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A literary study of avedhya sira W.S.R to urdhvajatrugata avedhya sira

Deepika Uniyal [1,*], Govind Malik [1] and Dipali P Nijwante [2]

[1] *Department of Rachana Sharir, Shivalik Institute of Ayurveda and Research, Dehradun, India.*
[2] *Department of Rachana Sharir, Jupiter Ayurved Medical College, Nagpur, India.*

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Abstract

The concept of Avedhya Sira, as delineated in classical Ayurvedic texts, represents a significant aspect of Ayurvedic anatomy, emphasizing non-puncturable vessels crucial for the sustenance of life. Among these, the Urdhvajatrugata Avedhya Sira, located in the head and neck region, plays a vital role in safeguarding sensory and motor functions, alongside the protection of Marma points. These structures correlate closely with modern anatomical entities such as carotid arteries, jugular veins, and cranial nerves. This literary study delves into the ancient descriptions of Urdhvajatrugata Avedhya Sira, drawing correlations with contemporary anatomical structures to underline their clinical relevance. The study explores the Ayurvedic classification of Sira, their physiological functions, and their embryological origins, establishing their importance in preventing injury that could lead to irreversible consequences such as sensory loss or neurological deficits. Integrating classical wisdom with modern science, this research contributes to a holistic understanding of head and neck anatomy and informs safer medical and surgical practices.

Keywords: Avedhya Sira; Urdhvajatrugata; Marma; Ayurvedic anatomy

1. Introduction

Ayurveda's profound understanding of human anatomy is exemplified by Acharya Sushruta's detailed descriptions of *Sira*.[1] These conduits, responsible for transporting *Rakta* (blood), *Vata* (air), and other fluids, are classified into 700 types based on their functional and anatomical significance. Of these, 98 are *Avedhya* (non-puncturable) due to their critical role in sustaining life.[2] The *Urdhvajatrugata Avedhya Sira*, located in the head and neck, are particularly significant as they protect sensory and motor functions along with vital *Marma* points.[3]

The concept of *Avedhya Sira* highlights Ayurveda's preventive approach, identifying structures where injury could lead to severe complications like sensory loss, neurological deficits, or fatal outcomes.[4] These *Sira* safeguard vital organs like the eyes, ears, and tongue, essential for functional integrity.

Acharya Sushruta's detailed descriptions of *Avedhya Sira*, linked with *Marma* points, align closely with modern anatomy, correlating with structures like the carotid arteries, jugular veins, and cranial nerves. This congruence bridges traditional wisdom with contemporary science, validating Ayurvedic principles in modern clinical and surgical practices.[5]

This study explores the literary aspects of *Urdhvajatrugata Avedhya Sira* in classical texts, correlates them with modern anatomy, and emphasizes their clinical relevance. By integrating these perspectives, it contributes to holistic management of head and neck disorders, ensuring precision and safety in medical and surgical interventions.

* Corresponding author: Deepika Uniyal

Aim and objectives

- To explore the concept of Urdhvajatrugata Avedhya Sira as described in Brihattrayi.
- To correlate these Sira with their underlying anatomical structures.
- To establish their clinical relevance in light of modern anatomical insights.

2. Materials and Methods

A literature review of Ayurvedic classics and modern anatomical texts were referenced to establish correlations. Key terminologies were critically analyzed to bridge traditional and contemporary understandings. Specific methodologies included cross-referencing classical descriptions with modern anatomical data and reviewing physiological functions described in Ayurveda.

3. Result

3.1. Historical Context and Evolution

References to Sira in Vedic literature, such as Atharvaveda, highlight their foundational role in early medical practices. The evolution of Sira's understanding in classical Ayurvedic texts underscores the progression of anatomical and physiological insights.

