

AUTONOMIC NERVOUS SYSTEM IN AYURVEDA: A BRIEF UNDERSTANDING IN RELATION TO TRIDOSHA

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Published online: March, 2018

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ABSTRACT

Ayurveda the eternal holistic science of life gives us ample amount of knowledge on different aspects and covering different patho-physiological concepts which brings an overall health of a person. Different health care approaches are being thought about and researched for the overall health of an individual, based on curative as well as preventive aspect. The accommodation mechanism of the human body consists of the autonomic nervous system and the endocrine system. The former consist of the sympathetic nerves and the parasympathetic nerves and makes up the framework of the accommodation mechanism operating upon the biological binary digit. In *Ayurveda* it is the *tridosha* which is governing the physiological as well as pathological aspects in relation to health and diseases, in sync with the variation in the day. The present study is to understand the *tridoshic* theory of *Ayurveda* along with the working of the Autonomic nervous system.

Keywords: Autonomic nervous system, *Tridoshik* theory, Ayurveda.

INTRODUCTION

In recent years different alternative health care systems are subjected to various medical researches to find a new approach to prevent and cure diseases. The accommodation mechanism of the human body consists of the autonomic nervous system and the endocrine system. The former consist of the sympathetic nerves and the parasympathetic nerves and makes up the framework of the accommodation mechanism operating upon the biological binary digit. On the contrary, the latter acts in close co-

operation with the former and elaborates an accommodation mechanism for more efficient and speedy adaptation. Accordingly, the abnormality of the accommodation mechanism manifest on the behaviour of the autonomic nervous system, showing abnormalities of the autonomic nervous system. The auto adaptation mechanism of the human body loses its rationality and suitability by the abnormality of the autonomic nervous system. And these types of adaptational disturbances are antagonistic in the constitu-

tional condition of host body, the biological specificity of stimulant factors and the stage in which the adaptational disturbances occur.

In this study, phenomenon of *tridoshic* changes described in our *ayurvedic* classics in various conditions such as *tridoshik* changes according to age groups, in 24 hours, seasons, in diseases and its cure, are classified into either sympathiconia type or parasymphathiconia type comparing and analysing the signs and symptoms of *tridoshic* changes observed in each conditions.

Since the concept of “Immunomodulation by the Autonomic Nervous System” provides a scientific verification to various alternative therapies, this conceptual study will hopefully provide corroborative evidence to substantiate age-old *tridoshic* theory which is very much applicable in pathophysiology as well as treatment of various diseases, hence it scientifically validates the *ayurvedic* therapy, since *ayurvedic* therapy is the ultimate application of the *tridoshik* theory, that is to bring balance to *tridoshas*.

Aim and objectives:-

1) To find a similar mechanism of autonomic nervous system in *tridoshik* principle and *ayurvedic* concept.

2) To study patho-physiological aspects of autonomic nervous system in *ayurveda* and modern medicine.

DISCUSSION

Anatomical and physiological relationship of Autonomic nervous system in the concept of Tridosha:-

*Vata*³:-*Vayu* controls the entire body as *Acharya Charak* says: the *vata* is the upholder of both, structure and function in the body. It is the very self of the five forms of *vata* in the body viz., *prana*, *udana*, *samana*, *vyana* and *apana*. It is the impeller of upward and downward movements; controller and conductor of the *Manasa* (mind); the inspirator of all the *indriyas* (senses); the conveyer of all the *indriyarthas* (sense –stimuli); the marshaller of the *dhatus* (body-elements); the synthesizing principle in the body; the impeller of speech; the cause of feeling and audition; the source of auditory and tactile senses; the origin of all the excitement and animation; the stimulator of the *agni* (gastric fire); the desiccator of the *doshas*; the eliminator of *Malas* (excretion) and deobstruent of the gross and subtle *srotas* (body channels); the modeller of the fetal form; the sustaining principle of life – all these are the functions of the normal *vata* in the body.

