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CONCEPT OF SIRA WITH THE SIGNIFICANCE OF VARNA (COLOUR)

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ABSTRACT:

Sira Shareera is a chapter dealt under Shareera Sthana of Sushruta Samhita, that deals with description regarding vascular entity and its distribution and function in the body. In Sushruta Samhita specific colours are mentioned for different kinds of Sira based on conducting material. Aruna Varna for Vatavaha Sira, Neela Varna for Pittavaha Sira, Gourya Varna for Kaphavaha Sira and Rohini Varna for Raktavaha Sira. These colours of the Sira depend on the nature and colour of material conducting through these Sira. The word Sira is not confined only to one type of structural entity but is used for tubular vessels of the body such as nerve, vein, artery, lymph vessels etc. In such condition it is very difficult to understand the concept of Sira doubtlessly in terms of modern anatomy. Therefore, it requires critical literature review and analytical probe to understand the concept of Sira.
KEYWORDS: Shareera Sthana, Sira, Varna, Vein.

INTRODUCTION:

The Shareera Sthana is an important section of Ayurveda that plays a significant role in understanding structural concept of human body. The concepts of Shareera Rachana possess great clinical significance. Sira Shareera is a chapter dealt under Shareera Sthana, which deals with description regarding vascular entity and its distribution and function in the body. The term Sira stands for channels through which Rasadi Dhatu is conducted throughout the body and help in nourishing and maintaining healthy state.[1] In total there are 700 Sira present in the body.[2] They are classified on the basis of Dosha, Adhishtana, Vedhya and Avedhya. Sushruta has categorized Sira based on their colour, characteristic features and conducting material. The word Sira is not confined only to one type of structural entity, but it is used for any tubular vessels of the body such as vein, artery, lymph vessels etc. In such condition it is very difficult to understand the concept of Sira doubtlessly in terms of modern anatomy. Therefore, an effort is made through reviewing all possible literature in understanding the concept of Sira in Sushruta Samhita based on the illustrated description as per modern parlance in relation to its colour and conducting material. Conceptual Review Sira present in the body are originated from the Nabhi and from there, they spread in all directions. The Nabhi is surrounded by Sira like the axle hole being surrounded by spokes. These Sira are spread in the body like water channels in a garden and takes part in nourishment and maintenance of the body.[2] Classification and Enumeration of the Sira As per Sushruta Samhita among 700 Sira, Moola Sira are 40 in number. These are classified as 10 Vatavaha, 10 Pittavaha, 10 Kaphavaha and 10 Raktavaha Sira. The 10 Vata carrying Sira, on reaching the seat of Vata, divides into 175, the Pitta carrying .Sira divides into 175 as it reaches seat of

Pitta, the Kapha carrying Sira divides into 175 Sira after reaching the seat of Kapha. Similarly, the Rakta carrying Sira on reaching Yakrut and Pleeha divides into 175 Sira. Thus, together they form 700 Sira.[2] Classification and Enumeration of Sira according to location Shakhagata Sira are mentioned in table number 1, and are 400 all together. Table 1: Shakhagata Sira (in each limb)[2] S. No. Type of Sira Number Total 1. Vatavaha sira 25x4 100

2. Pittavaha sira 25x4 100

3. Kaphavaha sira 25x4 100

4 Raktavaha sira 25x4 100

TOTA L
400

In the Koshta, there are 34 Vatavahi Sira. Out of these, 8 are in the pelvis residing in the anus and penis (4 each); 2 in each flank; 6 in the back; 6 in the abdomen and 10 in the chest. Identical distribution of Sira is considered for Pittavahi, Kaphavahi and Raktavahi Sira. Hence total number of Sira present in the Koshta region are 136 (34 x 4).[3]

Table 2: Koshtagata Sira S.NO TYPE OF SIRA NUMBE
R

1. Vata vaha Sira 34

2. Pittavaha Sira 34

3. Kaphavaha Sira 34

4. Raktavaha Sira 34

Total 136

In Urdhwajatru there are 41 Vatavahi Sira. Out of these, 14 are in the neck, 4 in the ears (2 in each ear), 9 in the tongue, 6 in the nose and 8 in the eyes (4 in each eye).[4] The arrangement of Pittavahi, Kaphavahi and Raktavahi Sira is also similar with an exception, in case of eyes and ears for Pittavahi, Kaphavahi and Raktavahi Sira, in eyes there are 10 Sira where as in ears there are two Sira. So, the total number of Urdhwajatrugata Sira is 164 (41 × 4).[4]
Table 3: Urdhwajatrugata Sira S.N O
TYPE OF SIRA NUMBE
R 1. Vata vaha Sira 41 2. Pittavaha Sira 41 3. Kaphavaha
Sira
41
4. Raktavaha Sira 41 Tot al
164
So, total number of Sira is 400+136+164=700. Classification of Vatadi Sira based on colour and characteristics features: Acharya Sushruta classifies the Vatadi Sira based on their colour along with other properties. Table 4: Classification of Vatadi Sira based on Colour and other properties[4] S.NO TYPE OF SIRA
VARN A
CHARACTERIS TICS

