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AN ANALYTICAL REVIEW OF *AVEDHYA SIRA* OF *URDHWASHAKHA* IN THE CONTEXT OF “*VAIKALYAM MARANAM CHA API*”

*Dr. Mukesh Chand¹, Dr. Pankaj Singh², Dr. Akansha Bhatt³, Dr. Sandeep Singh Rawat⁴

¹1st Year, P.G. Scholar, P.G. Department of Rachana Sharir, Himalayiya Ayurvedic Medical
College And Hospital Dehradun, Uttarakhand

²Guide and Assistant Professor, P.G. Department of Rachana Sharir, Himalayiya
Ayurvedic Medical College And Hospital Dehradun, Uttarakhand

³Co-Guide and Associate Professor, P.G. Department of Rachana Sharir, Himalayiya
Ayurvedic medical College & hospital Dehradun,

⁴1st Year, P.G. Scholar, P.G. Department of Rachana Sharir, Himalayiya Ayurvedic Medical
College And Hospital Dehradun, Uttarakhand

*Corresponding Author's Email id - mukeshramola56035@gmail.com

ABSTRACT

Background: In *Ayurveda*, the concept of *Avedhya Sira* (non-puncturable veins) is of paramount clinical significance. Among these, the *Avedhya Siras* located in the *Urdhwashakha* (upper extremity) are especially emphasized due to their association with life-threatening consequences like *Vaikalyam* (disability) and *Maranam* (death). Ancient texts have cautioned strongly against their injury during procedures like *Siravyadha* (venesection). This review explores the anatomical, physiological, and clinical dimensions of *Avedhya Siras* of *Urdhwashakha*, with modern anatomical correlations. **Aim & Objectives:** To analytically review the concept of *Avedhya Sira* in *Urdhwashakha* and evaluate its clinical significance in the context of *Vaikalyam* and *Maranam*, with correlation to modern anatomical structures. **Materials and Methods:** A comprehensive textual review of *Sushruta Samhita*, *Charaka Samhita*, *Ashtanga Hridaya*, and respective commentaries was carried out. Modern anatomical texts and clinical studies were also reviewed. Correlative analysis was employed to match classical descriptions with present-day vascular and neural structures.

Results and Observations: *Sushruta* described 16 *Avedhya Siras* in the upper limbs—10 in the hands and 6 in the arms. These are primarily associated with vital vascular and neural structures such as the brachial artery, median nerve, and deep palmar arches. Injury to these structures can result in paralysis, hemorrhage, or death. Modern anatomical correlations reinforce the classical avoidance of invasive procedures in these regions. **Conclusion:** The concept of *Avedhya Sira* in *Urdhwashakha* illustrates the surgical precision and anatomical insight of ancient *Ayurvedic* scholars. Correlation with modern anatomy affirms the clinical caution advised in ancient texts and highlights the need for integration of classical anatomical knowledge in modern surgical and procedural practices.

Keywords: *Avedhya Sira, Urdhwashakha, Vaikalyam, Maranam, Siravyadha, Sushruta Samhita*

INTRODUCTION

In *Ayurveda*, the structural and functional channels of the human body are systematically classified as *Sira*, *Dhamani*, *Snayu*, *Asthi*, and *Sandhi*. Among these, *Sira* plays a vital role in the transportation of *Rakta*, *Pitta*, and other bodily substances.¹ *Acharya Sushruta* emphasized the significance of *Siras* in maintaining the functional integrity of the body and devoted an entire section to their classification, number, and surgical relevance. Their proper functioning is essential for nourishment and homeostasis, which makes their understanding crucial in both diagnostic and therapeutic contexts.²

Sushruta, in his surgical treatise, has distinctly categorized certain *Siras* as *Avedhya*—meaning they must not be punctured or incised. These *Siras* are considered critical due to their proximity to vital structures, and any injury to them can result in severe consequences like *Vaikalyam* (disability) or *Maranam* (death). He has identified 98 *Avedhya Siras* in the body, dividing them systematically among the *Urdhvashakha* (upper extremities), *Adhahshakha* (lower extremities), *Koshtha* (trunk), and *Shira* (head and neck).³

