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The Anatomical Aspect Of Sira And Dhamani Sharir Related To Ayurvedic And Modern Perspective

Dr. Mahesh Kumar Bairwa[1], Dr. Anusha chauhan[2], Dr. Mahendra Kumar Sharma[3]

[1]P.G. Scholar, Department of *Rachna Sharir*, Post Graduate Institute of Ayurveda, Jodhpur, Rajasthan, India.

[2]P.G. Scholar, Department of *Rachna Sharir*, Post Graduate Institute of Ayurveda, Jodhpur, Rajasthan, India.

[3]Professor & H.o.D., Department of *Rachna Sharir*, Post Graduate Institute of Ayurveda, Jodhpur, Rajasthan, India.

ABSTRACT: -

The concepts of Sira, Dhamani, and Srotas Sharir are fundamental to Ayurveda, focusing on the anatomical study of these three structures. Ayurveda identifies subtle structural differences among Sira, Dhamani, and Srotas, which can be functionally distinguished by the substances they transport. All three are tubular structures that carry specific materials. Acharya Sushrut introduced innovative ideas regarding Rachana Sharir (Anatomy) and Shalya Tantra (Surgery), detailing various aspects of Rachana Sharir in the Sushrut Sharirsthan. In the seventh chapter of Sharirsthan, he provides comprehensive insights into the Siras of the human body. This chapter also highlights certain Avedhya Siras that should not be punctured during treatment. Dhamanis, which are also tubular structures filled with Vata dosha and exhibit pulsations, are characterized by their non-collapsible walls. The texts mention 700 Siras and 24 Dhamanis, which are further categorized. This comparative analysis of Sira and Dhamani aids in understanding the distinctions among Sira, Dhamani, and Srotas through anatomical perspectives. Ayurveda is recognized as a traditional healing science, offering numerous theories for maintaining health and preventing disease. It encompasses all aspects of the body's anatomical and physiological functions, including the concepts of vessels that transport fluids. Veins and arteries, crucial vessels in the body, are responsible for blood circulation, with Ayurveda referring to veins as Siras and arteries as Dhamanis, where Dhamani is regarded as a thicker vessel and Sira as a thinner blood vessel. The ancient Ayurvedic texts authored by Acharya Sushruta, Charaka, Vaghbhata, and others delve into the field of Rachana. Dhamani refers to a structure formed by thin-walled ducts that transport Rasa throughout the body, known as Sharira. The term Dhamani is often used interchangeably with Siras and Srotas, leading to confusion in the interpretation of these Ayurvedic terms. Acharya Sushruta provided a clear explanation of the human body's composition and the distinctions between Sira (vein), Dhamani (artery), and Srotas (capillaries). Charak noted that the hridaya generates ten Dhamani. In Ayurveda, Dhamanis (arteries) are described as tubular channels originating from the Hridaya (heart) that exhibit pulsation and facilitate the circulation of Rasa (lymph chyle or plasma) and Rakta (blood) throughout the body. The ascending Dhamani plays a crucial role in maintaining the body's integrity by enabling functions such as sound, touch, taste, smell, sneezing, laughter, and speech.

Conversely, the descending Dhamanis create a pathway for Vata, urine, excrement, semen, and digested food to flow downward. The Tiryaggami-Dhamani can be understood as the cutaneous or peripheral vessels that supply both the superficial and deep layers of the skin.

KEYWORDS: - Ayurveda, Sira, Dhamani, Srotas, Sharir, Hridaya, Rachana Sharir.