OTHER FEATURE 1. Vatavaha
Sira
Aruna _ Filled
with Vata 2. Pittavaha
Sira
Neela Warm _
3. Kaphavaha Sira
Goury a
Cold
Stable 4. Rakhtavaha
Sira
Rohit a
Neither very hot nor very cold
_

Functions of Sira as per affluent they carry Vata, moving in its own Sira perform physical functions without hindering the specific functions of Buddhi (intellect) and sense organs. When aggravated Vata accumulates in its own Sira, many Vataja diseases develop in the body. Pitta, moving in its own Sira provides luster and complexion to the skin, taste perception, keenness of digestive fire etc. When aggravated Pitta accumulates in its own Sira, many Pittaja diseases develop in the body. Kapha, moving in its own Sira bestows fluidic functions of the body, stability of the joints, provides strength to the body etc., when aggravated, Kapha accumulates in its own Sira, many diseases of Kapha origin, manifests in the body. Rakta, moving in its own Sira performs functions such as nourishment to the tissues, enhances colour and tactile sensation to the skin etc. When aggravated, Rakta accumulates in its own Sira and many diseases due to Rakta vitiation manifests in the body.[4]

MATERIALS AND METHODS:

Critical review of Ayurvedic classics, compilation of references and commentaries along with opinion of recent authors and peer reviewed publications in authentic journals is utilized and analyzed to elaborate as well as to understand the concept of Sira and significance of Varna in classifying it as per Sushruta Samhita.

DISCUSSION:

In Sushruta Samhita Sira is classified as Vatavaha Sira, Pittavaha Sira, Kaphavaha Sira and Raktavaha Sira along with colour, characteristic features and conducting material.Regarding the above description on classification of Sira, Ghanekar said that, at Vatadi Sthana, in the Sira, Vatadi Dosha will be increased. That means in Vata Sthana, Sira contain more Vata and same happens in other Dosha viz., Pitta, Kapha and Rakta. In Rakta Sthana like Yakrut and Pleeha, the Sira contain more Rakta. Because of this Sira are classified into Vatavaha, Pittavaha, Kaphavaha and Raktavaha.[5] Vatavaha Sira: The term Vatavaha Sira stands for the Sira through which Vata is conducted. In the definition of Vata ‘‘Vaa Gati Gandhanyoh’’, the first word Gati, indicates to move or to cause movement or motor activities of the body. [6] The second word Gandhan, indicates Suchana or information through Ghranendriya (organ of smell).[7] So, the term Gandhanyoh represents all other sensory perception and conducting nerves. Thus, the definition of Vata indicates the two main functions of nervous system i.e., motor and sensory. If we observe the function of Vatavaha Sira, "Buddhi Karma” has related to five senses organs and Manas. We can infer that Vatavaha Sira are exclusively channels for carrying neural impulses in either way i.e., centre to periphery or periphery to centre. The normal functions of the Vatavaha Sira point out that the Sira are nerves. But they are not nerves, they are blood vessels that carry oxygen rich blood. In Ayurvedic classics, the