Table 1:

Body organs ⁴	Effect of sympathetic stimulation	<i>Vata</i>	Effect of parasympathetic-c stimulation	<i>Vata</i>
Eyes		<i>Prasarana</i>		<i>Ankunchana</i>
Pupil	Dilated		Constricted	
Glands	Vasoconstriction and slight secretion	<i>Agni balaprada (saman)</i>	Stimulation of copious secretion	
Sweat glands	Copious sweating (cholinergic)	<i>Sweda</i>	Sweating on palm of hands	
Apocrine glands	Thick, odoriferous secretion		None	
Blood vessels	Most often constricted		Most often little or no effect	

Table 2: *Pitta*⁴ :-

Body organs	Effect of sympathetic stimulation	<i>Pitta</i>	Effect of parasympathetic stimulation	<i>Pitta</i>
Eyes		<i>Darshana</i>		<i>Vision</i>

		(<i>alochaka</i>)		(<i>alochaka</i>)
Pupil	Dilated		Constricted	
Glands	Vasoconstriction and slight secretion	<i>Indigestion (pachaka)</i>	Stimulation of copious secretion	<i>Digestion (pachaka)</i>
Sweat glands	Copious sweating (cholinergic)		Sweating on palm of hands	
Apocrine glands	Thick, odoriferous secretion		None	
Blood vessels	Most often constricted		Most often little or no effect	

Table 3: Kapha⁴ :-

Body organs	Effect of sympathetic stimulation	<i>Kapha</i>	Effect of parasympathetic stimulation	<i>kapha</i>
Eyes				
Pupil	Dilated		Constricted	
Glands	Vasoconstriction and slight secretion		Stimulation of copious secretion	<i>Kledana(kledaka)</i>
Sweat glands	Copious sweating (cholinergic)		Sweating on palm of hands	
Apocrine glands	Thick, odoriferous secretion		None	
Blood vessels	Most often constricted		Most often little or no effect	

A) Pathological relationship of ANS in the concept of TRIDOSA:-

When a man has a physically active behaviour, the frequency of the invasion of bacteria into the body from hands and feet sequentially increases. Therefore, the increase in the number of granulocytes by the stimulation of sympathetic nerves is beneficial for the protection of the body from bacterial invasion. Many cells in the body including leucocytes bear adrenergic or cholinergic receptors on the surface, with granulocytes bearing adrenergic receptors, which mean that granulocytes are increased in number by sympathetic nerve stimulation. So, when a man is physically active the number of granulocytes automatically increases. The physical active behaviour of a man is owing to the functions of *vata dosha* which has *rajasik* dominance in nature. As a general rule of *Ayurvedic* concept when a dosha are within a limit of normalcy a man remains healthy, but when *doshas* are increased excessively and get aggravated, it will lead to diseases.

When a person is exposed to *Vata dosha* aggravating causes, it causes sympathetic nerve stimulation, which in turn activates adrenergic receptor bearing

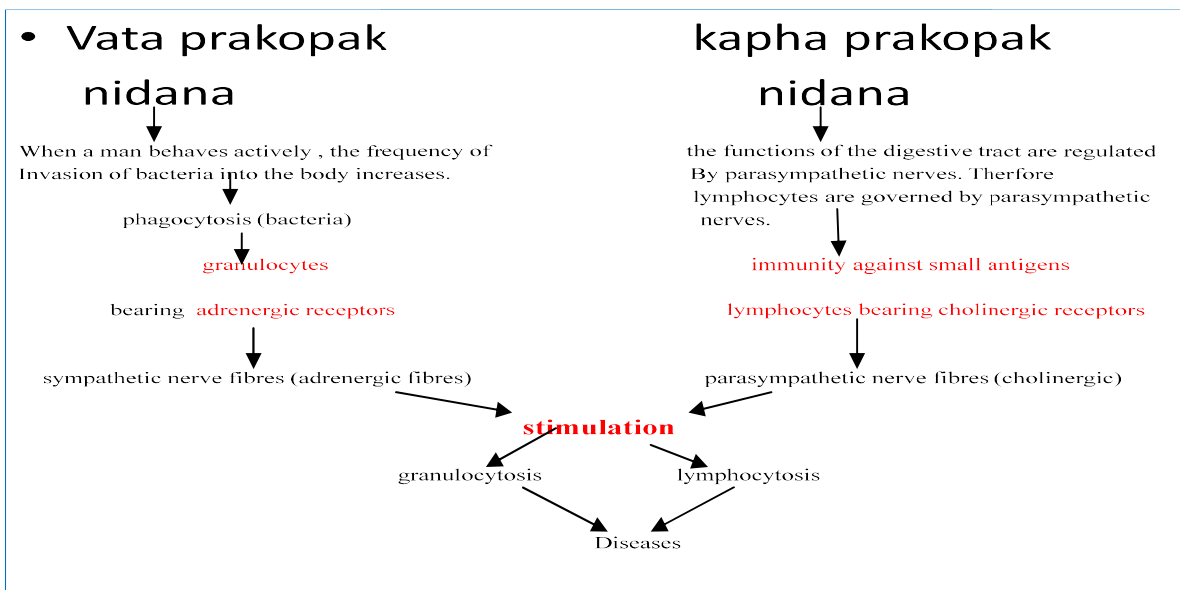
cells that is granulocytes, which process bacteria by phagocytosis. When sympathetic nerve stimulation is chronic or too excessive, that is, the regular long term excessive exposure to *vata dosha* aggravating causes, it causes imbalance of autonomic nervous system as well as *Dosha* imbalance (*vata* aggravation), leading to disease formation.

