Yoga and hypertension

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Abstract

Chronic stress appears to play an important role in initiating and maintaining hypertension (HTN). Yoga/meditation has been demonstrated to be an excellent stress management technique and may reduce blood pressure. This article reviews the literature regarding the short and long term effects of yoga on hypertension. Though the results are mixed, many randomized studies and Meta-analysis suggest a modest but consistent decrease in both systolic and diastolic blood pressure. This modest change in blood pressure may have significant effect on reduction of stroke and coronary heart disease (CHD). Most studies, however, have several limitations like small sample size, different methodologies and many are uncontrolled. A large well controlled randomized trials are needed to confirm these findings, but because of other beneficial effects of yoga like control of stress, promotion of physical and mental well-being and control of several risk factors for CHD, it is suggested that this cost effective technique and should be incorporated for prevention and control of mild hypertension and prevention of CHD.

Key Words

- Yoga
- Meditation
- Stress
- Biofeedback
- Mild hypertension

Introduction

Hypertension (HTN) is a major public health problem throughout the world. One quarter of world’s adult population has HTN and this is likely to increase to 29% by 2025. The absolute prevalence of HTN in economically developed nations is 37.3% compared with 22.9% in developing countries. Though the prevalence of HTN is widespread, majority of patients have mild hypertension or high normal blood pressure (Prehypertension). Preventing and controlling HTN is one of the most cost effective strategies to reduce global burden of cardiovascular disease in the general population. Reducing systolic BP by just 3 mmHg in general population has the potential to reduce stroke mortality by 8% and CHD by 5%. 1

Based on Cochrane collaborative databases and recommendation of various societies, lifestyle modification has been considered as the key strategy for prevention and treatment of HTN.2 Chronic stress may play an important role in initiating and maintaining hypertension3 and consideration of stress management is recommended intervention for HTN.4 Yoga, a mind body technique has been shown to be an excellent method of relaxation and stress control.5 Core components of Yoga include meditation, physical exercises (asanas) and breathing exercises (pranayamas) designed to promote mental, physical and spiritual well-being. 6 Recent studies suggest that yoga may be useful in controlling several risk factors for coronary heart disease (CHD)7 and for secondary prevention of CHD. 8 This article will review the evidence of blood pressure lowering effect of yoga in hypertension.
Evidence for role of yoga in hypertension

There are several controlled and uncontrolled trials that have demonstrated the short- and long-term usefulness of yoga in the treatment of HTN.  In earlier studies, involving the use of shavasana (corpse posture – a type of meditation by auto-suggestion), significant reduction in blood pressure was noticed. In another prospective study conducted by Benson et al. in 14 subjects with baseline systolic blood pressure (SBP) of 147.8 mmHg and 91.9 mmHg diastolic blood pressure (DBP), transcendental meditation 30 min twice daily, decreased the blood pressure to 135.5/87 mmHg. In 21 studies analyzed in 1985 using relaxation, TM, Yoga, Galvanic skin response, biofeedback, the average decline in systolic and diastolic blood pressure was 11.0 mmHg and 7.1 mmHg, respectively.

However, many studies showing the benefit of yoga in hypertension are not scientifically very sound because of small sample size, inconsistencies in baseline blood pressure and absence of adequate controls. Between 1970 and 1999, out of 500 publications on cognitive behavior in hypertension, only 26 randomized studies fulfilled the criteria for a meta-analysis.

Randomized trials

A review of literature in 1987 analyzed 25 randomized controlled trials of stress management in mild hypertension. There were a total of 88 severe or controlled randomized trials (SBP control 3.15 mmHg) and 6.21 mmHg in DBP (control 3.05 mmHg). In another meta-analysis, 16 controlled comparative studies involving 471 patients (pseudo-meditation), sham biofeedback or self relaxation, the systolic BP was reduced by 2.8 mmHg (95% CI 0.8-6.4) and diastolic by 3.15 mmHg) and 6.21 mmHg in DBP (control 3.05 mmHg). Changes in cardiovascular risk factors and hormones during a comprehensive residential three month sinria yoga and vegetarian nutrition. Acta Physiol Scand Suppl. 1977:640:158–62.

Chronic mental stress appears to be an important factor in initiating and maintaining hypertension. Yoga/meditation has been shown to be an excellent stress management technique that may help reduce blood pressure. Several studies to determine the effects of yoga/meditation have been reviewed in this article. Though the results are mixed, several randomized trials suggest a modest but consistent decrease in both SBP and DBP with yoga and meditation. This modest change in BP may, significantly decreases the risk of cardiovascular disease and stroke. Many studies have limitations like small sample size, different baseline blood pressure and absence of adequate controls.

A recent meta-analysis studied the effects of transcendental meditation (TM) on blood pressure included nine well conducted randomized controlled trials. TM compared to control was associated with reduction in SBP by 4.7 mmHg (CI 1.9-7.4) and DBP of 3.2 mmHg (CI 1.3-5.4), suggesting that regular practice of TM may have the potential to modestly reduce systolic and diastolic blood pressure. In another randomized study carried out by Murugesan et al. in 12 subjects with baseline systolic blood pressure of 147.8 mmHg and 91.9 mmHg diastolic blood pressure (DBP), transcendental meditation 30 min twice daily, decreased the blood pressure to 135.5/87 mmHg. In 21 studies analyzed in 1985 using relaxation, TM, Yoga, Galvanic skin response, biofeedback, the average decline in systolic and diastolic blood pressure was 11.0 mmHg and 7.1 mmHg, respectively.

Secondary prevention trials

Several randomized clinical trials have been conducted to study the effects of yoga for HTN.  In general, yoga has shown advanced atherosclerosis  and for secondary prevention of CHD. The yoga groups in these trials have consistently shown a greater reduction in systolic and diastolic as compared to controls. A secondary prevention trial utilizing TM has shown a reduction of 4% in cardiovascular mortality and myocardial infarction.

