

Research Article

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Suryanadi Pranayama (Right Unilateral Nostril Breathing) May be Safe for Hypertensives

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Abstract

Background: Previous studies have suggested that exclusive right uni-nostril breathing known as suryanadi pranayama (SNP) has sympathomimetic effects and hence, the present study was designed to determine immediate effects of 27 rounds of SNP on cardiovascular parameters in patients of essential hypertension (HT). This has clinical significance in determining whether such a potentially sympathomimetic practice is safe in such a population.

Materials and methods: Twenty hypertensive patients on standard medical management were taught to perform SNP by qualified yoga instructors. Heart rate (HR) and blood pressure (BP) were recorded after 5 minutes of rest in sitting posture and after 27 rounds of SNP. All data passed normality testing and hence was analyzed using Students t test for paired data.

Results: Statistical analysis revealed no statistically significant changes in any of the parameters following SNP. Gender based sub analysis of $\Delta\%$ following SNP revealed no significant differences between male and female subjects.

Discussion: The absence of any significant increase in HR or BP following SNP goes against earlier theories that it may be dangerous for hypertensive patients due to its sympathomimetic nature. SNP may not be increasing HR and BP in our subjects because they already had reached a certain threshold of reactivity. The goal of yoga is to restore homeostasis. Hence, if sympathetic reactivity of a subject is already higher than normal, yogic techniques will not further increase such a hyper reactivity but rather bring it back to normal. The small 1-2% decrease in most parameters in our study gives a hint of this possibility. In conclusion, our study offers evidence that exclusive right nostril breathing as performed in SNP may be safe in patients of HT. We also conclude that the cardiovascular effects of SNP in hypertensives are different than those reported by previous studies done in normal subjects. Further studies may throw light on possible mechanisms involved and also whether there is any difference produced by long term training in SNP.

Keywords: Yoga; Suryanadi pranayama; Nasika mudra; Shivaswarodaya; Hypertensives

Introduction

Ancient Rishis of India have intuitively analyzed all aspects of human life and one such example is swarodaya vijnan, the ultradian nasal cycle as codified in the Shivaswarodaya [1]. This has captured the imagination of scientists in recent times with numerous reports on differential physiological and psychological effects of exclusive right or left nostril breathing [2-8]. However, these studies have evaluated only the physiological effects on normal subjects and although potential health benefits of unilateral forced nostril breathing (UFNB) have been postulated, clinical research is required to prove immediate and sustained efficacy of these techniques in psychosomatic conditions like hypertension (HT) and diabetes mellitus (DM).

Previous studies have suggested that exclusive right uni-nostril breathing known as suryanadi pranayama (SNP) or surya anuloma viloma pranayama (SAVP) has sympathomimetic effects including increase in metabolism, baseline oxygen consumption, systolic pressure (SP) and heart rate (HR) [6]. These effects have been demonstrated after a month -long training [3] as well as immediately after 45 minutes of the practice [4]. A recent study also has reported significant increase in SP, diastolic pressure (DP) and mean pressure (MP) after 30 minutes of the practice [8].

With the above in mind, the present study was designed to determine immediate effects of 27 rounds of SNP on cardiovascular

parameters in patients of essential HT. This has clinical significance in determining whether such a potentially sympathomimetic practice is safe in such a population.

Materials and Methods

Twenty patients of essential HT attending the Yoga OPD run by ACYTER at JIPMER, Pondicherry were selected for this study by accidental sampling. Patients of secondary HT and those with history/signs and symptoms/laboratory reports suggestive of nephrologic, neurologic and ophthalmologic complications were excluded from the study. Ten patients were male and 10 female with an average age of 57.10 ± 2.47 (SEM) years. All of the subjects were under standard medical management and taking antihypertensive medications for more than five years. Sub classification of the subjects based on JNC VII guidelines [9] revealed that 10 of them were in stage I HT range,

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Received July 13, 2012; **Accepted** August 27, 2012; **Published** August 29, 2012

Citation: Bhavanani AB, Madanmohan, Sanjay Z (2012) Suryanadi Pranayama (Right Unilateral Nostril Breathing) May be Safe for Hypertensives. J Yoga Phys Ther 2:118. doi:10.4172/2157-7595.1000118

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7 in prehypertensive range and three had blood pressure (BP) in normotensive range even though they were on regular medication. None of them had any previous experience of yoga training. Informed consent was obtained by one of the investigators. Pre-intervention HR and BP were recorded after 5 minutes of rest in sitting posture using non-invasive semi-automatic BP monitor (CH-432, Citizen Systems, Tokyo, Japan).

The subjects were individually taught to perform SNP by a qualified yoga instructor. An overview of the practice was given to the patients and then they were instructed to take up an erect sitting position with palms on their thighs. They were asked to keep their eyes closed to facilitate the development of inner awareness. The subject was instructed to perform nasika mudra with their right hand by touching the tip of their index finger to the base of their thumb. The right ring finger was then used to close their left nostril with gentle pressure. The pranayama was then performed through the unblocked right nostril in a calm and regular manner with a conscious effort to use low, mid and upper parts of the lungs in a sequential manner during inspiration as well as expiration. Subjects were instructed to breathe in and out for an equal count of 5 that was given by the instructor with the help of a stop watch. A regularity of counts at the rate of 6 breaths/minute (BPM) was maintained by the instructor for the entire duration of nearly 5 minutes taken to complete 27 rounds of SNP.

