



Sanjna Vaha Srotas - A Critical Review

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ABSTRACT

In the new found theory of neurological and cardiac pathology, scientists have been able to make a connection between the two. A neurological disorder may possess cardiac manifestation and vice versa. A look at the classics where the *Sanjna Vaha srotas* (pathway of consciousness) has been mentioned in the context of some disorders like *Apasmara* (epilepsy) becomes more relevant. The *Rajas* (excitatory) and *Tamas* (inhibitory) *Doshas* (vitiations of mind) explained in the context of vitiations of *Manas* (mental faculty) and its seat as *Hridaya* (heart) needs to be seen in a new light. The neurotransmitters which are excitatory or inhibitory in action have different effect on the function of the heart. In addition, the sympathetic and parasympathetic nerve supply to the brain and heart also have significant impact. The blood supply from the heart to the brain is also of importance in many morbid conditions of the heart and that of the brain. The electromagnetic field of heart also has significant impact on brain. Hence the cumulative effect of neuro transmitters, nerve supply circulation and electromagnetic field manifests in changed emotions, status of mind and consciousness in an individual.

Key Words: *Sanjna Vaha Srotas*, *Rajas*, *Tamas*, *Chetas*, Neuro transmitters, sympathetic and parasympathetic nerve supply, electromagnetic field

INTRODUCTION

The higher faculties of consciousness and thinking have been associated with *Sanjna Vaha Srotas* and the emotional quotient has been associated with *Manas*. In the classical textbooks of *Ayurveda*, *Sanjna Vaha Srotas* and *ManoVaha Srotas* are used under different contexts. Though they seem to be synonymous with each other the terms used in certain contexts indicate that they have been intentionally used for explaining different phenomena. The *Sanjna Vaha Srotas* is used in the context of conditions where consciousness is altered due to imbalance between the neurons carrying impulses, and in conditions where there is altered circulation, or toxins in the blood. The onset of pathology may start from heart and its manifestations may be seen in the brain. Whenever emotions like *Bhaya* (fear), *Krodha* (anger), *Shoka* (sorrow) are involved, *Hridaya* is considered the site of origin but the channels involved are different. The present article deals with the understanding of *Sanjna Vaha Srotas* through the opinion expressed in the classics.

SANJNA VAHA SROTAS AND THE VARIOUS CONDITIONS

Out of the three components of *Manas* (mind), *Sattva Guna* (equilibrium) is characterized by *Kalyanamsha* (Conducive to mental health). The *Rajas Guna* (excitatory property) has predominance of *Roshamsha*

(excitation) and *Tamo Guna* (ignorance and inhibition) has predominance of *Mohamsha* (inhibitory property)¹. The *Manas* under the influence of *Sattva*, *Rajas* and *Tamas* can be in any one of the three states – state of equilibrium, state of excitability and state of inhibition respectively². *Sanjna Vaha Srotas* has been mentioned in the context of carrying *Rajas* and *Tamas*. The equilibrium is brought out by the *Sattva Guna*³. *Sanjna Vaha Srotas* does not find mention among the general description of the other *Srotas* (channels or pathways). Chakrapani states that the *Sanjna Vaha Srotas* are the *ManoVaha Srotas*. The pathogenesis of mental diseases depicts the association of heart with them⁴. The origin of *Sanjna Vaha Srotas* has been mentioned as *Hridaya* (heart)⁵.

Sanjna Vaha Srotas is mentioned along with other *Srotas* that carry *Rasa* (Chyle) and *Rakta* (blood) which are involved in the pathology of *Mada* (intoxication) *Murchcha* (Syncope), *Sanyasa* (coma). In the same context the seat of *Chetasa* (consciousness) is mentioned as *Hridaya*⁶. The etiological factors which vitiate *RaktaVaha Srotas* may also affect *Sanjna Vaha Srotas*⁷.

In the context of *Nidra* (sleep) there is predominance of *Tamas* which results in the clogging of *Srota*⁸ There is no mention of particular *Srotas*. The predominance of *Tamas* causes mutual loss of contact between the different factors which are responsible for perception⁹. In the pathogenesis of *Apasmara* the aetiological factors initially bring about *Upahata Chetas* (altered epileptic threshold) which further vitiated by *Rajas* and *Tamas*, culminates in *Apasmara Vega*. The seat of *Chetas* is *Hridaya* (heart) and it is connected to *Sanjna Vaha Srotas*¹⁰.

