



Brief Review of Sira's Ayurvedic Philosophy and its Modern Application

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ABSTRACT

In Ayurveda, the term "sira" denotes the vein. The sira is the pathway through which the body returns deoxygenated blood to the heart and then to lungs for oxygenation. The ayurvedic sira and the veins will be correlated in this instance. In the fifth chapter of viman sthana, Acharya charaka used several synonyms to describe sira, including veins, channels, arteries, capillaries, ducts, tubes, tracts, lacunae, passageways, glands, bladder, etc. These terms mostly refer to bodily areas that may be visible or invisible. The sushrut samhita includes an ayurvedic description of dissection, cadaveric anatomy, sira, dhamani, srotas, and marma. The seventh chapter of shaarir Sthaan has detailed information on sira. The beauty of the verses or shlokas written in the Samhitas is of immense interest for every medical student. This contribution is primarily intended to help the reader comprehend the term Sira, its significance, and its connections to modern science. The items to observe here are Ayurveda and Modern Science, both of which are different sciences but are intimately related with each other.

KEYWORDS: Sira, Veins, Sira Marma, Avedhya Sira, Sira Vedhya

I. INTRODUCTION

Our body's channels are referred to as sira, dhamani, and srotas. The most important of these three is sira, which Acharya Shusruta thought to be the equivalent of vasti in kayachikitsa in terms of its direct medicinal effect in the form of siravedha [1]. Most typically, the term "sira" refers to the blood veins that provide blood to the heart. The only liquids that are circulated and conveyed by the sira, a hollow tube-like structure, are blood, fluid, lymph, juice, secretions, etc. The sira structure also includes capillaries, nerves, lymphatics, arteries, veins, and ducts.

Sira is commonly referred to as a vessel in a variety of circumstances. In other circumstances, it is simply referred to as veins. Our masters and acharyas offered substantial descriptions of sira in publications like Shushrut Samhita, Charak Samhita, Ashtang Hridaya, and other texts on the history of Ayurveda. The four kinds of sira in the Sushrut Samhita are Aruna varna (crimson), Neela varna (blue), Gour varna (white), and Rohini (red), which correlate to the three doshas, vata, pitta, kapha, and rakta, respectively.

The venations of a leaf are similar to sira's pathway. The sira, as described in Ayurvedic writings, is said to emanate from the umbilicus and spread throughout the body in branches that face upward, downward, and obliquely. In terms of Jala-Harini, they nourish the body like rivers and streams. There are a total of 700 siras in the body, and they provide the entire body with regular lubrication and nutrition to carry out its daily functions [2]. However, some siras are not suitable for venesection and are classified as Avedhya siras, which are split into three regions: Shakhagat, Kosthagat, and Urdhavjatrugat. The human body contains 98 Avedhya siras and 602 Vedhya siras in total. Acharya Sushruta mentioned 98 Avedhya siras which should be taken care of by the physician or surgeon at the time of Siravyadha or any other surgical condition. Any trauma of these structures may lead to morbidity or death [3].

Sira is one of the least studied structures, and the descriptions that we have are very debatable. Therefore, it is crucial to comprehend what sira actually means. The aim of the present review is as follows:

- (1) To investigate Sira Shaarir using Ayurveda and contemporary science.
- (2) To look up and discover the references to Sira in the Sushruta Samhita.
- (3) To understand Sira's clinical anatomy.
- (4) To learn more about Avedhya Sira.

In the present review, the literature pertaining to sira has been assembled from several sthans (sections) of the Sushruta Samhita and modern anatomy texts such as Chaurasia's General Anatomy and Gray's Anatomy, among others, and have been critically examined and correlated with contemporary words.

II. MEANING OF SIRA

The Vedic word hira is said to have been the source of the word sira. The term hira is described as blood carrying channel towards the heart [4]. Ayurvedic acharyas have used an anatomical term sira, which is one of the controversial term (structure). It is used to represent tubular structure, to carry material such as rasa and rakta, and it is one of the synonyms of srotas [5]. Sushruta has clarified the details such as distinction among sira, dhamani and srotas, speaking more precisely, Sushruta states in the ninth chapter of sharira sthana's "Dhamani Shariram Vyakaranam" that some says there is no distinction between sira, dhamani and srotas, as dhamani and srotas are merely sira vikara. However, this is not correct because dhamani and srotas are the entities other than sira [6]. Sushruta claims that the sira's structure resembles thin threads found in a tree's leaf, which are thicker at the base and finer at the tip. The branches of the sira resemble tendrils; the first branch produces another, which produces yet another branch, and soon. The blood circulates throughout the body through all the sira, just like water channels in different sections of a garden or agricultural field.