Post intervention HR and BP measurements were recorded again at the end of the 27 rounds of SNP. Pulse pressure (PP) was calculated as SP-DP, mean pressure (MP) as $DP + \frac{1}{3} PP$, rate-pressure product (RPP) as $HR \times SP/100$ and double product (Do P) as $HR \times MP/100$.

Statistical analysis of pre and post intervention data was done using GraphPad InStat version 3.06 for Windows 95 (GraphPad Software, San Diego California USA, www.graphpad.com). All data passed normality testing by Kolmogorov-Smirnov Test and hence was analyzed using Students t test for paired data. P values less than 0.05 were accepted as indicating significant differences between pre and post intervention data.

Results

Results of the pre and post SNP comparisons are given in Table 1. Statistical analysis revealed no statistically significant changes in any of the parameters following 27 rounds of SNP though there was a trend of 1-2% reduction in HR, SP, PP, MP, RPP and Do P with a slight rise of 0.34% in DP. Gender based sub analysis of $\Delta\%$ following SNP revealed no significant differences between male and female subjects.

Discussion

The absence of any significant increase in HR or BP following SNP goes against earlier theories that it may be dangerous for hypertensive patients due to its sympathomimetic nature. Though earlier studies in normal subjects [2-4,6] have reported significant increase in HR and/or BP following exclusive right nostril breathing, our study shows that such a rise doesn't occur in patients of essential HT. Our findings are in agreement with those of Jain et al who reported no significant change in HR and a significant reduction in BP in healthy male subjects with no significant changes in female subjects after 15 minutes of SNP [7].

Enhanced sympathetic activity has been reported in essential HT [10]. Hence it is plausible that SNP may not be increasing HR and BP in our subjects because they already had reached a certain threshold

	B	A	% Change	p Value
HR (beats/min)	76.15 ± 3.31	75.25 ± 3.11	- 1.18	0.453
SP (mmHg)	128.10 ± 2.52	127.20 ± 3.02	- 0.70	0.472
DP (mmHg)	73.35 ± 1.89	73.60 ± 1.65	+ 0.34	0.837
PP (mmHg)	54.75 ± 2.26	53.60 ± 3.29	- 2.10	0.602
MP (mmHg)	91.60 ± 1.83	91.47 ± 1.56	- 0.15	0.838
RPP (units)	97.13 ± 4.06	95.31 ± 3.90	- 1.87	0.339
DoP (units)	69.80 ± 3.29	68.81 ± 3.00	- 1.42	0.364

Values are $M \pm SEM$ for 20 subjects with p values obtained from Students t test for paired data.

Table 1: Immediate effect of suryanadi pranayama on heart rate (HR), systolic pressure (SP), diastolic pressure (DP), pulse pressure (PP), mean pressure (MP), rate-pressure product (RPP) and double product (Do P) in patients of essential hypertension. B: before and A: after five minutes of the practice.

of reactivity. The goal of yoga is to restore homeostasis. Hence, if sympathetic reactivity of a subject is already higher than normal, yogic techniques will not further increase such a hyper reactivity but rather bring it back to normal. The small 1-2% decrease in most parameters in our study gives a hint of this possibility.

In earlier studies we have report that both sukha pranayama and chandra nadi pranayama (CNP) at the rate of 6 BPM reduces HR and BP in hypertensive patients within five minutes of practice [11,12]. We have suggested that this may be due to a normalization of autonomic cardiovascular rhythms as a result of increased vagal modulation and/or decreased sympathetic activity and improved baroreflex sensitivity. It is possible that in our present study, a similar effect due to breathing at the rate of 6 BPM is overriding the sympathomimetic effect of SNP and hence HR and BP did not change. Jain et al. have suggested that sympathetic activation produced by right nostril breathing may be masked by vagally mediated lung bar receptor activity that is enhanced by voluntary breathing efforts [7]. As an earlier study [2] on normal subjects reported increased HR following right UFNB at 6 BPM, it is possible that this difference is due to the fact that cardiovascular regulatory mechanisms are altered in hypertensives. This is substantiated by an earlier study from JIPMER reporting that vasoconstrictor and cardiac acceleratory responses to isometric handgrip test are subnormal in hypertensive patients and that yoga training improves these reflex regulatory mechanisms [13]. The above may explain the differential effects of SNP in normal subjects and in hypertensive patients.

Upon gender based sub analysis of the $\Delta\%$ changes of HR and BPs, we found no differences between male and female subjects following the practice of SNP. Again, this is in contradiction to an earlier report of gender differences in HR and BP responses to UFNB in healthy subjects [5]. They have suggested a nostril laterality affecting the autonomic nervous system differentially in males and females. Though we found this to be true in our recent study on exclusive left nostril breathing of CNP in hypertensive patients [12], this is not found to be true in our present study on SNP. Even the study by Jain et al. has not reported any significant gender differences between healthy male and female subjects after 15 minutes of SNP [7].

In conclusion, our study offers evidence that exclusive right nostril breathing as performed in SNP may be safe in patients of HT. We also conclude that the cardiovascular effects of SNP in hypertensives are different than those reported by previous studies done in normal subjects. Further studies may throw light on possible mechanisms involved and also whether there is any difference produced by long term training in SNP.

Acknowledgements

The authors thank Sri G Dayanidy and Selvi L Vithiyalakshmi, yoga instructors at ACYTER for their assistance during the study. We also thank the Director, MDNIY and Director, JIPMER for their support as this study was possible because ACYTER has been established as a collaborative venture between the Morarji Desai National Institute of Yoga, New Delhi and JIPMER, Puducherry with funding from Department of AYUSH, Ministry of Health and Family Welfare, Government of India.

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