RELATIONSHIP BETWEEN BRAIN AND HEART

Neurotransmitters and their effect on the functions of heart and brain:

There are a number of studies which establish the relationship between the heart and the brain. The communication between the heart and brain is a dynamic, ongoing, two – way dialogue. Each organ continuously influences the other's function. Research shows that heart communicates with the brain in four major way:

Neurologically – through the transmission of nerve impulse.

Biochemically- through hormones and neuro transmitters.

Biophysically -Through pressure waves.

Energetically – Through electromagnetic field interactions¹¹

Neuro transmitters can be classified into two groups- excitatory and inhibitory. Excitatory receptors open channels that admit sodium ions or both sodium and potassium ions. Inhibitory receptors cause opening of potassium or chloride channels. The receptor for light and the hundreds of different olfactory receptors that detect odours are linked to G proteins¹².

Each neuro transmitter has different type of impact on the heart and brain. In vitro studies on the heart of nudibranch *Archidoris montereyensis* have shown that several neurotransmitters including serotonin, dopamine, neuropeptides increased the rate and amplitude of heart contractions. Only acetylcholine inhibited the heart, decreasing the rate, amplitude and tones of contractions¹³. In vitro studies on *Squilla oratoria* showed that the heartbeat was activated by application of glutamate, serotonin, dopamine, octopamine or acetylcholine. The heartbeat was inhibited by application of gamma amino butyric acid (GABA)¹⁴. Adrenaline infused in six healthy volunteers showed that the heart rate remained elevated for several hours despite a fall in plasma adrenaline concentration¹⁵. There is evidence for release of cardiac sympathetic co transmitters in addition to noradrenaline. Neuropeptide Y plays a potential role in reducing vegal neurotransmission and directly influencing myocyte excitability in the presence of beta receptor blockade¹⁶.

Acetyl choline is a neurotransmitter in the central and peripheral nervous systems that affect plasticity, arousal and reward. In the CNS, the neurons that release and respond to acetylcholine comprise the cholinergic system

which causes anti- excitatory effects. Acetyl choline plays a role in synaptic plasticity, including learning and short-term memory. In cardiac tissue, acetyl choline neurotransmission has an inhibitory effect which lowers heartbeat. Acetyl choline also behaves as an excitatory neurotransmitter at neuromuscular junctions in skeletal muscle.¹⁷

Sympathetic and Parasympathetic nervous system and their effect on the heart and brain:

The medulla located in the brain stem above the spinal cord, is a major site in the brain for regulating autonomic nerve outflow to the heart and blood vessels and is particularly important for short – term feedback regulation of arterial pressure. The medulla contains cell bodies for the two main divisions of the autonomic nervous system – sympathetic and parasympathetic.

The heart is innervated by vagal and sympathetic fibres. The right vagus nerve primarily innervates the SA (sino atrial) node whereas the left vagus innervates AV (atrio ventricular) node. Sympathetic efferent nerves are present throughout the atria and ventricles including the conduction system of heart. Sympathetic stimulation of the heart increases heart rate (positive chronotropy), inotropy and conduction velocity. Parasympathetic stimulation of the heart has opposite effects. Sympathetic and parasympathetic effects on heart functions are mediated by beta- adrenoceptors and muscarinic receptors respectively.¹⁸

Electromagnetic field and its effect on the heart and the brain:

Energetic communication between the heart and the brain takes place in the form of waves. The heart is the most powerful source of electromagnetic energy in the human body. It produces the largest rhythmic electromagnetic field of any of the organs of the body. The electric field of the heart is about sixty times greater in amplitude than the electric activity generated by the brain. The magnetic field produced by the heart is more than hundred times greater in strength than the field generated by the brain the timing between pulses of the magnetic field of the heart is modulated by different emotional status.

The heart secretes a number of different hormones with each contraction. So, there is a hormonal pulse pattern that correlates with heart rhythms. Hormonal and electric patterns are the carriers of emotional information. These are generated by the heart in the form of low- frequency oscillations. The higher frequency oscillations found in the electroencephalogram reflect the conscious perception and labelling of feelings and emotions. The pressure wave generated by the heart travels rapidly through the arteries. These pressure waves force the blood cells through the capillaries to provide oxygen and nutrients to cells and expand the arteries. This generates a large electrical voltage. The pressure waves also apply pressure to the cells in a rhythmic fashion. This stimulates the proteins to generate an electric current in response. A change in the brain's electric activity is recorded when the blood pressure wave reaches it after every systole¹⁹. Certain forms of autogenic meditations are found to have brought changes in electrophysiological responses and dynamic correlations were found between heart and brain rhythm²⁰.