In Charak samhita, sira and dhamani have been described as synonyms for srotas [7]. They have been mentioned for any passage or channel, but in Sushruta Samhita, it is made clear that sira, dhamani, and srotas are three distinct entities and explains the differences between them, including differences in their personalities, original numbers, and particular functions, among other things. Only due to their close relationship (anatomically), there are similarities in some of the basic functions as described in the classics and also due to their minuteness. However, even though their functions are different, they appear to be performing identical work [8]. Sushruta has given the following four reasons for isolation of these three structures [9]:

- (1) Vyanjanayatvat (different features). By difference in features siras are of distinct colours like sanguine red, white, blue and red, whereas there is no similar isolation in dhamanis and srotas.
- (2) Mulasanniyamat (commencing point). By commencing point original siras are 40 where as dhamanis and srotas are 24 and 22, independently.
- (3) Karmavisesyat (specific functions). By specific functions sira by their contractility and sluggish

property, force nutrition to the body. Dhamanis carry sensation of sound, vision, taste, smell, etc., while srotas carry air, water, food, rasa, etc.

- (4) Agamcca (scriptural authority). By scriptural authority discourses of Ayurveda have specific sira, dhamani and srotas independently at numerous places. Dhamani and srotas are, therefore, distinct from sira.

The above structures look analogous because of the following reasons [10]:

- (1) Paraspara sannikarshata (collective propinquity). Sira, dhamani and srotas lie very close in the body. Veins and arteries, along with their branches, are set up side by side nearly in all parts of the body.
- (2) Sadhrusyagama (analogous authority). Due to the transport of the rasa, there is no distinct difference between sira, dhamani and srotas. These three names have interchangeable meanings in Ayurveda. Veins and arteries are identical because all these are concave tubes.
- (3) Sadhrusya karma (analogous function). Common function of the three structures are transport of doshas and dhatus. Along with functional similarity, there's also some anatomical similarity. All these three structures are rudiments of akash (ether).
- (4) Sukshamat (minuteness). Due to its minute nature the differentiation/distinction is delicate.

III. ORIGIN OF SIRA

According to sushruta sira appears in the embryonic life from nabhi (umbilicus) and spreads overhead, down and in oblique fashion from nabhi (umbilicus) [11]. Only during embryonic life sushruta's assertion is believed to be true. It is also seen in the foetus that the umbilicus is connected to a number of veins. In the fetal life the siras are concerned with the nutrition of the foetus through the umbilical cord, but after birth these siras do not exist further. Sushruta has labeled them "Nabhiprabhava" because during uterine life, they either begin or finish in the nabhi (umbilicus). Therefore, Sushruta's description regarding the origin of sira seems to be correct [12].

IV. STRUCTURE AND CHARACTERISTIC FEATURES OF SIRAS

According to Sushrut Sharirsthan (chapter 7), there are seven hundred siras all over the body. As a garden or a field is irrigated by the water carrying channels and every part receives nutrition, the siras similarly supply nutrition to the body by their compression and dilatation [13]. The structure of siras is like the fine filaments in the leaf of a tree, thick at their roots and becoming finer towards the end. The sira's branches resemble tendrils; the first branch sprouts another branch, which sprouts yet

another branch, and so on. All of the siras, which are described as "water channels going out to the different areas of a garden or agricultural field", have blood flow [12,14]. The drushant of leaf correlates with the structural aspect of blood vessels very well. Large arteries leave the heart and branch into lower ones that reach out to colorful parts of the body. These divide still further into lower vessels called arterioles that access the body tissues. Within the tissues the venules combine with the arterioles branch into a network of microscopic capillaries. As the blood exchanges materials with the cells, substances pass in and out of the capillary walls. Before leaving the tissues, capillaries unite into venules, which are small veins, forming larger and larger veins that eventually return blood to the heart. This makes arteries more elastic and able of expanding when blood surges through them from the beating heart. Compared to artery walls, vein walls are more malleable. This allows cadaverous muscles to contract against them, squeezing the blood along as it returns to the heart. Blood flows only one way, thanks to one-way valves in the walls of veins. There is only one cell between capillary walls. Among all the blood vessels, only capillaries have walls thin enough to allow the exchange of materials between cells and the blood [15-18].

Veins consist of the following three layers:

- (1) Tunica adventitia. It is the external layer and consists of connective tissue which surrounds, protects and support vessels.
- (2) Tunica media. It is the middle layer and consists of muscular tissue and nerves fibres, which stimulate to contract or relax (stimulation by medulla oblongata).
- (3) Tunica interna. It is the inner layer and is constructed from smooth endothelial cells which facilitate the blood cells. The endothelial cells develop fold known as semilunar valves. These valves are conspicuous bulges in veins, substantially present in larger blood vessels, which help blood to move toward the heart by precluding back flow.