INTRODUCTION: -

Sira is a tubular, hollow structure responsible for the circulation and transportation of liquid substances such as blood, fluids, lymph, juices, and secretions. This structure encompasses arteries, veins, lymphatics, capillaries, nerves, and ducts. Generally, Sira is referred to as vessels in various contexts, although it is sometimes specifically identified as veins. Ayurveda identifies four essential components-Sharira, Indriya, Satva, and Atma—that contribute to physical, mental, and spiritual well-being. A thorough understanding of Rachana Sharira is crucial for effectively managing health-related issues. Initially, ancient scholars believed that arteries solely transported air, but it was later recognized that they also carried vital fluids. By the seventeenth century, the circulatory system was accurately understood and described. Ayurveda refers to Dhamani as a tubular structure that conveys sound, form, touch, and taste. The term Sira is derived from Hira, which denotes a channel for blood transport. Ayurveda Acharyas classify Sira as Srotas, as it carries Rasa and Rakta similar to Srotas. Sushruta elaborated on the distinctions between Sira, Dhamani, and Srotas based on their structural and functional characteristics. Dhamanis are regarded as thick ducts, while Siras are characterized by thinner walls. Sushruta documented approximately 700 Siras and 200 Dhamanis, noting that while he referred to Dhamanis as Srotas Mula Sthanas, he did not classify Siras in the same manner. Understanding the anatomical and functional differences between Dhamanis and Siras is vital for physicians to conduct accurate surgical interventions and diagnose circulatory system disorders.

Ayurveda represents a vast reservoir of knowledge that was cultivated by our esteemed ancestors. To fully grasp and effectively apply this wisdom, it is essential to understand the concept of Sharira. In Ayurveda, the Kriyasamarthya, or action potential, is linked to the Doshas, which are conveyed through structural components known as Sira and Dhamani. The ancient Acharyas advocated for a scientific understanding of life, making the study of Rachana Sharira, or anatomy, crucial for students in any medical discipline. The terms Srotas, Siras, and Dhamani have their origins in the Vedas and, while often used interchangeably, they denote distinct entities. Generally, Sira and Dhamani refer to blood vessels, with Dhamani also being associated with Prishniparni, a medicinal plant identified as Uraria picta from the Fabaceae family, which has a total of twenty-four Sanskrit synonyms.

Acharya Sushruta, recognized as the father of surgery, provided extensive insights in the Sushrut Samhita regarding the methodology for studying anatomy, including dissection of cadavers and the functions of Dhamani, Sira, Srotas, and Marma. He emphasized the importance of practical knowledge. The term Dhamani appears frequently in the Sushrut Samhita, in contexts such as Moola of Srotas and Nabhinadi. While Siras and Dhamanis are both referenced in the Vedas, they are not synonymous. Siras generally refers to thin blood vessels, whereas Dhamani denotes thicker vessels connected to the heart, highlighting their distinct yet related roles in the circulatory system.The ascending Dhamani is responsible for preserving the body's integrity through specific functions such as hearing, touch, taste, smell, sneezing, laughter, and speech. The descending Dhamanis create a channel for the downward movement of Vata, urine, excrement, semen, and digested food. Rasa, which is transported throughout the body by the Dhamanis and is infused with air, is notably conveyed exclusively by these Dhamanis.

MATERIAL AND METHODS: -

Dhamani and Sira Overview: -

Dhamanis are akin to arteries, characterized by their thick walls and tubular structure, originating from the heart to transport Rasa. According to Sushruta, the Nabhi is identified as the primary origin of Dhamani. In contrast, Sira resembles veins with thinner walls, directing impure Rasa back to the heart. While some texts cite Nabhi as the origin of Dhamani, others refer to Hridaya. At their origin, there are 40 Sira and 24 Dhamani.

Spread and Classification: -

Sushruta notes that Dhamani extend in various directions post-origin, with Astang Sangraha and Bhavprakash identifying 24 distinct Dhamani.

Characteristics: -

Sira, which carries Vata, is light red, while Pitta-carrying Sira appears blue, and those transporting Kapha and Rakta are white and deep red, respectively. Dhamani, however, is colorless, reflecting the hue of the Dhatu it conveys.

Functional Aspects: -

Dhamani (arteries) primarily transport oxygenated blood, whereas Sira (veins) carry deoxygenated blood. The flow in Sira moves from organs to the heart, while Dhamani directs blood from the heart to the organs. Sira can contract and dilate, providing nutrients, while Dhamani pulsates to deliver pure blood, with Srotas facilitating the movement of fluids, food, and other substances.