Within the upper extremity or *Urdhvashakha*, there are 16 *Avedhya Siras*—10 located in the hands and 6 in the arms. These *Siras* are closely associated with vital arteries, veins, and nerves such as the brachial artery, radial and ulnar arteries, and the median and radial nerves. Injury to these structures can lead to profuse bleeding, neuromuscular damage, or even death. Thus, these anatomical zones were rightfully marked as non-puncturable in classical surgical texts to ensure patient safety.⁴

The classical warnings associated with *Avedhya Siras* are not merely theoretical but are grounded in clinical logic and surgical prudence. During procedures like *Siravyadha* (therapeutic bloodletting), *Bhedana* (incision), or *Vedhana* (puncture), one must avoid these regions to prevent iatrogenic complications. The precision with which Sushruta outlined these contraindications reveals an advanced understanding of human anatomy and surgical ethics, aligning closely with principles still followed in modern operative techniques.⁵

Despite the descriptive clarity in Ayurvedic texts, direct correlation of *Avedhya Siras* with modern anatomical nomenclature remains a challenge. The advancement of medical imaging and vascular studies has opened avenues to reassess classical descriptions and map them onto recognized neurovascular structures. Such analytical comparisons not only validate ancient insights but also provide a deeper understanding of the clinical rationale behind avoiding certain anatomical regions during interventions.⁶

In this context, the present study aims to undertake an analytical review of the *Avedhya Siras* of *Urdhvasakha*, with particular reference to their potential to cause *Vaikalyam* or *Maranam* upon injury. It also intends to explore their anatomical, physiological, and clinical relevance by comparing classical data with modern anatomical evidence. This integrated approach is essential to reinforce surgical safety, refine procedural guidelines, and promote the scientific interpretation of Ayurvedic surgical wisdom.⁷

AIM AND OBJECTIVES

AIM & OBJECTIVES:

To analytically review the concept of *Avedhya Sira* in *Urdhvasakha* and evaluate its clinical significance in the context of *Vaikalyam* and *Maranam*, with correlation to modern anatomical structures.

MATERIAL AND METHOD

The present study was conducted as a textual analytical review based on classical Ayurvedic literature and modern anatomical references. Primary sources included *Sushruta Samhita*, *Charaka Samhita*, and *Ashtanga Hridaya*, along with authoritative commentaries such as *Nibandhasangraha* and *Ayurvedadipika*. Specific references related to *Avedhya Sira* of *Urdhvasakha* were identified, compiled, and critically interpreted. Secondary data from modern anatomical texts and peer-reviewed journals were used to correlate classical

descriptions with contemporary vascular and neural anatomy. The data were synthesized and analyzed to explore clinical implications, with special emphasis on the outcomes of *Vaikalyam* and *Maranam* due to injury of these vital *Siras*.⁸

CONCEPTUAL STDUY

In Ayurvedic surgical science (*Shalya Tantra*), the concept of *Avedhya Sira* reflects deep anatomical insight combined with clinical caution. The term *Avedhya* means “not to be punctured or incised,” and *Sira* refers to the tubular structures that carry *Rakta*, *Pitta*, and other life-supporting elements. *Acharya Sushruta* describes a total of 700 *Siras* in the body, of which 98 are classified as *Avedhya*. These are distributed regionally across *Shira* (head and neck), *Koshtha* (trunk), *Urdhwashakha* (upper limbs), and *Adhahshakha* (lower limbs). The *Urdhwashakha* is of special clinical concern because of its use in therapeutic procedures like *Siravyadha*, where accidental injury to vital *Siras* could lead to *Vaikalyam* (functional impairment) or *Maranam* (death).⁹