3.2. Sira Explained in Different Samhita

3.2.1. Charak Samhita

- In Vimanasthana (5th Chapter): Charak mentions multiple synonyms for Sira and defines it as the passage through which blood or fluids flow from one place to another in the body.[6]
- Process of "ShanantaraGamana" or "Sarana": Charak describes this as the movement of blood, which he associates with the term Sarnat Sira in Sutrasthana, referring to the flowing of blood in the blood vessels.[7]
- Function of Sira: Charak focuses on the circulatory function of Sira, which allows the movement of vital substances like blood throughout the body.

3.2.2. Sushruta Samhita

- Human Anatomy and Surgery: Sushruta's perspective on Sira is rooted in his comprehensive understanding of human anatomy and surgical practices. He emphasizes that the study of anatomy is essential for performing surgery, and this requires an in-depth understanding of structures like Sira (blood vessels).
- Origin of Sira: Sushruta mentions that the Nabhi (navel) is the origin of Sira, from where it extends throughout the body.[8]
- Characteristics of Sira: According to Sushruta, Sira are naturally unstable and may modify their location in the body.

3.2.3. Types of Sira

- Puncturable Sira: Sushruta categorizes Sira into puncturable and Avedhya Sira (non-puncturable). He lists 700 Sira in total, with 602 being puncturable and 98 being non-puncturable.[2]
- Role of Sira: Sushruta explains the nutritional role of Sira, emphasizing their dilatory and contractile properties, which nourish tissues in the body. The analogy of water channels nourishing a garden is used to describe the function of Sira.[9]

3.2.4. Acharya Vagbhata:

- While Vagbhata does not provide extensive individual commentary on Sira, his works also emphasize the importance of Sira in the circulatory system and its essential role in the overall function of the body. He refers to Sira in the context of treating diseases and maintaining balance of the Doshas.[10]

3.2.5. Commentators and Other Scholars (Chakrapani, Dr. Ghanekar):

- Cakrapani: As a commentator on Charak, Cakrapani elaborates on the term "Sarna", which Charak uses to refer to the flowing of blood in blood vessels. He refers to Sira as channels through which blood and other fluids circulate.[8]

- Dr. Ghanekar: In his interpretation of the Sharirasthana (the anatomical section of Sushruta Samhita), Dr. Ghanekar acknowledges that the Sira anatomy is complex and difficult to interpret. He emphasizes the importance of understanding Sira's structure and puncturing techniques for therapeutic purposes.

3.3. Definition of Sira

Sira are described in Ayurveda as tubular structures that serve as conduits for the flow of various bodily elements, including Rakta (blood), Vata (air), and other essential fluids.[11] Sushruta's definition emphasizes their anatomical and functional importance, whereas Charaka highlights their physiological roles in transporting and nourishing Dhatus.

3.4. Classification of Sira

Sushruta Samhita categorizes Sira into four types based on the predominant Dosha they transport[12]:

Table 1 Showing Classification of Sira

Vatavaha Sira	Responsible for the movement and expansion of bodily elements.
Pittavaha Sira	Contributing to digestion, metabolism, and complexion.
Kaphavaha Sira	Enhancing structural integrity and lubrication.
Raktavaha Sira	Facilitating the nourishment and oxygenation of tissues.

Among the 700 Sira described, 98 are classified as Avedhya. These are further divided regionally as[3]:

- Extremities: 16
- Trunk (Koshtha): 32
- Urdhvajatrugata (Head and Neck): 50

3.5. Embryological Origin

Classical Ayurvedic texts describe the origin of Sira from the Nabhi (umbilicus) during fetal development, extending throughout the body to ensure nourishment and systemic integrity. This embryological perspective aligns with modern anatomical observations of vascular development originating from central structures.[13]

3.6. Pathological Implications

Injury to Avedhya Sira is associated with severe outcomes. Classical texts describe[14]:

- Vaikalyata (Disability): Manifesting as loss of sensory or motor functions.
- Marana (Death): Resulting from catastrophic vascular or neurological damage.
- Disease Susceptibility: Impairments in Sira contribute to disorders such as Siragata Vata and Raktapitta.

