



THE LITERARY STUDY OF SHAKHAGAT AVEDHYA SIRAS

Nitin S. Madavi¹ and Priti R. Desai²

¹AVSPM Ayurved College Buldhana, Maharashtra, India

²Mahatma Gandhi Ayurved college Hospital & Research centre, Salod (H.), Wardha, Maharashtra, India

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ABSTRACT

Background- The 'Sira' term is used collectively for blood vessels (Arteries, Veins, Capillaries, and Lymphatic) which denote the circulatory system. Some *siras* are not suitable for vein puncture. These *siras* are called *Avedhya sira*. A surgeon should not perform venesection on this *siras* which definitely can cause disability or death. The sites are available in classic texts but the exact location and anatomical description not yet described. Therefore, it requires great research work to get a clear concept. **Aim & objectives-** To correlate *Avedhya siras* mentioned by our mentors with modern anatomical structures and review in contemporary science. **Materials and methodology-** Ancient *Ayurvedic* classics were reviewed and compiled references for said subject were critically studied to comprehend the *Avedhya siras* in extremities. **Observations & Results** – Scattered references are available in *Ayurvedic* classics and Modern Anatomy (Surgical & Clinical) texts regarding *Avedhya Sira*. Preliminary knowledge of *Avedhya siras* is very important for Physicians as well as surgeon. The *Avedhya siras* stated in *Ayurveda compendia* can be correlated with blood vessels, vein in Modern Anatomy.

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INTRODUCTION

The term *Sira*, at one place reflects a meaning of blood vessels while at other place, it means nerve. In such condition it is very difficult to know doubtlessly about it [like Modern Anatomy]. 'Sira' is one of such structures with its structural, clinical & surgical significance. The important descriptions about 'Sira' are mentioned by our mentors in *Ayurvedic* classical text like; *Sushruta Samhita*, *Charak Samhita*, *Ashtang Hridaya* and other text books. In *Sushruta Samhita* 4 types of *Sira* – *Aruna Varna* (Crimson), *Neela Varna* (Blue), *Gour Varna* (White) and *Rohini* (Red) which are relevant with *Dosha* – *Vatta*, *Pitta*, *Kapha*, *Rakta*.¹ The term *Sira* stands for channels through which substances or physical forces flow.² *Siras* carries the *Rakta Dhatu* which helps to nourish the body and maintain healthy state.³ Their ramifications are like venations of the leaf. The *siras* begins from the umbilicus from which they spread upwards, downward and obliquely throughout the body.^{1,2,3}

Among the 700 *Siras* in the body as per the classics which are classified on the basis of *Dosha*, *Adhishtana*, *Vedhya* and *Avedhya* which is mentioned in *Sushruta Samhita*, 98 *siras* are *Avedhya*; which are strictly prohibited for puncturing, if by mistake or by stupidity of the *Chikitsak* these are punctured it leads to harmful results.^{1,2,3} There are several examples of disease those are cured by *Sira Vedhan* process like *Grudhrasi* (Sciatica), *Vishvachi* (Eczema), *Unmad* (Insanity or Madness),

Apasmar (Epilepsy or seizure disorders) etc.⁴ According to *Sushruta*, *Marma* is the vital spot in the body where confluence of *Mamsa* (Muscles), *Sira* (Blood Vessels), *Snayu* (Ligaments), *Asthi* (Bones) and *Sandhi* (Joints) present. In these places *prana* resides specially by nature, therefore any trauma on any one of these *Marmas* invariably causes death.^{1,5,6} The *Sira* which are located over the vital points (*Marmas*) are *Avedhya* (contra-indicated for puncture). *Sushruta* has clearly mentioned the *Vedhya siras* especially in connection with the diseases which are cured by *Siravedha*. There are 100 *Siras* in each *Shakha* (Limbs/Extremities) of which 4 *siras* are *Avedhya*, they are; *Jaaladhara-1*, *Urvi-2* and *Lohitaksha-1*. *Jaaladhara siras* are deep blood vessels where as *Urvi* and *Lohitaksha siras* are superficial blood vessels.¹ *Acharya Dalhana* in his commentary on *Lohithaksha* and *Urvi siras*, mentions that these *siras* are similar to the *Lohithaksha* and *Urvi Marmas* and its *Viddha Lakshana* may also be taken as the same.^{5,6} *Lohithaksha* and *Urvi* are *Sira Marmas* and are said to be *Vaikalyakara Marmas*.⁷ The knowledge of *Marma* is said to be half of study of *Shalya Tantra*.⁸ *Acharya Vagbhata* also had the same opinion on the total number of *siras*. He then further explains that those *siras* which are fused together, formed in to lumps, very minute, curved and those located inside the joints should not be *Vedhya*.⁹