Similarities between Dhamani and Sira: -

- Sira and Dhamani are located in close proximity within the human body.
- Both share a similar structure; they are hollow, duct-like, and elongated vessels.
- Their primary function is transportation, as they both carry fluids, primarily Rasa.
- Sira and Dhamani are significantly associated with the heart regarding their origin and termination.
- Composed of Akash Mahabhuta (space or ether), they exhibit numerous anatomical similarities.
- Both Sira and Dhamani are minute in nature, functioning as channels.
- Distribution: -
- Dhamanis extend upward, facilitating sensory perception for sound, sight, touch, taste, and smell. Some are located above the umbilicus in areas such as the abdomen, back, flanks, chest, neck, shoulders, and arms.
- Siras originate during embryonic development, extending both upward and downward, and are connected to the umbilicus during fetal life to provide nutritional support through the umbilical cord.

Structures of Dhamani and Sira: -

- Siras resemble fibers akin to tree leaves, tapering finely at their ends. They originate from tissues, uniting as capillaries (venules) that eventually form larger veins returning blood to the heart.
- Arteries emerge from the heart, branching into smaller arteries that reach various body parts, further dividing into smaller vessels known as arterioles. Within tissues, these arterioles develop into microscopic capillaries.
- The walls of arteries and veins consist of three layers, differing in thickness. Generally, arteries have thicker inner or middle layers compared to veins, which supports their function of carrying pulsating blood from the heart. The greater elasticity and expansion capacity of arteries compared to veins provide advantages in transporting blood from the beating heart, while veins have more flexible walls, allowing them to contract easily to return blood to the heart.

Diseases associated with Dhamani and Sira include: -

Mamsa Kshaya, which can result in Dhamani Shaitilya; Dhamani Praticahya, a condition that may be classified as Shleshmaja Nanatmaja Vikara; and symptoms of Vata Prakopaka manifesting as Dhamani Spandana and Sira Snaayu. Additionally, blockage (Avarana) of Dhamani and Sira can occur. The presence of Vrudda Vata may lead to Urdhvaga and Adhoga Dhamani, resulting in further complications. Vrudda Dosha can infiltrate Pradhana Dhamani along with Shonita, causing diseases such as Arshas. Conditions like Pandu and Visarpa Roga arise when Prakupita Dosha affects the Dhamani, leading to additional complications.

Regarding Sira Dhamani Srotas, the identification of these structures as identical is based on four factors: -

Sannikarsha (proximity), Sadrishyagamatva (similarity in textual description), Karmukatva (functional similarities), and Saukshmatva (minuteness). These reasons lack scientific rigor; modern science recognizes that veins, arteries, and channels are similar due to their hollow tube structure, and their functional similarity lies in the circulation of Rasa Rakta. Consequently, distinguishing these structures can be challenging, as the functions of dhamani (arteries) and nerves are both independent and complementary.

Variations in Sira Dhamani Srotas: -

1. Distinctive characteristics - Sira (veins) transport Vata, Pitta, and Rakta, which are identified by their respective colors: light red, blue, white, and deep red. In contrast, Dhamani are colorless, while Srotas reflect the color of the Dhatu they contain.

2. Quantity at the source - There are forty Siras, twenty-four Dhamanis, and twenty-two Srotas.

3. Unique roles - Sira is responsible for the uninterrupted functioning of the mind and intellect, whereas Dhamani facilitate the perception of sensory objects (such as touch, smell, and taste).

4. Textual references - Ayurvedic texts frequently distinguish between Sira, Dhamani, and Srotas, indicating that Dhamani and Srotas are not the same as Sira. Sushruta places particular importance on Dhamani (arteries), attributing all functions to them, including the transport of the three Doshas along with Rasa Dhatu.

- **SIRA SHARIR: -**

Sira sankhya (number of sira): -

According to the 7th chapter of Sushrut Sharirsthan, there are a total of 700 siras, all originating from the umbilicus. Sushrutacharya classifies these 700 siras to include veins, arteries, lymph vessels, and nerves. He identifies 40 Moola Siras, which are further categorized into four groups: - 10 Vatavaha Siras, 10 Pittavaha Siras, 10 Kaphavaha Siras, and 10 Raktavaha Siras.

The second classification includes 175 siras in each of the four categories: Vatavaha, Pittavaha, Kaphavaha, and Raktavaha.