Different siras have characteristic features. Vatavaha siras are aruna (golden) in colour and contain vata within it, pittavaha siras are bluish in colour and warm in touch, kaphavaha siras are cool, sthira and white in colour, whereas rakta vahasiras are rohini (red) in colour and neither too hot nor cold [19].

V. FUNCTIONS OF INDIVIDUAL VARIETIES OF SIRAS [20]

Functions of vatavahasira. By moving via its channels, the vata performs body activities without interference, ensures the normal functioning of the intellect, and demonstrates the other traits unique to it. Different vatic illnesses are brought on by vata vitiation. Because the characteristics and functions of nerves are similar to those described in this description of vatavaha siras, it is possible to classify vatavaha siras as nerves.

Function of pittavahasira. The pitta that circulates through its channels provides the body shine, fosters a love of food, boosts appetite, maintains health, and carries out other pitta-related tasks. Numerous pittik disorders are brought on by pitta vitiation. According to current science, the pittavaha siras' outward characteristics and functional characteristics closely mirror those of veins. All other Ayurveda acharyas have accepted this.

Function of kaphavahasira. Normal kapha circulation provides lubrication to the body's numerous components, joint stability, strength, energy, and all other kapha-assigned duties. The body develops a number of kapha ailments whenever vitiated kapha circulates in its pathways. Kaphavahasira's anatomical and physiological descriptions resemble those of the body's lymphatic pathways. Kaphavahasira can be thought of as lymphatic conduits as a result.

Functions of raktavahasira. The rakta flowing through its channels nourishes and colors the dhatus, produces a distinct touch sensation, and carries out other tasks ascribed to rakta. When vitiated rakta circulates, a number of blood-related conditions are triggered. Atherosclerotic arteries can be regarded as raktavahasira due to their morphological and physiological similarities.

The characteristic features and functions of different siras and their correlation with modern medical sciences are summarized in Table 1.

VI. AVEDHYA AND VEDHYA SIRAS

The school of Sushruta first discussed the precise detailed study of Siravedhya as well as Avedhya siras in the history of medicine and surgery. This school mentioned 98 Avedhya siras and said that any trauma on these structures might cause to morbidity or death [23]. The number of Avedhya siras was also reported by Acharya Vagbhata and Acharya Sushruta. His idea is that, apart from these 98 Avedhya siras, siras which are oblique, short, tortuous and narrow placed in the subject should also be included under this heading [24]. In the Sakhas four hundred veins are present. but there are one hundred and thirty-six veins present in the Koshta, and one hundred sixty-four in the Urdhvajatrugata.

Table 1. Characteristic features and functions of different siras and their correlation with modern medical sciences [21].

Types of sira	Colour	Character	Function	Modern correlation [22]
Vatavaha	Aruna (golden or copper colour)	Filled with vata	Perform various functions of body without any hindrance, the proper functions of buddhi and other functions of vata.	Nerves
Pittavaha	Neela (blue)	Warm in touch	Creates lusture in the body and develops good appetite, maintain health and other function of pitta.	Veins
Kaphavaha	Gaura (white)	Cold in touch	Gives lubrication to various body parts and produces firmness in the joints. It also improves strength.	Lymphatic
Raktavaha	Rohini (red)	Neither too warm nor cold	Nourishes the dhatus, improves the complexion definite perception of sparsha.	Artery

Among the above Siras, sixteen in the extremities, thirty-two in the trunk and fifty above the shoulders are to be considered as Avedhya [25, 26]. The number of Vedhya and Avedhya siras are given Table 2.

A brief summary of Avedhya Sira and its temporary relevance is given in Table 3.

VII. SIRA MARMA

Sira Vigyan is essential to the plot of Marma Vigyan. According to Dalhana, the commentator of Sushruta samhita, Marma is that spot where any injury or trauma causes death [28]. Most of the time, prana lives in marma. There are roughly 107 marmas, and any injury or trauma can result in death. We have a total of 41 sira marma, according to rachna's division. These are: (1) Niladhamani - 4, (2) Matrika - 8, (3) Srngataka - 4, (4) Apanga - 2, (5) Sthapani - 1, (6) Phana - 2, (7) Stanamula - 2, (8) Apalapa - 2, (9) Apastambha - 2, (10) Hridaya - 1, (11) Nabhi - 1, (12) Parsvasandhi - 2, (13) Brhati - 2, (14) Lohitaksha - 4, (15) Urvi - 4. When Marmas are injured the vayu

is increased and encircles the siras, it causes severe pain. Because of this, pain consciousness is gradually lost [29].

VIII. CLINICAL ANATOMY

(1) Sira vedhya is a technique for releasing impure blood by puncturing the vein at specified locations in order to avoid harming the body.