anatomy of the brain or the nervous system has not been much elaborated, we get description regarding Shiras (head),which is considered as Uttamanga, and residence of Prana Vayu as Murdha (synonym for Shiras). The Vayu which circulates in blood vessels is responsible for performing the functions of nervous system and sense organs. An abrupt interruption of constant blood supply to brain causes loss of neurological function, termed as stroke. Interruption of blood flow may be due to blockage, leading to ischemic stroke or may be due to bleeding in brain leading to deadly haemorrhagic stroke. This affects Buddhi Karma and psychosomatic homeostasis of the body. The colour of Vatavaha Sira is considered asAruna (crimson red) and the quality of this Sira is VayuPuryante (filled with Vayu). The crimson red colour of Vatavaha Sira and performing function without hindrance coincides with the two characters of artery. The arteries are conducting oxygenated blood which is also crimson red in colour due to presence of haem that binds with oxygen in bloodstream and responsible for providing crimson colour to oxygenated blood and there is continuous flow of blood without any hindrance. Red blood cells contain hemoglobin, a protein with red pigment which carries oxygen. Each hemoglobin molecule is made up of four haem groups surrounding a globin group, forming a tetrahedral structure. Haem is composed of ring like organic compound known as a porphyrin to which iron atom is attached.[8]It is the iron atom that binds oxygen as the blood travels between the lungs and the tissues. If we observe the function of Vatavaha Sira as maintaining the intellect and senses, we can infer that it conducts Prana Vayu, and as per modern parlance the oxygen is carried to each cell by binding with haem. This confrontation of haem protein absorbs the Wave lengths of light from violet end of the spectrum and reflect only red colour. Thus, this may be the reason responsible for arteries look crimson red in colour. So, those Sira through which oxygenated blood is circulating throughout the body is considered as Vatavaha Sira. If blood oxygen levels are too low, body will not work properly. Blood carries oxygen to the cells throughout the body and keeps them healthy. Hypoxia may cause mild problems like headache and shortnessof breath. In severe hypoxia it interferes with brain and heart function.Brain cells are very sensitive to a lack of oxygen, brain cell start dying within 5 minutes after disappearance of oxygen supply. Due to physiological effects of travelling high altitude, some may suffer from mountain sickness with symptoms like disorientation, lethargy nausea etc due to problem in acclimating. Pittavaha Sira: The term Pitttavaha Sira stands for the Sira through which Pitta is conducted. The word Pittais derived from the root ‘‘Tapa Santape’’ which means the fire[6] . In modern concept Tapa Santape can be compared with cellular metabolism. Metabolism is the set of life-sustaining chemical reactions in organisms. The three main purposes of metabolism are the conversion of food to energy to run cellular processes; the conversion of food to building blocks for proteins, lipids, nucleic acids, and some carbohydrates; and the elimination of metabolic wastes. Metabolic reactions may be categorized as catabolic – the breaking down of compounds or anabolic – the building up of compounds such as proteins, carbohydrates, lipids, and nucleic acids. Usually, catabolism releases energy, and anabolism consumes energy. [9] The colour of Pittavaha Sira is considered as Neela and the quality of this Sira as Ushna. The Ushna property of Pitta helps Pachaka Pitta in digestion and assimilation of food. It divides the food into Sara (essence) and Kitta (metabolic waste) with the help of Samana Vayu. The Sara is absorbed as Anna Rasa which is further transformed into Rasa Dhatu. At various stages of metabolism in formation of Rakta from Rasa, Mamsa from Rakta, Meda from Mamsa, likewise Asthi, Majja and Shukra, one after the other specific forms of related Pitta in the form of Dhatvagni help in transformation, formation and function of particular structural entity in the body. [10,11] . The metabolic waste is carried out by blood for elimination from body. Metabolic wastes include nitrogenous compounds, carbon dioxide, sulphates, ammonia, urea, uric acid, creatinine etc. Due to presence of carbon dioxide the vessels and carrying the metabolic wastes, it appears dark red to purple in colour.Pitta is considered as Mala of Rakta.[12] This may be referred for trafficking of the hormones, enzymes, the nitrogenous waste along withdeoxygenated blood. When haemoglobin releases oxygen, its shape is modified and appears darker red. The actual colour of venous blood is dark red. Though the veins are not blue in colour, they look blue because when the wavelengths of light hit the skin and veins some light is absorbed and some are reflected. The wavelengths of blue light cannot penetrate skin as well as red light, and more blue wavelengths are reflected than red wavelengths.[13] Thus, this may be the reason responsible for veins under the skin look blue in colour going in