Even though the descriptions of these *siras* are available in *Ayurvedic Samhita* the structures which are related to this region, their anatomical description and their surgical

*Corresponding author: Nitin S. Madavi

AVSPM Ayurved College Buldhana, Maharashtra, India

importance need further more explanations. As per our mentors mentioned *Avedhya Siras* not suitable for *Siravedha*, if done so leads to disability or death. *Siravedha* is the half of treatment in *Shalya Tantra*. Therefore *Avedhya siras* are to be taken care of during surgery & clinical procedures.

Aim & Objectives

- To correlate the *Avedhya siras* mentioned by our mentors with modern anatomical structures.
- Review of *Avedhya siras* in contemporary science.
- To study the *Avedhya siras* in extremities with its clinical and surgical significance

METHODOLOGY

All sorts of references has been collected and compiled from various available Ayurvedic classic texts like *Samhita*, available commentaries and text books along with modern science. Research articles from various websites related to *Avedhya siras* (Contra Indicated Vein) were accessed. The collected literature was critically revived and it an attempt was made to correlate the *Shakhagat Avedhya siras* with the structural aspect of the extremities. Based on the correlation, conclusions were drawn.

REVIEW OF LITERATURE

Structure of Sira

According to *Sushruta*, Structure of *Siras* are like the fine fibers in the leaf of a tree, thick at their roots and becoming finer towards the end, the branches of the *Sira* resemble the tendrils, the first branch gives out a branch and this again gives out another branch and so on. The blood flows in all the *Sira* which are “like water channels going out to the different areas of a garden or agricultural field.”^{6,9}

This *drushant* of leaf very well correlates with the structural aspect of blood vessels. Large arteries leave the heart and branch into smaller ones that reach out to various parts of the body. These divide still further into smaller vessels called arterioles that penetrate the body tissues. Within the tissues, the arterioles branch into a network of microscopic capillaries. Substances move in and out of the capillary walls as the blood exchanges materials with the cells. Before leaving the tissues, capillaries unite into venules, which are small veins. The venules merge to form larger and larger veins that eventually return blood to the heart. The walls of arteries, veins, and capillaries differ in structure. In all three, the vessel wall surrounds a hollow center through which the blood flows. The walls of both arteries and veins are composed of three coats, but they differ in thickness. The inner and middle coats of arteries are thicker than those of veins. This makes arteries more elastic and capable of expanding when blood surges through them from the beating heart. The walls of veins are more flexible than artery walls. This allows skeletal muscles to contract against them, squeezing the blood along as it returns to the heart. One-way valves in the walls of veins keep blood flowing in one direction. The walls of capillaries are only one cell thick. Of all the blood vessels, only capillaries have walls thin enough to allow the exchange of materials between cells and the blood.^{10,11,12,13}

Avedhya siras

Some *siras* are not suitable for venepuncture. These *siras* are called *Avedhya Sira*. If a surgeon performs *Vedhya Karma* on there *siras*, it would definitely cause disability or death. Any

venesection which is direct cause of severe blood loss or falling of blood pressure can cause death. To avoid these miss happenings our mentors had mentioned these ninety eight restricted veins for the venesection at particular sites. Rest of the veins can be a choice for the *vedhya karma* in certain diseases.^{1,9}

There are 16 *Avedhya siras* present in the *Shakhas* (Extremities), 32 in the *Koshtang* (Viscera), & 50 in the *Urdhvyatrugat* region (Head & Neck).^{1,9}

Amongst the 16 *Avedhya siras* of the extremities named as 1 *Jaldhara*, 2 *Urvi* and 1 *Lohitaksha* in each both extremities (Upper & Lower).