The factors which cause sympathetic nerve stimulation are similar to *vata prakopak nidana*. The factors which causes sympathetic nerve stimulation are mental stress, physical stress, cold food and drinks, excessive physical exertion or exercise (*vyayama*), not eating (*Anashan*), Anxiety (*Chinta*), exposure to chill wind, exposure to extreme temperatures, fear and grief, walking at late nights which almost corresponds with *vata prakopak nidana*. Another point to be highlighted is that the signs and symptoms and the resulting effects of sympathetic nerve stimulation again correspond with the *lakshanas* of *vata prakopa*, which are like tremors, abdominal distension with constipation, obstruction of faeces, and depletion of strength and power of sense organs, delirium, and giddiness etc⁸.

Lymphocytes are known for processing small antigens such as viral particles and foreign proteins by immune functions. These antigens are digested by enzymes in the digestive tract. And lymphocytes phylogenically derived from the digestive tract. The digestive tract is under the regulation of parasympathetic nerves. Therefore lymphocytes which bear cholinergic receptors on the surface are under the control of parasympathetic nerves and act in coordination with the digestive tract. The increase in the number of lymphocytes is beneficial for protecting the body from the infection from the small antigens. The parasympathetic nerve system is more active during rest, at night, during meal, in mild climate, during childhood and in a person whose nature is mild and calm and who has more sedentary lifestyle. The causative factor for the activation of parasympathetic nerve system is similar to *kapha* aggravating factors. Since lymphocytes bear cholinergic receptors on the surface, they increase in number when parasympathetic nerves are dominant. When parasympathetic nerve stimulation is chronic or too excessive, that is prolonged exposure to *kapha dosha* aggravating causes, it causes imbalances of automatic nervous system as well as *dosha* imbalance (*kapha aggravation*) leading to disease formation.

The signs and symptoms and the resulting effects of parasympathetic nerve stimulation also corresponds with *lakshanas* of *kapha prakopa*.

In case of cancer formation by sympathetic nerve activation with granulocytosis, *vata* aggravating factors such as physical and mental stress, overwork, less sleep, cold diet and food, irregular lifestyle etc causes sympathetic nerve activation with the resulting granulocytosis. As a direct effect of sympathetic nerve stimulation, blood supply increases in general, which leads to local blood congestion. At the same time, the activated granulocytes attack cells. The areas such as skin, nerves, GIT, liver etc are the places where there is constantly high metabolism and active cell division. So there are more chances of errors of cell division and more production of waste materials in these areas. In case of cancer formation by the parasympathetic nerve activation with lymphocytosis, *kapha* aggravating factors such as obesity, eating full stomach, lack of physical activity, sedentary lifestyles etc causes parasympathetic nerve activation with the resulting lymphocytosis. The body is in the state of relaxation so blood vessels are dilated leading to local blood congestion.⁶ This ultimately becomes a cause for cancer formation



B) Tridoshik phenomena in 24 hrs and in different age with reference to Immunomodulation by ANS.