Blood circulation and its effect on heart and brain:

The status of blood flow in the brain is dependent on the supply of blood from the heart. Cerebral blood flow has regular variations caused by the systolic increase in blood pressure over the cardiac cycle. The blood flow to the brain is synchronous with the heartbeat. Because the brain is contained within the fixed skull, these pulsations in flow and pressure are in turn transferred into the brain tissue and all of the fluids contained therein including cerebro spinal fluid²¹.

Discussion:

The *Sanjna Vaha Srotas* mentioned in classics in the context of diseases like *Apasmara*, *Mada*, *Murchcha* and *Sanyasa* deals with the impairment in the equilibrium of *Rajas* and *Tamas*. The pathology which follows results in the imbalance of the concentration of neuro transmitters, ions, sympathetic and parasympathetic action, hormones, pressure waves, electromagnetic field and circulation. The qualities brought about by

increase in the *Rajas* entity results in increase in excitatory action of the heart and brain. If the *Tamas* entity is in excess, it brings about a cumulative action of inhibition. Depending on the initial site of pathology the *Srotas* involved may be *Sanjna Vaha Srotas* related with consciousness.

If the equilibrium is maintained the normal activities are carried. If there is excess of *Rajas* there is hyper excitation and if there is predominance of *Tamas*, then there is loss of consciousness. In case of *Apasmara* there is transient loss of consciousness associated with seizures. The other conditions which are associated with *Sanjna Vaha Srotas* are *Mada*, *Murchcha*, *Sanyasa*. The mention of *Rasa* and *Rakta Vaha Srotas* along with *Sanjna Vaha Srotas* indicates that these conditions are resultant of any toxic substances in the circulation or sudden change in the blood circulation itself. *Durbala Chetas* again is a prerequisite for the three conditions. The condition of *Mada* has been compared to intoxication caused by *Madya* (Alcohol). Intoxication is a condition that follows the administration of a psychoactive substance and results in disturbances in the level of consciousness, cognition, perception, judgement, affect, or behaviour or other psycho physiological functions and responses. It resolves with time with complete recovery except where tissue damage or other complications have arisen²². *Murcha* is due to affected *Sanjna Vaha Srotas* along with *Rasa* and *Rakta Vaha Srotas* either individually or in combination due to vitiated *Rajas* and *Tamas*. There is involvement of vitiated *Vata* which may decrease blood supply. The condition of *Murchcha* is compared to that of *Apasmara* but devoid of *Bibhatsa Cheshta* (tonic clonic seizures). Syncope is a temporary loss of consciousness related to insufficient blood flow to the brain. It can happen in sudden drop in blood pressure, drop in heartbeat. *Sanyasa* is the condition which cannot be managed without medicines. The *Malas* (toxins) in the somatic body and mind seize their functions. The coma is a prolonged state of unconsciousness from which an individual cannot be aroused. The main cause of coma is drug poisoning. Certain drugs may damage the synaptic functioning in the ascending reticular activating system (ARAS) and prevent the system from properly functioning to arouse the brain. Secondary effect of drugs which include abnormal heart rate and blood pressure may also indirectly harm the functioning of the ARAS and lead to coma. The second most common cause of coma is lack of oxygen generally resulting from cardiac arrest²³. The other *Srotas* mentioned along with *Sanjna Vaha Srotas* is *Hrit Srotas*. This is associated with circulation as well as emotions. The *Sanjna Vaha Srotas*, *Hridaya*, *Rajo Guna* and *Tamo Guna* play important role in maintaining the status of equilibrium in the mind²⁴.

CONCLUSION

The *Hridaya* is the seat of *Chetas* and is connected to the *Sanjna Vaha Srotas*. The *Sattva Guna* represents the equilibrium while *Rajas* and *Tamas* represent the extreme points on either end of the scale. The excitatory action is brought out by the cumulative effect of neurotransmitters, ion concentrations, hormones, sympathetic and parasympathetic nerve supply, blood supply and electromagnetic field. This can be related to the predominance of *Rajas* and it has different actions on the heart and brain which are connected through the *Sanjna Vaha Srotas*. The inhibitory action is brought out by another set of neurotransmitters, ion concentrations, nerve supply, blood supply and electromagnetic field which represents the predominance of *Tamas*. Thus *Sanjna Vaha Srotas* can be termed as a pathway which connects the heart with the brain through a complex system of network of nerves, neurotransmitters, blood vessels, hormones and electromagnetic field which has its origin in the heart. The study of *Sanjna Vaha Srotas* from this perspective may open new avenues in the study of diseases of neurocardiogenic origin and cardiac psychiatry.

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