Jaal

Network of each muscles, blood vessels, ligaments, and bones are four, they are situated in wrists & ankles bound & mixed together with holes by which the entire bony is falling net like holes.¹⁴

Modern science: - There are no specific guidelines for *Avedhya siras* (contra indicated veins). All veins can be considered for puncturing as per necessity & emergency.

Structure of Vein

Venous return to the extremity is provided by two sets of veins namely the superficial and the deep veins. The main superficial veins are superficial to the deep fascia and are often located at or below the investing layer of superficial fascia in the subcutaneous tissue. Deep veins are situated deep to the deep fascia and often accompany the artery and the nerves supplying the limb forming a neurovascular bundle.^{10,11}

Venous blood flow is a passive flow (not supported by a smooth muscle pump such as the heart). The direction of the flow is maintained by the valves within the vein which prevents flow reversal. The valves found near the entry of a tributary. Venous channels are smaller, return blood from different tissue of body. The wall of vessels is thin and transparent, it carries of elastics fibers (hence its property of contraction & dilation).¹¹

Veins consist of three layers

1. Tunica adventitia- outer layer & consist of connective tissue which surrounds, protected & support vessels.
2. Tunica media –middle layer & consist of muscular tissue & nerves fibres which stimulate to contract or relax. (Stimulation by medulla oblongata)
3. Tunica intima- inner layer & constructed of smooth endothelial cells which facilitates the blood cells etc. endothelial cells develops fold known as semilunar valves. These valves noticeable bulges in veins, mostly present in larger blood vessels & which purpose of blood move toward heart by preventing back flow.^{11,12,13}

Venesection - Indications, location and causes¹⁵

Indications

1. Thrombosed veins – these feel hard and cord.
2. Tortuous, sclerosed, fibrosed, inflamed, fragile veins

Location

1. Veins that cross over joints, bony prominences and those with little.

Causes

1. Medications – (e.g.-anticoagulants, steroids, thrombocytopenia)
2. Injury, disease or treatment may prevent the use of a limb (e.g. amputation, fracture, cerebrovascular accident).
3. Surgery on one side of the body, for example, mastectomy and axillary node dissection, as this can lead to impairment of lymphatic drainage.
4. Hematological factors decreased level of Hb% (Hemoglobin) and PLC (Plate Late Counts)

DISCUSSION

Profound knowledge of any science is obtained by critical review, observations and researches in the field. *Avedhya Siras* is the functional complex part of our body. It is need of hour to highlight every aspect related to *Avedhya Siras* in our science.

Jaaldhara in upper extremities is considered as cephalic vein & in lower extremities can be considered as great saphenous vein. In the view of Cephalic vein there is chance of accidental arterial puncture, as this vein crosses the brachial artery. It is also in close proximity to the radial nerve. These both veins are contra indicated and drains.¹⁶ Due to *Siravedha* these can be severe blood loss, which leads to death or deformities, harmful effect. In *Marma Sharir* there are 41 *Sira Marma* considered out of which 2 *Urvi* & 4 *Lohitaksha* belong to that category. *Urvi* is considered as brachial vein in upper extremities & femoral vein in lower extremities, which can cause severe blood loss by puncturing them. *Lohitaksha* is considered as axillary vein in upper extremities & profunda femoris vessels in lower extremities. In *Sushruta Samhita* it is considered as “*Lohitakshyem Marnam*”.^{1, 5, 6, 9, 17, 18} Weinstein, *et al* (2007), stated that Venepuncture of veins in the lower limbs is associated with a higher risk of complications due to the increased presence of valves and the fact that, comparatively, the blood flow in the lower limb is diminished.¹⁹

Table 1 showing *Avedhya siras* which should not be punctured

Regions/ locations	Numbers	Sanskrit names	According to Dr. B. G. Ghanekar (Sushruta Sharirasthanam commentary) modern Science correlation of <i>Avedhya Siras</i> (16)
<i>Sakthies / Bahu</i> (upper and lower Extremities)	8+8	(a) <i>Jaaladhara</i> -1 (b) <i>Urvi</i> -2 (c) <i>Lohitaksha</i> -1	Great sephanous veins, femoral vessels, cephalic veins, brachial vessels, axillary vessels