During 24 hours, there is a good balance of stimulation of both sympathetic and parasympathetic nervous systems, which in turn maintains the balance between granulocytes and lymphocytes. During the day, man tends to be active (activities are *Vata* predominant), because of which sympathetic nervous system predominates and granulocytes increase in number. Whereas during sleep (*kapha* predominant), parasympathetic nervous system predominates and lymphocytes increase in number.¹

Acharya Vagbhata's quote²: *Tridosha* are predominant respectively, during the last, middle and final stages of life, the day, the night and during the process of digestion of food. *Vata* is dominant in old age (after 60 years old), in the afternoon (between 3pm and 7 am), late night (2am to 6am) and at the end of digestion of food. *Pitta* is predominant in the middle of age (between 20 and 60 years), mid day (between 11am and 4pm), midnight (between 12 and 2am) and during middle period of digestion. *Kapha* is predominant in early age (from birth upto 16 years), in the forenoon (between 6am and 10am), in the early part of the night (between 7pm and 11pm per midnight) and the early period of digestion.

A new born baby shows granulocytosis which is the result of postpartum even induced by pulmonary respiration. Oxygen stress induces the activation of sympathetic nerves, leading to granulocytosis. It is well known that *apana vayu* plays an important role during delivery. Following this, a dominant state of lymphocytes appears.

Children 1-4 years- prominent lymphocytosis

Children 5-15 years- 1:1 ratio (lymphocytes: granulocytes)

After 15- 20 years- ratio of adult pattern (35%-60%)

20 years onwards – proportion of granulocytes gradually increases.

Lymphocytosis seen in children is induced by the dominant state of parasympathetic nerves. This im-

munological state in children may be important for the absorption of growing stress. Hence, the increase in body weight is extremely prominent in children between the ages of 1-4 years old. This lymphocytosis and parasympathetic state can be associated with the state of *kapha* predominantly in *bala avastha* (childhood)

Granulocytosis seen in the elderly is due to the dominant state of sympathetic nerves, which is an effect of accumulation of oxidised substances. And this granulocytosis and sympathetic state in the elderly can be associated with the state of *vata* predominance in *vriddha avastha* (old age).⁵

CONCLUSION

In this conceptual study, various phenomena of *tridoshik* changes are analysed in terms of autonomic nervous system. We have seen the interesting relation between *Vata/pitta dosha* and sympathetic nervous and sympathetic nerve activation. The signs and symptoms of changes in the level of autonomic nervous system and *lakshanas* of each *dosha prakopa* correspond to each other. Since the level of autonomic nervous system influences the bodily internal environment, viz leukocytic distribution and its resulting defence mechanism, the balance in the level of autonomic nervous system leads to health. In the same manner, the balance in the level of *doshas* lead to *Swastha* as Acharya Sushruta says that the person whose *doshas*, *agni* and functions of *dhatu* and *malas* are in the state of equilibrium and who has a cheerful mind, intellect and sense organs is termed as *Swastha* (healthy).

Since the *doshas* are the ones that ultimately control all the bodily functions, bringing balance to *tridosha* is the final goal in the treatment in ayurveda. Since we have studied that there is a definite relation between autonomic nervous system and *tridosha*, the Ayurvedic treatment can also bring balance of the autonomic nervous system. To be precise *dinacharya* (daily regimens) *ritucharya* (seasonal regimens) *sadvritta* (mental hygiene) *achara rasayana* (*rasayana* conducts) advocated by Ay-

urveda can bring balance to autonomic nervous system.

Since the concept of “immunomodulation” by the autonomic nervous system provides a scientific verification to various alternative therapies, we have seen in our study a corroborative evidence to substantiate age old *tridoshic* theory which is very much applicable in pathophysiology as well as treatment of various diseases. It also scientifically validates the *ayurvedic* therapy, since *ayurvedic* therapy is the ultimate application of *tridoshic* theory, that is, to bring balance to *tridoshas*.

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Source of Support: Nil

Conflict Of Interest: None Declared

How to cite this URL: Sikha Lekharu et al: Autonomic Nervous System In Ayurveda: A Brief Understanding In Relation To Tridosha. International Ayurvedic Medical Journal {Print} 2018 {cited March, 2018} Available from: http://www.iamj.in/posts/images/upload/1068_1073.pdf