favour with Neela Sira.Kaphavaha Sira: The term Kaphavaha Sira stands for the Sira through which Kapha is flowing. The word Kapha/Shleshma is derived from the root ‘‘Shlish Alingane’’ which means cohesion or joining.[6] The colour of Kaphavaha Sira is considered as Gourya and the quality of this Sira is Sheeta. The Gourya Varna (white colour) of Kaphavaha Sira resembles with the lymph which is milky white in colour due to conduction of chyle, fat free fatty acids. Lymph is the fluid that flows through lymphatic system, composed of lymph vessels and intervening lymph nodes. The function of lymphatic system is like the venous system, is to return fluid from the tissues to the central circulation. This lymphatic fluid is then transported via larger lymphatic vessels through lymph nodes, where substances are removed by tissue lymphocytes and circulating lymphocytes are added to the fluid, before emptying ultimately into the right or the left subclavian vein, where it mixes with central venous blood. Lymph contains a variety of substances, including proteins, salts, glucose, chyle, fats, water, and white blood cells, immunoglobins.[14] The lymph formed in the human digestive system called chyle is rich in triglycerides, and looks milky white because of its lipid content. The special lymphatic vessels surrounding the intestine that collect chyle are called lacteals. Lacteals drain into the cisterna chyli at the lower end of the thoracic duct. The thoracic duct then conveys the chyle to the bloodstream, where the fats, it carries can be processed for energy or storage. Chyle plays a critical role in immune function, transporting immunoglobulins and T lymphocytes around the body.[15] WBCs are the cells of the immune system that are involved in protecting the body against both infectious disease and foreign invaders. All white blood cells are produced and derived from multipotent cells in the bone marrow known as hematopoietic stem cells. Leukocytes are found throughout the body, including the blood and lymphatic system.[16] Immunoglobulins, also known as antibodies, are glycoprotein molecules produced by white blood cells. They act as a critical part of the immune response by specifically recognizing and binding to antigens, such as bacteria or viruses, and aiding in their destruction.[17] The Kaphavaha Sira bestow fluidic functions of the body, stability of the joints, provides strength to the body etc. All these functions are performed byvarious components of the lymphatic fluid such as immunoglobins protecting the body from foreign particles, thus providing Bala. The Sheeta Guna of this Sira may be due to presence of fatty substances in lymphatic fluid as Sneha is Sheeta in nature. It has the property of soothening, cooling, replenishing, energising and anabolic effect on the body. Raktavaha Sira: The term Raktavaha Sira stands for the Sira through which Rakta is flowing. The colour of Raktavaha Sira as per Acharya Sushruta is of Rohini Varna means straw coloured that helps in nourishing the Dhatu. As per modern science, when the erythrocytes sediment, a light straw colour serum settles over the precipitated blood cells. This may be considered as blood plasma. Blood plasma is a straw coloured liquid component of blood that holds

the blood cells, proteins and other constituents of whole blood in suspension. It makes up about 55% of the body's total blood volume. Blood plasma is separated from the blood by spinning a tube of fresh blood containing an anticoagulant in a centrifuge until the blood cells fall to the bottom of the tube. The blood plasma is then poured or drawn off. It is mainly composed of clotting factors and other protein molecules. Plasma in blood mainly comprises 80 to 90 percent of water and the other 10 percent is composed of salts, lipids, nutrients, enzymes and hormones. Plasma in blood cells is rich in proteins, immunoglobulin, clotting factors and fibrinogen. This protein helps maintenance of serum osmotic pressure. Plasma serves as a transport medium for delivering nutrients to the cells of the various organs of the body and for transporting waste products derived from cellular metabolism to the kidneys, liver, and lungs for excretion. It is also a transport system for blood cells, and it plays a critical role in maintaining normal blood pressure. Plasma helps to distribute heat throughout the body and to maintain homeostasis, or biological stability, including acid- base balance in the blood and body.[18] As the main function of Raktavaha Sira is providing nourishment to the Dhatu and thus helps in maintaining the homeostasis in the body. Same functions are performed by blood plasma also. The colour of this Sira is due to conduction of plasma.

CONCLUSION:

The term Sira stands for channels through which Rasadi Dhatu flow. In general, this term stands for blood vessels. In Sushruta Samhita specific colours are mentioned for Vatadi Sira. Aruna Varna for Vatavaha Sira, Neela Varna for Pittavaha Sira, Gourya Varna for Kaphavaha Sira and Rohini Varna for Raktavaha Sira. These colours of the Sira depend on the nature and colour of material conducting through these Sira. The oxygenated blood is conducted through the Vatavaha Sira, which possess red colour due to presence haem protein. That's why Vatavaha Sira appears Aruna (crimson red) in colour.The metabolic wastes are carried out by venous blood for elimination from body is conducted by Pittavaha Sira. These metabolic waste products consist of carbon dioxide, nitrogenous waste, aminoacids, hormones and enzymes. Due to presence of carbon dioxide the vessels carrying the metabolic wastes appears dark red in colour. The actual colour of venous blood is dark red. Though the veins are not blue in colour, they look blue because the blue wavelengths are reflected by light spectrum more as compared to red wavelength. Thus, Pittavaha Sira appears Neela (blue) in colour. The lymph is conducted through the Kaphavaha Sira. The lymph is milky white in colour due to conduction of chyle, fats, free fatty acids, immunoglobins. Thus, the Kaphavaha Sira appears Gourya (white) in colour. The Raktavaha Sira appears Rohini (straw) in colour due to conduction or presence of blood plasma which is also same in colour. Thus, we can conclude that the colour of Sira depends on the colour of its conducting material.

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