NUMBER AND DISTRIBUTION IN URDHWASHAKHA

According to *Sushruta Samhita*, there are 16 *Avedhya Siras* in the *Urdhwashakha*, which are further subdivided into 10 in the *Hasta* (hand) and 6 in the *Bahu* (arm). These *Siras* are located in highly sensitive anatomical zones such as joints, muscular grooves, and nerve-rich areas. The regions identified include *Manibandha* (wrist), *Kurpara* (elbow), *Anguli Moola* (base of fingers), *Talahridaya* (center of the palm), and *Urdhva Kurpara* (above the elbow). The ancient scholars of Ayurveda emphasized that these areas, due to their neurovascular complexity, should never be subjected to puncture or surgical manipulation.¹⁰

ANATOMICAL AND CLINICAL SIGNIFICANCE OF HAND AVEDHYA SIRAS

The 10 *Avedhya Siras* of the hand are described in the *Hasta* region, which includes intricate anatomical structures such as the superficial and deep palmar arches, digital nerves, and flexor tendons. For example, the *Talahridaya Sira*, located at the center of the palm, corresponds anatomically with the superficial palmar arch formed primarily by the ulnar artery and palmar branches of the median nerve. Injury to this area may lead to profuse bleeding, loss of fine motor function, or ischemia of the fingers. Likewise, the *Anguli Moola Siras* lie at the base of the fingers and correlate with the digital neurovascular bundles, whose damage could cause finger contractures, sensory loss, or necrosis.¹¹

ANATOMICAL AND CLINICAL SIGNIFICANCE OF *ARM AVEDHYA SIRAS*

The 6 Avedhya Siras of the arm (Bahu) are primarily located near the elbow joint (*Kurpara*), upper arm (*Urdhva Bahu*), and medial brachial region. These *Siras* are associated with major vascular structures such as the brachial artery, basilic vein, and neural structures like the median nerve, ulnar nerve, and radial nerve. The *Kurpara Sira*, for instance, lies close to the elbow crease and is vulnerable to damage during intravenous cannulation or bloodletting. An injury here can cause hematoma, vascular compromise, or neuropathy, manifesting as loss of grip, wrist drop, or paralysis of forearm muscles—resulting in *Vaikalyam*.¹²

RISK OF *VAIKALYAM AND MARANAM*

The Ayurvedic texts explicitly warn that any injury to these *Avedhya Siras* may lead to *Vaikalyam* (permanent disability) or *Maranam* (death). This is because these *Siras* correspond to vital structures in modern anatomy—interruption of which may result in irreversible damage. For example, trauma to the brachial artery during venesection can cause rapid blood loss leading to hypovolemic shock. Similarly, compression or laceration of the median or ulnar nerve can permanently impair limb function. This correlates with the Ayurvedic concept of *Marmabhighata*—injury to vital points leading to catastrophic outcomes.¹³

SURGICAL PRECAUTION

From a surgical standpoint, the Ayurvedic concept of *Avedhya Sira* is highly relevant even today. Modern medicine recognizes the upper limb as a zone with "no-go" areas during procedures such as venipuncture, nerve blocks, or catheterization. Avoidance of regions like the cubital fossa, carpal tunnel, and palmar arch aligns with the classical Ayurvedic precaution. Moreover, modern imaging techniques such as Doppler ultrasound and angiography have validated these vascular territories as zones of high clinical sensitivity. Hence, the Ayurvedic emphasis on avoiding these *Siras* is a reflection of surgical foresight and patient safety awareness.¹⁴

CLINICAL IMPLICATION

The knowledge of *Avedhya Siras* in the *Urdhwashakha* must be emphasized in both Ayurvedic and integrative medical education to promote safe clinical practices. By understanding these *Siras*, practitioners can better plan para-surgical procedures like *Siravyadha*,