The total of 700 siras is distributed as follows: 400 in the extremities (100 in each of the four limbs), 136 in the trunk (34 in each of the four sections), and 164 in the head and neck (41 in each of the four regions).

Classifications of sira (sira prakar): -

The first classification is based on functional quality, which includes: -

1. Vatavaha Sira 2. Pittavaha Sira 3. Kaphavaha Sira 4. Raktavaha Sira.

The second classification is determined by the type of material they transport: -

1. Tamra Sira – Arteries – Red – Pure Blood 2. Neela Sira – Veins – Blue/Black – Impure Blood 3. Shweta Sira – Lymph Vessels – White – Lymph 4. Aruna Sira – Capillaries – Variable Color – Blood Grain.

Avedhya sira (venesection): -

Certain siras in the human body are not to be punctured, referred to as avedhya siras. According to Sushrutacharya, there are 98 such siras, categorized as follows: - • In Shakha Pradesha (Extremities) – 16 • In Koshtha Pradesha (Trunk) – 32 • In Jatrurdhwa Pradesha (Head, Neck) – 50.

- **Dhamani Sharir: -**

Dhamanis are tubular or cord-like structures filled with Vata dosha, characterized by their pulsations. The walls of dhamanis remain intact due to these pulsations. The term 'dhamani' has two interpretations: firstly, it refers to pulsation, as arteries exhibit this feature while veins do not. Dhamanis transport Vata dosha, which encompasses impulses and sensations associated with the nervous system. Additionally, they facilitate various muscle movements through nerve sensations, necessitating pulsation and blood supply for effective response and action. Thus, the structure of dhamani can be likened to both arteries and nerves. However, from a practical standpoint, it is more appropriate to associate dhamanis primarily with arteries, given their pulsatile nature and the role of blood supply in maintaining structural and functional activity within the body. According to Ayurvedic physiology, dhamanis carry Vata dosha along with oxygenated blood, known as Rakta.

Dhamani Sankhya (Number and Types of Dhamani): -

There are 24 dhamanis that originate from the Nabhi (umbilicus). Sushrutacharya has classified dhamanis solely as arteries in his description of dhamani sankhya. The types of dhamanis include Urdhwagami Dhamani (10), Adhogami Dhamani (10), and Teeryakagami Dhamani (4).

Dhamani Marma: -

Dhamani Marma, as introduced by Acharya Vaghbhata, is a critical concept in Ayurveda. In contemporary times, we recognize that injuries to Marma can result in death, prolonged suffering, or physical deformities. Vaghbhata identifies six categories of Marma, with Dhamani Marma being the sixth. This category represents a crucial area in human anatomy, classified based on its structural components.

From a modern perspective: -

The Sira varies in color depending on the fluids they transport, but no such distinctions are made for Dhaminis and Srotas. In terms of Mulasanniyamat, there are 40 Siras, 24 Dhamanis, and 22 Srotas. Sira is primarily linked to the overall functioning of the body, mind, and intellect, while Dhamani is associated with sensory perception (including sound, taste, smell, touch, and light), and Srotas pertains to the movement of air, water, and other substances.

The modern correlation of Sira: -

Includes Vatavaha Sira, which corresponds to motor and sensory nerves and spinal nerves that facilitate sensation; Pittavaha Sira, which refers to ducts that transport digestive juices like bile and pancreatic fluids; Kaphavaha Sira, which relates to lymph vessels involved in lymphatic circulation; and Raktavaha Sira, which encompasses arteries, veins, and capillaries responsible for blood circulation.

The modern correlation of Dhamani: -

Contemporary Classification of Dhamani - 1. Urdhwagami Dhamani – Arch of the Aorta and its Branches 2. Adhogami Dhamani – Abdominal Aorta and its Branches 3. Teeryakagami Dhamani – Cutaneous Arteries 4. Urdhwagami Dhamani – a. Arch of Aorta b. Right Brachiocephalic Trunk c. Right Common Carotid Artery d. Right Subclavian Artery e. Left Common Carotid Artery f. Left External Carotid Artery g. Left Internal Carotid Artery h. Right External Carotid Artery i. Right Internal Carotid Artery j. Left Subclavian Artery 5. Adhogami Dhamani – a. Coeliac Trunk b. Superior Mesenteric Artery c. Inferior Mesenteric Artery d. Gonadal Artery e. Renal Artery f. Right Common Iliac Artery g. Left Common Iliac Artery h. External Iliac Artery i. Internal Iliac Artery j. Median Sacral Artery 6. Teeryakgami Dhamani - Cutaneous Arteries.

