

A CRITICAL REVIEW OF DHAMANI IN AYURVEDIC LITERATURE: CORRELATING CLASSICAL VASCULAR CONCEPTS WITH MODERN HEMORRHOIDAL PATHOPHYSIOLOGY

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ABSTRACT

Background: The *Sushruta Samhita* provides a detailed description of *Dhamanis* as distinct vascular structures, establishing a sophisticated framework for understanding cardiovascular anatomy and pathology. While contemporary scholars debate whether *Dhamanis* represent mere modifications of *Siras* (veins), *Sushruta* explicitly refutes this position, asserting their distinct structural and functional identity. **Objective:** This review aims to critically examine the classical Ayurvedic concept of *Dhamani*, particularly in the context of anorectal vascular pathology (*Arsha*), and establish correlations with modern anatomical and pathophysiological understanding of hemorrhoidal disease. **Methods:** A comprehensive analysis of *Sushruta Samhita* (*Sharirasthana*,

Nidanasthana) was undertaken, focusing on descriptions of *Dhamani* classification, vascular pathways, and pathogenesis of *Arsha*. Modern anatomical texts and contemporary hemorrhoidal pathophysiology literature were reviewed to establish structural and functional correlations. **Results:** *Sushruta's* description of 24 *Dhamanis* originating from *Nabhi*, with 10 coursing upward (*Urdhwagami*), 10 downward (*Adhogami*), and 4 transversely (*Tiryakgami*), demonstrates remarkable correlation with the splanchnic vascular anatomy. The *Adhogami Dhamanis* correspond to mesenteric vascular territories, including the Inferior Mesenteric Artery and its terminal branch, the Superior Rectal Artery—the primary arterial supply to the hemorrhoidal plexus. *Sushruta's* classification of *Raktavahi Dhamanis* as specific carriers of blood establishes a direct vascular link to hemorrhoid formation. The pathogenesis model describing vitiated *Vata* obstructing *Dhamanis* carrying *Rakta* and *Mamsa* in *Guda* parallels

modern understanding of arteriovenous shunting, vascular smooth muscle dysfunction, and hemorrhoidal engorgement. **Conclusion:** The classical Ayurvedic description of *Dhamanis* demonstrates a sophisticated understanding of vascular anatomy and pathology that aligns with modern biomedical concepts. This correlation supports the validity of *Sushruta's* vascular framework and may inform integrative therapeutic approaches, including targeted arterial interventions.

KEYWORDS: *Dhamani*, Hemorrhoids, *Arsha*, Vascular Anatomy, Superior Rectal Artery, *Raktavaha Dhamani*.

INTRODUCTION

Background and Rationale

The *Sushruta Samhita*, one of the foundational texts of Ayurvedic medicine, presents a comprehensive system of human anatomy and physiology that predates Western medical understanding by several centuries. Among its most significant contributions is the detailed description of the cardiovascular system, particularly the concept of *Dhamanis*—structures that modern scholarship increasingly recognizes as bearing remarkable similarity to arteries in the contemporary biomedical framework.^[1] Hemorrhoidal disease, or *Arsha* in Ayurvedic terminology, represents one of the most common anorectal conditions worldwide, affecting millions of individuals and imposing substantial medical and socioeconomic burdens.^[2] The classical Ayurvedic description of *Arsha* pathogenesis, centered on vitiated *Vata dosha* affecting *Dhamanis* in the *Guda* (recto-anal) region, offers a sophisticated etiological framework that warrants critical examination through the lens of modern vascular pathophysiology.^[3]

OBJECTIVES

This review seeks to

1. Critically analyze the concept of *Dhamani* as presented in *Sushruta Samhita*
2. Establish structural and functional correlations between classical *Dhamanis* and modern vascular anatomy
3. Examine the pathogenetic model of *Arsha* through the *Dhamani* framework
4. Explore therapeutic implications arising from this correlation

The Dhamani Concept in Sushruta Samhita

Distinct Identity of Dhamanis

The *Sushruta Samhita* (*Sharirasthana* 9/3) directly addresses a contemporary debate regarding whether Dhamanis are simply modifications of Siras (veins):