3.7. Modern Correlation Of Sira[15]

Table 2 Showing Modern Correlation Of Sira

Structure	Ayurvedic Reference	Modern Correlation
Carotid Arteries and Jugular Veins	Manyamarma and Greevagata Sira are described as critical due to their association with life-sustaining functions.	The carotid arteries supply oxygenated blood to the brain, while the jugular veins facilitate venous return. Injury can cause cerebral ischemia or hemorrhage.
Cranial Nerves	Sira related to Netra (eyes), Karna (ears), and Jihva (tongue) are mentioned in the context of sensory and motor functions.	Cranial nerves (e.g., optic, auditory, hypoglossal) serve similar functions. Damage causes sensory or motor impairments, paralleling Ayurvedic descriptions.
Venous Sinuses	Shringataka Marma, encompassing cranial sinuses, is considered fatal if injured due to its pivotal role in venous drainage.	The venous sinuses of the brain are essential for intracranial pressure regulation. Injury can cause severe neurological outcomes, validating ancient emphasis.

Lingual Vessels	Rasavaha and Vagvaha Sira, associated with taste and speech, are considered Avedhya.	The lingual arteries and veins supply blood to the tongue, facilitating speech and taste. Injury impairs these functions, as noted in Ayurveda.
Nasal and Palatine Vessels	Nasa and Mridu Talu Sira are identified as critical for olfactory and respiratory health.	The nasal and palatine vessels support mucosal and respiratory functions. Injury can result in epistaxis or nasal dysfunction.
Temporal and Occipital Arteries	Shankha and Murdhagata Sira ensure blood supply to vital regions of the head and scalp.	The superficial temporal and occipital arteries vascularize these regions. Injury aligns with Ayurvedic concerns of systemic and localized effects.

3.8. Urdhvajatrugata Avedhya Sira and their anatomical correlations[16]

The detailed findings of Urdhvajatrugata Avedhya Sira and their anatomical correlations are presented in the table below:

Table 3 Showing Urdhvajatrugata Avedhya Sira and their anatomical correlations

Region	Number of Avedhya Sira	Description	Anatomical Correlation
Greeva (Neck)	16	Includes Marmasangyaka, Krikatika, and Vidhura Sira.	Carotid arteries, jugular veins. Injury causes dumbness, voice abnormalities.
Hanu (Mandibular)	4	Associated with mandibular vasculature.	Mandibular arteries and veins. Critical for jaw function preservation.
Jihva (Tongue)	4	Includes Rasavaha and Vagvaha Sira.	Lingual arteries and veins. Responsible for taste and speech.
Nasa (Nose)	5	Includes Mridu Talu Sira.	Nasal and palatine vessels. Influence olfactory functions and breathing.
Netra (Eyes)	2	Associated with zygomatico-temporal vessels.	Related to visual function and blood supply to the eye region.
Karna (Ears)	2	Shabda Vahini Sira linked to auricular vasculature.	Auricular arteries and veins. Important for auditory functions.
Lalata (Forehead)	7	Includes Keshantanugata, Avarta, and Sthapani Sira.	Frontal and supraorbital vessels. Sensory and circulatory functions.
Shankha (Temporal)	2	Sira near the superficial temporal artery.	Superficial temporal vessels.
Murdha (Head)	8	Includes Utkshepa, Simanta, and Adhipati Sira.	Parietal and occipital vascular network. Injury leads to severe outcomes.