DISCUSSION: -

The concepts of Sira, Dhamani, and Srotas Sharir are fundamental to Ayurveda, focusing on the anatomical study related to these three structures. Ayurveda identifies subtle structural differences among Sira, Dhamani, and Srotas, which can be functionally distinguished by the materials they transport. All three are tubular structures that carry specific substances. Aacharya Sushrut introduced innovative ideas regarding Rachana Sharir (Anatomy) and Shalya Tantra (Surgery). Sira refers to the hollow tubular structure responsible for the circulation and transportation of liquid materials such as blood, lymph, and other fluids. In this context, Sira encompasses arteries, veins, lymphatics, capillaries, nerves, and ducts, and is often broadly referred to as vessels, though it may sometimes specifically denote veins. Dhamanis, on the other hand, are tubular or cord-like structures filled with Vata dosha and characterized by pulsations, which prevent their walls from collapsing. Practically, Dhamanis are correlated with arteries due to their pulsatile nature, which is essential for the structural and functional activity of various body parts. There are 700 Sira and 24 Dhamani, each with distinct types.

There are varying opinions on the identification and role of Dhamani; some liken it to nerves while others associate it with arteries, based on their quantity and function as described in the text. Dhamani, characterized by their structural properties, serve as conduits for transporting nutritional elements. The pulsation of Dhamani signifies vitality and health. These structures are considered Panchabhutika, facilitating the connection between sensory organs and their corresponding objects throughout life. Authors who relate Dhamani to arteries support the notion that their pulsating nature is the reason for this classification. The Urdhvagami-Dhamani are linked to the internal functions of the head, neck, thorax, and upper limbs, while the Adhogami-Dhamani are associated with the abdominal organs and lower limbs. The Tiryaggami-Dhamani correspond to the outer skin surface of the body.

In contemporary anatomical terms, Tiryaggami-Dhamani can be viewed as cutaneous or peripheral vessels that supply both the superficial and deep layers of the skin. The pulsation of Dhamani not only represents life but also reflects health and disease. The micro-anatomical connections between cells and blood vessels are crucial in tissues that heavily rely on their blood supply. These Dhamani facilitate the absorption of substances applied to the skin, whether in liquid or paste form, into the body. Dhamani can sense both pleasurable and painful stimuli. As Panchabhoutika entities, they play a vital role in connecting sensory organs with their respective objects throughout life. It is inaccurate to equate Dhamani with nerves, as their characteristics are fundamentally different from those of arteries. While the functions of Dhamanis (arteries) and nerves may appear similar due to their interconnection and complementary roles, nerve function in any area lacking blood supply from arteries will be ineffective.

CONCLUSION: -

In general terms, sira is often referred to as vessels in various texts, while in some contexts, it is specifically identified as veins. The term Dhamani, as indicated by its definition, can be associated with arteries and nerves. However, from a practical standpoint, it is more appropriate to relate dhamanis to arteries, as they exhibit pulsations and facilitate blood flow, which is essential for the structural and functional activity of the human body. According to Ayurvedic Physiology, dhamanis not only transport oxygenated blood, known as Rakta, but also carry the Vata dosha. This comparative analysis of sira and dhamani aids in distinguishing between sira, dhamani, and srotas through anatomical understanding. Dhamani is responsible for carrying Prana (life), and any dysfunction in dhamani can result in health issues. The body's tissues rely heavily on the supply of arterial blood for their proper functioning, highlighting the crucial role arteries play in maintaining physiological health. Dhamani also facilitates sensory perceptions such as sound, smell, taste, and touch. In this context, sira refers to vessels, where Pittavaha Siras can be equated to veins, Kaphavaha Siras resemble lymphatic channels, and Raktavaha Siras can be likened to capillaries. Sira is responsible for transporting fluids, nutrients, and other substances, primarily supplying impure blood from tissues back to the heart for purification.

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