Jalaukavacharana (leech therapy), or *Agnikarma* while ensuring anatomical safety. Furthermore, correlation with modern anatomical structures offers an opportunity for translational research, enhancing the global relevance of Ayurvedic surgical wisdom. The teaching and application of these concepts can help minimize iatrogenic injuries and improve surgical precision in both traditional and contemporary settings.¹⁵

VAIKALYAM MARANAM CHA API

The phrase "*Vaikalyam Maranam Cha Api*" is derived from the Sanskrit verse found in *Sushruta Samhita*, which warns against puncturing certain vital *Siras* (vessels) due to their risk of causing "*Vaikalyam*" (deformity or functional disability) or "*Maranam*" (death). In the context of *Avedhya Siras*, this phrase serves as a clinical caution for surgeons and physicians, emphasizing that mishandling or puncturing these *Siras* during procedures like *Siravyadha* (bloodletting) or *Bhedana* (incision) may result in serious consequences. It reflects the high value ancient Ayurvedic scholars placed on anatomical precision and surgical safety.¹⁶

VAIKALYAM

Vaikalyam in Ayurveda refers to partial or complete loss of function of a body part (*Anga Vikriti* or *Kriya Hani*), often resulting from damage to *Marmas* or *Siras* that are integral to neuromuscular function. In the *Urdhwashakha*, *Vaikalyam* may manifest as weakness in grip strength, loss of sensation, muscular atrophy, or joint deformities due to trauma to key *Siras* that correspond anatomically to nerves like the median, radial, or ulnar nerves. Classical examples include wrist drop, claw hand, or inability to flex the fingers. Such complications arise when the structural integrity of the *Sira* and its associated *Marmas* is compromised, disrupting *Prana Vayu* and *Rakta Vaha Srotas*.¹⁷

From a modern medical perspective, *Vaikalyam* can be correlated with neurovascular injuries resulting in motor or sensory deficits. For instance, injury to the *Kurpara Sira*—located around the elbow joint—can damage the radial nerve, leading to wrist drop. Similarly, trauma to *Talahridaya Sira* in the palm could affect the median nerve or palmar arch, resulting in ischemic damage or carpal tunnel-like symptoms. Such injuries may not be fatal but can permanently impair limb function, validating the classical warning against disturbing these *Siras*.¹⁸

MARANAM

Maranam refers to death, and in the context of *Avedhya Sira*, it indicates that certain vascular injuries can result in life-threatening complications such as massive hemorrhage, shock, or systemic failure. In *Urdhwashakha*, this is particularly relevant when *Siras* corresponding to major arteries like the brachial or axillary artery are punctured. Ancient texts, though lacking modern hemodynamic terminology, clearly recognized the danger of rapid blood loss and circulatory collapse. They emphasized that injury to such *Siras* could abruptly end life, reinforcing the importance of surgical restraint.¹⁹

CLINICAL CORRELATION OF MARANAM

In modern clinical practice, trauma to major vessels of the upper limb—especially the brachial artery, deep palmar arch, or axillary artery—can lead to severe hemorrhagic shock. If not immediately managed with vascular repair, transfusion, or emergency surgery, it may cause death. Furthermore, vascular injuries can lead to compartment syndrome, thrombosis, or embolism, which also carry high mortality risk. This modern understanding supports the Ayurvedic assertion of *Maranam* following inappropriate intervention in *Avedhya Sira* zones.²⁰

SURGICAL ETHICS AND SAFETY

The concept of "*Vaikalyam Maranam Cha Api*" is a timeless surgical principle that integrates anatomical awareness, clinical prudence, and ethical practice. It urges physicians to recognize zones of vulnerability and to act with care and precision during any invasive intervention. Whether viewed through the lens of classical *Ayurveda* or modern surgery, the core message remains the same: avoid harm to vital anatomical structures. In this way, *Acharya Sushruta's* teachings continue to serve as foundational guidelines for safe medical and surgical practice.²¹

RESULT AND FINDINGS

- A total of 16 *Avedhya Siras* were identified in the *Urdhwashakha* as per *Sushruta Samhita* — 10 in the hand (*Hasta*) and 6 in the arm (*Bahu*).
- These *Siras* are anatomically located near major vascular and neural structures such as the brachial artery, palmar arches, median nerve, ulnar nerve, and radial nerve.