The main symptoms of *Marma* injuries are bleeding and unconsciousness. In this context *Sushruta* said that – “there are four types of *siras* in the body.”¹⁷ They generally lie in the site of *Marmas* and supply nutrition to *Snayu* (Ligaments), *Asthi* (Bones), *Mans* (Muscles), and thus maintain the body.¹⁸ When *Marmas* are injured the *vayu* is increased and encircles the *siras*, it causes severe pain. Because of this, pain consciousness is gradually lost”. Here *Sira* is the structure that gives nutrition to the body and maintains the body. Same point is noted in Modern science every structure in the body receives blood supply for nutrition & nerve supply for motor and sensory functions. Every structure is supplied by neurovascular bundle; it contains artery, vein & nerve. In *Sira Marma* concept all these structures are considered under the term of *Sira*.¹⁸

B.M.N. Kumar *et al*- (2013) stated that *Sushruta* considered the 4 types of *siras* that is *Vata*, *Pita*, *Kapha* and *Raktha* where as *Vatavaha siras* seeing the colour *Aruna Varna* (Crimson Red) and character filled with *vayu* (pulsation) denotes that in Modern Anatomy these two are characters of artery. In *Pittavaha siras* seeing the colour *Neela Varna* (Blue), it suggests that in Modern science veins are blue in colour because these carry deoxygenated blood. In *Kaphavaha siras* seeing the colour *Gowra Varna* (White), it suggests that in Modern science lymphatics are white in colour because these carrying clear fluid lymph. In *Rakthavaha siras* seeing the colour *Rohini* (Red) and function nourishes the *Dhatus*, it suggests that in Modern science capillaries are red in colour and exchange the nutrients in tissue level.¹⁸

The dilating vein causes stretching of the valve base precipitating valve dysfunction. These stretched valves are less mobile and produce intra luminal flow obstruction. Due to the high flow and shear stress, they also develop inflammatory changes (thickening often referred to as myxoid degeneration by pathologists) which in turn can lead to fibrosis and eventually the development of stenosis of the vein wall.²⁰ A combination of altered flow, increased pressure and inflammation; all triggered by intra luminal obstruction caused by a dysfunctional valve, results in a plethora of problems including neo-intimal hyperplasia. Such stenosis can increase the pressure within the needle access segment (pressure is a function of volume flow and diameter of the stenotic outflow).²¹ The vascular access surgeons routinely destroy any valves they come across in the operative field. This produces stasis of blood in some of the tributaries resulting in thrombosis and eventual scarring down the tributaries. The inflammatory response from thrombosis could result in variable amounts of structural alteration in the main out flowing veins. Valves open in the direction of the flow; valves have to be incompetent for a tributary to act as an outflow. Similarly, any valve in a vein branch has to be rendered incompetent to obtain a reversal of blood flow direction. Due to the development of a “swing point stenosis”, could result in the obliteration of the deep venous outflow to the extremity. This places the limb at a higher risk for venous hypertension with any other kind of peripheral access, thus limiting the further access options. Dorsal venous plexus *Vedhan* (punctured) leads to direct cause of severe blood loss or falling of blood pressure can cause death or deformity.^{22, 23, 24}

CONCLUSION

Avedhya siras is emphasized as a preventive measure as well as therapeutics for several disorders. *Avedhya siras* and *Marmas* are not same in extremities, but they are anatomically closely related. *Sira* are one of the important components of *Marma*, according to definition of *Marma*. *Avedhya siras* are the anatomical structures which are either deep vessels or superficial vessels which can be led to a harmful affect if undergoes *Siravedhan*. Therefore it is essential for the surgeons and physician to follow the guidelines & avoid *Siravedhaya* of these 16 *Avedhya siras* in extremities

References

1. Ghanekar Bhaskar Govind, *Susruta*; *Susruta Samhita*; *Sharirasthanam*, Reprint 2012, Meharchand Lachhmanda, Adhyay 7. Shloka no. 18- 21, Page .no-210 and 213,