Skin disorders, gout, elephantiasis, swollen joints, burning pain, granthi, vidradhi, cancer, heaviness of the body, conjunctivitis, yakrutpliha roga, herpes, pidaka, and paka are among the conditions for which bloodletting is recommended as a treatment. Bloodletting can be done by Shringa, Jalauka, or Siravyadha in all ailments.

Varicose veins and ulcers (Siraja Granthi). Sushruta, the pioneer of surgery, has taken enough of brains in elaborately describing the disease [30]. As far as the treatment of the disease is concerned, he explains Siravyadhana [31]. In Uttaratantra, Vagbhatta has explained Siravyadhana and Basti for Siraja Granthi [32].

Table 2. Number of Vedhya and Avedhya siras.

Anga Pratyanga	Vedhya Siras	Avedhya Siras	Total
Shakhagata	384	16	400
Koshta	104	32	136
Urdhvajatrugata	114	50	164
Total	602	98	700

Table 3. Different body parts and their Sanskrit names.[21]

Regions/ locations	Numbers	Sanskrit names	cf. ref. [27]
<i>Sakthie /bahu</i> (upper and lower limbs)	8+8	(i) <i>Jaaladhara</i> (ii) <i>Urvi</i> (iii) <i>Lohitaksha</i>	Great sephanous veins, femoral vessels, cephalic veins, brachial vessels, axillary vessels
<i>Shroni</i> (gluteal and inguinal region)	8	(i) <i>Vitapa</i> (groin or inguinal) (ii) <i>Katikataruna</i>	Spermatic vessels Gluteal vessels
<i>Parshva</i> (flanks)	4	-	The lateral side of the body lacks such large arteries and veins.
<i>Prishtha vansha</i>	2	<i>Brihati</i>	Subscapular artery
<i>Udara</i> (around the romaraji's side and above the penis)	4	-	Inferior epigastric vessels
<i>Vaksha</i> (thorax/ chest)	14	(i) <i>Hridaya</i> (ii) <i>Stanamoola</i> (iii) <i>Stanarohita</i> (iv) <i>Apalapa</i>	Intercostal vessels Internal mammary vessels Lateral thoracic vessels
<i>Greeva</i> (neck)	16	(i) <i>Ashta-matrika</i> (ii) <i>Krikatika</i> (iii) <i>Vidhur</i>	External, internal carotid arteries and jugular veins. Occipital vessels Posterior auricular vessels
<i>Hanusandhigata</i> (temporo-mandibular joint)	4	-	Internal maxillary vessels
<i>Jihva</i> (tongue)	4	(i) <i>Rasavaha</i> (ii) <i>Vakvaha</i>	Profunda lingulae vessels
<i>Nasa</i> (nose)	5	<i>Aupnasika</i>	Angular vessels
<i>Talu</i> (palate)	2	<i>Talu sira</i>	Palatine vessels
<i>Netra</i> (eyes)	2	<i>Apanga sira</i>	Zygomatico-temporal vessels
<i>Karna</i> (ears)	2	<i>Shabdavahi sira</i>	Anterior tympanic vessels
<i>Lalata- nasa- netra gata</i> (vessels located in forehead but runs towards the nose and eyes orbit)	5	(I) <i>Keshantanugata sira</i> (hairline) (ii) <i>Aavarta</i> (iii) <i>Sthapani</i>	The nasal branch of frontal vein and branches of superficial temporal arteries. Frontal branch of superficial temporal vein.
<i>Shankha</i> (temporal)	2	<i>Sankhasandhigata sira</i>	Superficial temporal vessels in the temporal region.
<i>Murdha</i> (head)	8	(i) <i>Utkshepa</i> (ii) <i>Seemanta</i> (iii) <i>Adhipati</i>	Parietal branch of superficial temporal vessels. Branches of occipital and superficial temporal vessels.

(2) The median cubital vein is the vein of choice for intravenous injections, for withdrawing blood from donors, and for cardiac catheterization.

(3) Great saphenous vein is used for bypassing the blocked coronary arteries.

(4) Venesection is done on the great saphenous vein as it lies in front of medial malleolus. This vein is used for transfusion of blood/fluids in case of nonavailability or collapse of other vein.

IX. CONCLUSION

So far, we have discussed the concept of sira and uncovered plenty of intriguing facts. Sira is the vein, the way we name it in contemporary science. Sira and vein have numerous parallels, and the Sage Sushruta has gone over them all in detail. Sushruta Samhita, one of the most significant manuscripts of all time, has meticulously chronicled every detail of the Sira Shaarir. Certain siras are known as *avedhya siras*, which are veins that cannot be surgically punctured and hence do not have collateral blood circulation. *Sira marma* is another fascinating topic to explore and comprehend. Integrating a modern twist makes this topic a lot more intriguing.

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