-year yoga practice, significantly reduced weight and controlled various biochemical parameters [12]. Lipid lowering and plaque-stabilizing effects of yoga exercise have been speculated to be similar to statins (HMG-CoA reductase inhibitors) [13,14]. However, mechanistic studies are needed to be done in the direction. Statins work by releasing NOs

in vascular endothelium. Besides antiatherogenic, antiproliferative, and leucocyte adhesion - inhibiting effect, NOs have local vasodilating properties. It is also involved to check the activity of endothelin-1 [15]. Endothelin-1 is a potent vasoconstrictor and mitogen [16]. Studies have clearly indicated that yoga modulates neuro-endocrine axis which results in beneficial changes among pregnant women yoga practitioner [17]. A number of studies done in the direction have showed that it may be effective in improving pregnancy, labor, and birth outcomes [18]. Yoga practices including physical postures, breathing, and meditation practiced by pregnant women 1 hr daily resulted in an increase in birth weight, decrease in preterm labor, and its labor parameters such as comfort, pain, and duration [19]. Decrease in intrauterine growth restriction either in isolation or associated with pregnancy-induced hypertension, with no increased complications was also observed by Narendran *et al.* [19]. Kathryn Curtis's randomized clinical trials studies showed that yoga may produce improvements in stress levels, quality of life, aspects of interpersonal relating, autonomic nervous system functioning, and labor parameters [20]. For pregnant women, yoga leads to improvements on a variety of pregnancy, labor, and birth outcomes. According to the studies done by Beddoe *et al.* showed that women practicing yoga in their second trimester had significantly reduced physical pain from baseline to post-intervention. Greater reductions in perceived stress and trait anxiety were observed in women in their third trimester [21]. Schmidt *et al.* found a reduction in urinary excretion of adrenaline, noradrenaline, dopamine, and aldosterone. Decrease in serum testosterone and luteinizing hormone levels and an increase in cortisol excretion were also observed, indicating optimal changes in hormones during yoga practices [22]. Raised levels of maternal cortisol, a stress hormone especially in the second and third trimester of pregnancy, point to the importance of evaluating the effects of a prenatal yoga intervention to establish if there is any relationship between the maternal hypothalamic-pituitary-adrenal axis and sympathomedullary pathway. Given the specific physical needs of women during pregnancy which is full of stress like state, a systematic and specialized yoga protocol of practice is best indicated.

YOGA AND HEMATOLOGICAL ALTERATIONS

Yoga is being used increasingly in the medical field as a healing modality for adult patients experiencing serious illness involving alterations in the hematological profile of the patients including for those undergoing chemotherapy and radiation treatment for cancer [23]. A study was conducted by Yadav *et al.*, to find out the effect of yoga asanas on selected hematological variables of female college students. Hematological parameters included erythrocytes, hematocrit, hemoglobin (Hb), platelets, erythrocyte sedimentation rate (ESR), etc., the experimental group showed lowering in albumin level and raised hemoglobin level and ESR. The results of the study have revealed significant differences between control and experimental groups in relation to Hb but in the case of platelets, the insignificant difference was found between control and experimental groups [24]. In another study conducted by Sayyad *et al.*, including 150 patients, effect of Sudarshan Kriya yoga for 8 days, was observed on Hb concentration, lipid profile, and pulmonary functions. Hb level was found to be elevated, along with improved lipid profile and pulmonary functions [25]. From these studies, it can be hypothesized that anti-stress and antioxidant effect of yoga is very important in various degenerative diseases. A vast no of hematological parameter were well-recorded to be improved including hemocrit value, Hb, lymphocyte count, total white blood cell, etc., Geetanjali reported the effect of various yoga exercises on various hematological parameters such as platelet count, clotting time, and bleeding time. The study was done among 40 normal young healthy individuals aged between 15 and 35 years, and they were trained for various types of yoga exercises for 90 hrs. Their platelet count and clotting time both were increased while bleeding time was decreased significantly [26]. From these studies, it is very evident and can be hypothesized that respiratory adaptations induced by the practice of yoga may be the driving force to stimulate erythropoiesis and represent an efficient strategy to cop up with yoga-

induced transient hypoxia. Though few specific yoga Kriyas were reported to have no effect on the hematological parameters. A study done by Baljinder Singh Bal gave some unusual results. An intervening attempt was done by him to determine the short-term effects of Kapalbhathi Pranayama on hematological parameters of university level girls. No significant differences were found in Hb [27]. In a study done in 2015, to assess the effects of Chandra Nadi Pranayama on hematological parameters university level students between the age group 21-26 were included. No significant differences were found in Hb, TC, LDL-cholesterol, HDL-cholesterol, and triglycerides [28]. There are not enough data to say how effective yoga is in the management of hematological problems. Therefore, the role of yoga for assessing hematological changes remains unclear. Further large, high-quality, randomized, controlled trials are needed to be done in the direction.

CONCLUSION

Yoga practices hold great promise and potential in the field of medical science. Yoga therapy will definitely emerge as a major branch of medical treatment and eventually become a standard of care and practice in coming few years. India has made great progress in yogic science research as evidenced by a number of scientific and clinical papers in various journals. Although Yoga as therapy is still at the stage of clinical research, advances have been made in understanding how to use these practices for treating various diseases via correlating its biochemical, hematological spectrum. Some future developments are desirable and worthy of consideration: (1) As an improvement of study design of clinical studies trying to identify disease spectrum of specific yoga activity. (2) Increased international cooperation and pooling of the patient clinical data from different parts of the world. (3) Standardization and further development of reliable yoga strategy for healing purposes. (4) Reinforcement of the biochemical and hematological screening focused approach in order to identify the particular yoga techniques. (5) More and more research should be focused on existing yoga practices in relation to their blood-related parameters that could of great help to the therapeutic dilemma.

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