3.9. Avedhya Sira present in head and neck region[17]

The detailed findings of Avedhya Sira present in head and neck region are presented in the table below:

Table 4 Showing Avedhya Sira present in head and neck region

S.No	Region	No	Avedhya Sira
1	Greeva	16	Marmasangyaka Sira (12), Krikatika (2), Vidhura (2)
2	Hanu	4	Sandhigata Sira of both side (2*2=4)
3	Jihwa	4	Rasavaha Sira (2), Vagvaha (2)
4	Nasa	5	Nasasameep Sira (4), Mridutalu Sira (1)

5	Netra	2	ApangaSira (2)
6	Karna	2	Shabdavahini Sira (2)
7	Lalata	7	Keshantanugata (4), AvartaSira (2), Sthapani Sira(1)
8	Shankha	2	Shankasandigata Sira(2)
9	Shira	8	Utkshepamarma Sira (2), Simanta Sira (5), Adhipati Sira (1)
Total		50	

3.10. Location of Avedhya Sira according to Astanga Samgraha and Ashtanga Hridaya[10]

The detailed findings of Location of Avedhya Sira according to Astanga Samgraha and Ashtanga Hridaya are presented in the table below:

Table 5 Showing Location of Avedhya Sira according to Astanga Samgraha and Ashtanga Hridaya

S.No	Location	No. of Sira	No. of Avedhya Sira	Description
1	Uras	40	14	2 in Hridaya, 2 in Sthanamoola and 2 in Sthanarohita, 1 in Apalapa and 1 in Apastambha
2	Greeva	24	16	2 Neela, 2 Manya, 2 Krukatika and 2 Vidhura, 8 Matruka
3	Hanu	16	2	1 which bind the joint on each side
4	Jihwa	16	4	2 for speech, 2 for taste sense
5	Nasa	24	3	1 in palate, 2 for smell perception
6	Netra	56	6	2 each for closing and opening of eyelids, 2 in Apanga
7	Lalata	60	7	1 in Sthapani, 2 in Avarta and 4 in Keshanta
8	Srotra	16	2	2 for Shabda
9	Sankha	16	2	2 in Sankhasandhi
10	Moordha	12	8	2 in Utkshepa, 1 in Adhipati, 5 in Seemanta

4. Discussion

The description of Sira exemplifies a profound understanding of human anatomy, highlighting their critical role in preserving sensory and motor functions while protecting vital Marma points. Acharya Sushruta's division of the body into three segments, with the third designated as Shira, demonstrates the anatomical precision inherent in Ayurveda. Dalhana further refines this perspective, defining Shira as the head, while Acharya Charaka extends the definition to include the neck (Shiro-Greeva), emphasizing its role as the Uttamanga—the supreme region housing sensory organs (Sarvaendriya) and Prana (vital essence).

The classification of 98 Avedhya Sira as non-puncturable structures underscores Ayurveda's preventive approach, with Urdhvajatrugata Avedhya Sira (50 in number) safeguarding critical structures of the head and neck region. The categorization of Sira into Vatavaha, Pittavaha, Kaphavaha, and Raktavaha reflects their functional integration with the Doshas, contributing to systemic balance and physiological harmony.

The anatomical correlation of Urdhvajatrugata Avedhya Sira with modern entities such as the carotid arteries, jugular veins, cranial nerves, and venous sinuses validates the precision of Ayurvedic descriptions. For instance, Shringataka Marma corresponds to cranial venous sinuses, while Rasavaha and Vagvaha Sira align with the lingual arteries and veins. Classical texts provide detailed regional anatomies of Sira, encompassing locations, associated structures, and their physiological functions, emphasizing their relevance to clinical and surgical practices.

Acharya Sushruta's pioneering methods of cadaveric dissection and the classification of Sira into regional anatomies, including Greeva, Hanu, and Jihwa, reflect an unparalleled depth of knowledge. These insights, harmonized with

consistent descriptions from Acharyas like Vagbhata, bridge classical Ayurvedic principles with modern anatomical understanding. Ayurveda's integrative approach, prioritizing the identification and protection of critical anatomical structures, continues to provide a foundational framework for precision and safety in contemporary medical and surgical practices.

5. Conclusion

This study highlights the anatomical precision of Ayurveda through Urdhvajatrugata Avedhya Sira, aligning classical descriptions with modern anatomy, such as the carotid arteries and cranial nerves. The functional categorization of Sira underscores Ayurveda's holistic understanding of structure and physiology, validating its relevance in modern clinical and surgical contexts.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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