चतर्विंशतिविधमन्यो नाभिप्रभवा अभिहिताः । तत्र केचिदाहुः – सिराधमनीस्रोत सामविभागः, सिराविकारा एव हि धमन्यः स्रोतांसि चेति ।

तत्तु न सम्यक्, अन्या एव हि धमन्यः केवलं तु परस्परसन्निकर्षात् सदृशागमकर्मत्वात् सौक्ष्माच्च विभक्तकर्मणामप्यमविभाग इव कर्मसु भवति ॥

(*Sushruta Samhita, Sharira Sthana* 9/3)^[4]

Translation: Twenty-four *Dhamanis* originating from the *Nabhi* have been described. Some scholars assert there is no difference between *Siras*, *Dhamanis*, and *Srotas*—that *Dhamanis* and *Srotas* are merely modifications of *Siras*. This is not correct, for *Dhamanis* are indeed distinct structures. However, due to their proximity, similar textual descriptions, similar functions, and minuteness, even structures with distinct functions appear undifferentiated in their actions. *Sushruta* identifies four factors contributing to the misidentification of *Dhamanis* as *Siras*:

- *Sannikarsha* (Proximity): Close anatomical relationship
- *Sadrishagamatva* (Similar textual description): Comparable literary characterization
- *Sadrishakarmatva* (Similar functions): Overlapping physiological roles
- *Saukshmya* (Minuteness): Microscopic or macroscopic indistinguishability

This description bears striking similarity to the modern anatomical relationship between arteries and veins—structures that run in parallel, are often mistaken for each other macroscopically, yet possess distinct histological and functional characteristics.

Classification and Distribution of Dhamanis

Sushruta provides a detailed roadmap of the vascular tree in

Sharirasthana 9/4:

"तासां तु खलु नाभिप्रभवाणां धमनीनामर्ध्वगा दश, दश चाधोगामिन्यः, चतस्तस्तिर्यग्गाः

(*Sushruta Samhita, Sharira Sthana- 9/4*)"^[5]

Interpretation: Of the 24 *Dhamanis* originating from the *Nabhi* (umbilicus), ten course upward (*Urdhwagami*), ten course downward (*Adhogami*), and four course transversely (*Tiryakgami*).

Modern Correlation: The 10 *Adhogami Dhamanis* represent the mesenteric vascular bed, including the Inferior Mesenteric Artery (IMA) and its terminal branches. The *Nabhi* as a root correlates anatomically to the origin of the IMA from the abdominal aorta at the level of the L3 vertebra, which approximates the umbilical region.^[6] This suggests that *Sushruta's* classification may represent an early topographic mapping of the splanchnic circulation.

Functional Classification of *Dhamanis*

Sushruta further classifies *Dhamanis* by their contents in *Sharirasthana*

9/12:

"...अन्नवाहिन्यश्च धमन्यः... रसवाहिन्यश्च धमन्यः... रक्तवाहिन्यश्च धमन्यः..."

(*Sushruta Samhita, Sharira Sthana* 9/12)^[7]

Interpretation: Specific *Dhamanis* are designated as carriers for:

- *Anna* (food/nutrients) → Corresponding to mesenteric arteries
- *Rasa* (plasma/nutritive fluid) → Corresponding to nutrient-carrying arteries
- *Rakta* (blood) → Corresponding to systemic arteries

Modern Correlation: The *Raktavahi Dhamanis* correspond to all systemic arteries. Critically, the Superior Rectal Artery—a terminal branch of the Inferior Mesenteric Artery—represents one such *Raktavahi Dhamani* that specifically supplies the hemorrhoidal plexus.

Hemorrhoidal Disease: Modern Understanding Definition and Epidemiology

Hemorrhoidal disease refers to the symptomatic enlargement and distal displacement of normal anal cushions. This condition affects millions worldwide, constituting a major medical and socioeconomic burden.