- Injury to these *Siras* is described in classical texts to result in *Vaikalyam* (disability/deformity) or *Maranam* (death), due to severe bleeding or neuromuscular damage.
- Classical descriptions of *Sira* locations correlate closely with modern anatomical danger zones such as the cubital fossa, carpal tunnel, and palmar neurovascular bundle.
- Comparative analysis showed that traditional surgical precautions in Ayurveda are aligned with modern surgical safety protocols, particularly regarding neurovascular preservation.
- The review confirms that *Avedhya Sira* is a clinically protective concept, emphasizing anatomical precision and procedural restraint in both ancient and modern practice.
- Modern interpretation of *Vaikalyam* includes neuropathy, motor dysfunction, ischemic damage, while *Maranam* relates to hypovolemic shock or fatal vascular trauma.
- The study highlights the translational value of Ayurvedic anatomical knowledge in enhancing safe surgical and parasurgical practices today.

DISCUSSION

The concept of *Avedhya Sira* in Ayurveda is a foundational surgical guideline outlined by *Acharya Sushruta*, aiming to prevent iatrogenic injury during invasive procedures like *Siravyadha*. The identification of 16 *Avedhya Siras* in the *Urdhwashakha* (10 in the hand and 6 in the arm) highlights the importance of this region, which is anatomically dense with arteries, veins, and nerves. The caution “*Vaikalyam Maranam Cha Api*” suggests that any injury to these structures can lead to functional impairment or even death, reflecting the surgical foresight and clinical prudence in classical Ayurvedic practice.²²

Modern anatomical correlations provide validation to these classical teachings. The *Kurpara*, *Manibandha*, and *Talahridaya* regions—described as *Avedhya*—align with the locations of critical neurovascular bundles such as the brachial artery, median nerve, and deep palmar arch. These structures are also recognized in contemporary medicine as high-risk zones where injury can result in hemorrhage, nerve damage, or ischemic complications. The alignment between Ayurvedic caution zones and modern surgical danger areas indicates the anatomical accuracy and relevance of Ayurvedic knowledge.²³

The clinical implications of injuring *Avedhya Siras* have been traditionally described as *Vaikalyam* (loss of function) and *Maranam* (death). Modern medicine interprets these outcomes as neurological deficits such as wrist drop, loss of grip strength, and paralysis due to nerve injuries, or fatal consequences like hemorrhagic shock from vascular trauma. The Ayurvedic perspective, although expressed in classical terminology, accurately reflects the pathophysiological outcomes seen in modern surgical and emergency care settings, thus bridging ancient and modern clinical understanding.²⁴

Furthermore, the Ayurvedic approach to *Avedhya Sira* serves as an early example of surgical ethics and anatomical safety. By demarcating non-puncturable sites, ancient surgeons were advised to avoid unnecessary harm and preserve patient function. This aligns with today's surgical principles of "do no harm" and minimal invasiveness. The concept encourages practitioners to possess thorough anatomical knowledge before performing any intervention, a value that remains integral to surgical training and practice in modern medicine.²⁵

CONCLUSION

The analytical review of *Avedhya Sira* in the *Urdhwashakha* not only reinforces the wisdom of ancient Ayurvedic surgery but also provides a practical framework for safe clinical practice today. The phrase "*Vaikalyam Maranam Cha Api*" encapsulates a critical caution rooted in both structural understanding and clinical experience. Its relevance continues in contemporary times, especially in integrative and para-surgical procedures, validating that Ayurvedic anatomical concepts are not merely theoretical but hold enduring clinical value when viewed through an interdisciplinary lens.

CONFLICT OF INTEREST –NIL

SOURCE OF SUPPORT –NONE

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