Possible mechanisms

The mechanism of the positive role of yoga/meditation appears to be the reduction of sympathetic activity by yoga. The sympathetic nervous system may initiate or maintain human HTN and the method to reduce sympathetic tone will be of its management. Some antihypertensive drugs like reserpine, clonidine and alpha methyl dopa act by affecting sympathetic activity. Non-drug measures such as meditation, yoga, biofeedback, avoidance of particular food (alcohol and caffeine) that augment sympathetic activity and regular physical exercise achieve the same antihypertensive effects though to a varying degree with the advantage of no side effects. Some studies also suggest that yoga can restore baroreflex sensitivity thereby reducing blood pressure.

Conclusion

Chronic mental stress appears to be an important factor in initiating and maintaining hypertension. Yoga/meditation has been shown to be an excellent stress management technique that may help reduce blood pressure. Several studies to determine the effects of yoga/meditation have been reviewed in this article. Though the results are mixed, several randomized trials suggest a modest but consistent decrease in both SBP and DBP with yoga and meditation. This modest change in BP may, significantly decreases the risk of cardiovascular disease and stroke. Many studies have limitations like small sample size, different baseline blood pressure and absence of adequate controls. In several individuals the blood pressure was significantly lowered.

References

Evidence for role of yoga in hypertension

There are several controlled and uncontrolled trials that have demonstrated the short- and long-term usefulness of yoga in the treatment of HTN.13-18 In earlier studies, involving the use of shavasana (corpse pose – a type of deep relaxation achieved by auto-suggestion), significant reduction in blood pressure was noticed.19 In another prospective study conducted by Benson et al.17 in 14 subjects with baseline systolic blood pressure (SBP) of 140 mmHg and 91 mmHg diastolic blood pressure (DBP), transcendental meditation 30 min twice daily, decreased the blood pressure to 135.5/87 mmHg. In 21 studies analyzed in 1985 using relaxation, TM, Yoga, Gallivan skin response, biofeedback, the average decline in systolic and diastolic blood pressure was 11.0 mmHg and 7.1 mmHg, respectively.20

However, many studies showing the benefit of yoga in hypertension are not scientifically very sound because of small sample size, inconsistencies in baseline blood pressure and absence of adequate controls. Between 1970 and 1999, out of 500 publications on cognitive behavior in hypertension, only 26 randomized studies fulfilled the criteria for a meta-analysis.21

Randomized trials

A review of literature in 1987 analyzed 25 randomized controlled trials of stress management in mild hypertension.22 Thirty minutes of meditation over 8.8 min reduced SBP (control 3.15 mmHg) and 6.2 mmHg in DBP (control 3.05 mmHg). In another meta-analysis, 16 controlled comparative studies involving cognitive or spinal yoga (pseudo-mediation), shun biofeedback or self relaxation, the systolic BP was reduced by 2.8 mmHg (95% CI 0.8-6.4) and diastolic by 1.3 mmHg (95% CI 1.3-3.8).23 These changes were not statistically significant but in several individuals the blood pressure was significantly lowered.24

A recent meta-analysis studied the effects of transcendental meditation (TM) on blood pressure included nine well designed randomized controlled trials which their results have been pooled to examine the overall effects of TM on blood pressure.25 Several randomized clinical trials have been conducted to study the effects of yoga for hypertension.14,26-28 These changes were not statistically significant but in several individuals the blood pressure as well as heart rate was significantly reduced.29-31

Secondary prevention trials

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References

Dietary approaches for the prevention and management of hypertension

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Abstract
Hypertension is a major public health problem in India and the world over. It is a strong risk factor for cardiovascular and renal disease, including stroke, coronary heart disease, heart failure, and kidney disorders. Both genetic and environmental factors as well as their interactions are the major causative factors of hypertension. Lifestyle modification has an important role in the management of hypertension/pre-hypertension; and such modifications can not only serve as initial treatment before the start of drug therapy but can also reduce the drug dosage among patients already on medication. In pre-hypertensive individuals, lifestyle modification has the potential to prevent hypertension, and more importantly to reduce blood pressure (BP) and lower the risk of related clinical complications. The lifestyle modification for prevention and management of hypertension, includes dietary modification (low salt, low fat, high potassium and fibre), regular physical activity, weight management, limiting substance abuse (limiting the consumption of alcohol and tobacco/smoking) and stress management.

Key Words
- Hypertension
- Lifestyle modification
- Dietary modifications
- Physical activity
- Weight management
- Stress management

Introduction
Hypertension is a major public health problem in India and all over the world.¹ It is a powerful risk factor for complications such as stroke, coronary heart disease, heart failure, and chronic kidney disease², and is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths in India.³ Even the individuals with pre-hypertensive have a higher probability of developing hypertension as well as complications compared to those with a normal BP level (systolic BP <120 mmHg; diastolic BP <80 mmHg). It has been estimated that among adults aged >50 years, the lifetime risk of developing hypertension is approximately 90%.⁴ Hypertension is registering an increasing trend in both urban and rural areas in India, with the prevalence rates almost similar to those in the US. Various studies conducted across the country have estimated the prevalence of hypertension ranging from 1.99% (1958) to 21.2% (1994). The prevalence of hypertension as defined by the seventh United States Joint National Committee (JNC-VII) criteria (140/90 mmHg) shows a steep increase in urban population.⁵

Although the prevalence has increased in rural populations, the increase is not as steep as among the urban dwellers (Table 1).

The problem of hypertension is not limited to adults only but it also affects children and adolescents. Primary hypertension has become increasingly common in children but remains largely under studied, under diagnosed and under treated. In an ICMR funded study of 773 adolescents...