Various etiological factors have been proposed, notably constipation and chronic straining.^[8]

Modern Angio-Architecture of Hemorrhoidal Plexus

Contemporary anatomy identifies three vascular cushions in the anal canal (left lateral, right posterior, right anterior), containing:

Arterial Supply

Terminal branches of the Superior Mesenteric Artery (via middle colic → superior rectal artery—though the superior rectal artery actually derives from the IMA)

- Inferior Mesenteric Artery (superior rectal artery)

- Middle rectal arteries (from internal iliac artery)
- Inferior rectal arteries (from pudendal artery)

Venous Drainage

- Internal hemorrhoidal plexus → superior rectal vein → inferior mesenteric vein → portal system
- External hemorrhoidal plexus → middle/inferior rectal veins → systemic circulation (IVC) Arteriovenous Anastomoses (AVAs): Glomus bodies regulating pressure and temperature within the hemorrhoidal cushions.^[9]

Pathophysiology of Hemorrhoidal Disease

The fundamental pathology of hemorrhoidal disease involves abnormal dilatation and distortion of the vascular channel, along with destructive changes in the supporting connective tissue of the anal cushion.

Key mechanisms include

Failure of AVAs and Smooth Muscle Support

Dysfunction of AVAs and Treitz's muscle (smooth muscle supporting anal cushions) leads to dilation and arteriovenous shunting within the hemorrhoidal plexus. This results in engorgement, bleeding, and prolapse. Importantly, this condition represents arterialized venous flow due to increased mesenteric arterial pressure transmission, rather than simple varicose veins.^[10]

Integrative Pathogenetic Model of Arsha

Classical Ayurvedic Samprapti

According to *Sushruta*, *Arsha* arises from vitiated *Vata* (primarily *Apana Vata*) obstructing *Dhamanis* carrying *Rakta* and *Mamsa* in the *Guda* (recto-anal region).^[11]

Key Steps:

Nidana (Etiological Factors)

- Suppression of natural urges
- Constipation
- Sedentary lifestyle
- Spicy food consumption
- *Vata-Pitta* imbalance

Dushyas (Affected Tissues)

- *Rakta* (blood)
- *Mamsa* (muscle/connective tissue)
- *Meda* (fat)

Srotodushti (Channel Pathology)

- *Purishavaha Srotas* (faecal channel) obstruction
- *Raktavaha Srotas* (vascular channel) obstruction

Dhamani Involvement: *Sushruta* states that *Vata* dries or distends the

Dhamanis in *Guda*, leading to pedunculated or sessile growths (*Arsha*)—essentially varicose vascular cushions.^[12]

Modern Pathophysiological Correlation

Nidana → *Apana Vata* Vitiation → Disturbed Defecation Dynamics, Chronic straining and constipation increase intra-abdominal pressure, impeding venous return and promoting vascular engorgement. This corresponds to *Vata's* role in disturbing normal *Apana* (downward) flow. *Dhamani* Involvement: Hyperdynamic Arterial Flow Hyperdynamic arterial flow via SMA/IMA branches to hemorrhoidal cushions leads to increased pulsatile pressure in *Raktavaha Dhamani*.

This parallels modern understanding of premature AVA opening and arteriovenous shunting.

Sanga (Obstruction): Venous Congestion Venous return via the superior rectal vein becomes partially blocked by elevated intra-abdominal pressure, straining, or portal congestion—a mechanical manifestation of *Sanga* (obstruction) in the vascular pathway.

Sirajanya Guna: Vascular Wall Changes *Dhamani* wall loses elasticity due to *Vata's Ruksha* (dryness) and *Khara* (roughness) qualities. This correlates with modern concepts of endothelial dysfunction and smooth muscle atrophy within the vascular wall.