2. Sharma P.V. Charak Samhita; Sutrashtanam. Chaukhambh. Reprint 2011. Adhyay 30. Shloka no. 12. Page. No. 237.
3. Murthy Shrikantha, K.R. Astang Samgraha of Vagbhata. Edi. 2007. Chaukhambha. Reprint: 2010. Adhyay 6. Shloka. No. 3, 4 & 6. Page. No.76 -77
4. Ibidem 1. Adhyay 8. Shloka. No.10, 29, page no. 218, 223
5. Acharya Jadvji Trikamji. Susrutha Samhitha with Nibandha sangraha commentary of Dalhanacharya, edited by. Varanasi: Chaukhambha, Reprint: 2010; Page no. 375-378 824.
6. D.G.Thatte, Sushruta Samhita text with English translation, IInd edition, Varanasi, Chaukhambha Orientalia Publisher, 2007, Volume-III: 140 p.
7. Mishra. J.N, Marma and Its Management, Varanasi, Chaukhambha publisher, 2005; Page. No. 38, 63, 81,106.
8. Ibidem 1. Sharirshthanam. Adhyay 6. Shloka no. 44. Page. No.202.
9. Kunte Anna Moreshwara & Shastri Navre Krishna Ramachandra. Ashtanga Hridayam with the commentaries Sarvangasundara of Arunadatta and ayurveda Rasayana of Hemadri annotated Varanasi: Chaukhambha Surbharati. Reprint: 2007. Shloka. No.20-22, 33-34. Page no- 391, 956.
10. Chaurasia B.D., Handbook of General Anatomy, 3rd edition, New Delhi, CBS Publishers, 2000, Page no 81.
11. Henery Gray. Gray's anatomy, 40 edition, Elsevier churchil living stone, 2002; Page. No., 700,703, 942, 1451, 1518.
12. Singh Vishram, Clinical & surgical anatomy. 2nd Edi. London, Elsevier publications; Page no.83
13. Das. S, A manual on clinical surgery. Edit 3rd. Standring Susan. 2009; Page no.23.
14. Ibidem 1. Sharirshthanam. Adhyay 5. Shloka no. 11. Page. No.153.
15. Judy C. Arbiqie BHSC, ART (CSMLS), MLT (CSMLS), and CLS (NCA) Halifax, NS-venipuncture: part 3 vein assessments and selection version date January 2008.
16. Cunninham D.J. Cunningham's Manual of Practical Anatomy Volume-1, edited by C.J.Romanes 15th edition. New York: Oxford University Press 1999. Churchill Livingstone, 40th edition, 2008; Page no 775-906.
17. Sharma Ashok Kumar *et al*, Review on Contra-Indicated Veins for Vein Puncture (Avedhya Sira) in Ayurveda, *Jour. of Ayurveda & Holistic Medicine*, Volume-I, 2014.
18. Kumar BMN, Awasthi HH *et al*, Anatomical considerations on Sira in Ayurveda with special reference to Sushruta Samhita, *International Journal of Ayurvedic Medicine*, 2013, 4(4), 320-327- 320.
19. Weinstein S *et al*, Plumer's Principles and Practice of Intravenous Therapy. 8th edition., Philadelphia: JB Lippincott; 2007.
20. Johnson D, Collins P, Healy JC *et al*. In: Standring S, 5th edition, Gray's anatomic basis for clinical practice. Elsevier Moore KL. Upper limb. In: Moore KL, Dalley AF, eds. clinically oriented anatomy. Lippincott, Williams & Wilkins, 5th, edition, 2006; Page no 726-884.
21. Pansky B. Upper extremity. In: Pansky B, ed. Review of gross anatomy. McGraw Hill, 6th edition 1996; Page no 231-324.
22. Shenoy S, Middleton WD, Windus D, *et al*. Brachial artery flow measurement as an indicator of forearm native fistula maturation. In: Mitchell L Henry, ed. Vascular Access for Hemodialysis VII. W.L. Gore and Associates, Precept Press, 2001; pp 233-239.
23. Surendra Shenoy, Washington University School of Medicine, Barnes Jewish Hospital, St. Louis, MO – USA, Surgical anatomy of upper arm: what is needed for AVF planning, *The Journal of Vascular Access* 2009; 10: 223-232 © 2009 Wichtig Editore.
24. Loukas M, Myers C.S, *et al*; The clinical anatomy of the cephalic vein in the deltopectoral triangle, *Folia Morphol*, Vol. 67, No. 1, P. 72–77, ISSN 0015–5659.

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