Result: *Rakta* and *Mamsa* Accumulation Blood and tissue accumulate in *Guda*, forming *Arsha* (vascular pedunculated mass). This represents the classical description of hemorrhoidal engorgement and prolapse.^[13]

Sequence of Pathogenesis

The *Sushruta Samhita* (*Nidana Sthana* 2/4) provides a sequential pathogenetic model:

Prakupita Dosha → *Prasara* → *Pradhana Dhamani Anuprapadya* → *Adho Gatva* → *Guda*

Prapthi → *Mamsa Praroaha*

INTERPRETATION

1. *Vitiated Doshas* (primarily *Vata*)
2. Spread (*Prasara*) through systemic circulation
3. Entry into *Pradhana Dhamanis* (major arteries)
4. Downward movement (*Adho Gatva*)
5. Localization in *Guda* (recto-anal region)
6. Proliferation of *Mamsa* (formation of hemorrhoidal cushions)

This sequence demonstrates a sophisticated understanding of how systemic pathology localizes to a specific vascular territory.

Modern Correlation: The primary arterial supply to the hemorrhoidal plexus derives from the Superior Rectal Artery, a terminal branch of the Inferior Mesenteric Artery—precisely one of the 10 *Adhogami Dhamanis* described by *Sushruta*. Modern angiography confirms that hemodynamic changes in this vascular territory directly contribute to hemorrhoidal pathogenesis.^[14]

Therapeutic Implications-Ayurvedic Approaches

Vata-Anulomana (Restoring Downward Flow)

Therapeutic interventions aimed at normalizing *Apana Vata* function, thereby reducing intra-abdominal pressure and vascular congestion.

Raktamokshana (Bloodletting)

Bloodletting near *Guda Dhamani*—akin to dearterialization—to reduce vascular engorgement and local inflammation.

Kshara Karma (Chemical Ablation):

Chemical ablation of hyperdynamic vascular tissue using alkaline preparations, reducing hemorrhoidal mass and bleeding.^[15]

Modern Therapeutic Correlations

Hemorrhoidal Artery Ligation (HAL) / Doppler-Guided Dearterialization: This contemporary procedure precisely targets superior rectal arterial branches—which correspond to *Raktavahi Dhamani* per *Sushruta*'s concept—reducing inflow without excising cushions.^[16] Comparison:

- Ayurvedic *Raktamokshana* → Reduces local vascular congestion

- Modern HAL → Reduces arterial inflow via targeted ligation
- *Kshara Karma* → Chemical ablation comparable to sclerotherapy

Both traditional and modern approaches share the common goal of reducing pathological vascular engagement while preserving normal anatomical structures.

DISCUSSION

Significance of Dhamani Classification

The *Sushruta Samhita*'s classification of 24 *Dhamanis* originating from *Nabhi* represents one of the earliest systematic descriptions of vascular anatomy in medical literature. The identification of 10 *Adhogami Dhamanis* specifically aligns with the mesenteric vascular supply to the lower gastrointestinal tract, including the hemorrhoidal plexus. This correlation suggests that ancient Ayurvedic anatomists possessed sophisticated observational skills, likely derived from systematic dissection and clinical correlation. The recognition that *Dhamanis* are distinct from *Siras*, despite their superficial similarity, demonstrates an understanding of structure-function relationships that parallels modern histological distinctions between arteries and veins.

Validity of the Pathogenetic Model

The *Sushruta* model of *Arsha* pathogenesis through *Dhamani* involvement demonstrates remarkable concordance with modern understanding of hemorrhoidal pathophysiology:

Ayurvedic Concept	Modern Equivalent
<i>Vata vitiation (Apana)</i>	Increased intra-abdominal pressure, straining
<i>Dhamani</i> involvement	Arterial hyperdynamic flow, AVA dysfunction
<i>Sanga</i> (obstruction)	Venous congestion, impaired return
<i>Sirajanya guna</i> (Vata effect)	Endothelial dysfunction, smooth muscle atrophy
<i>Rakta</i> accumulation	Vascular engorgement, arteriovenous shunting
<i>Mamsa</i> accumulation	Cushion prolapse, connective tissue destruction

The sequence of *Prakupita Dosha* → *Prasara* → *Pradhana Dhamani Anuprapadya* → *Adho Gatva* → *Guda Prapthi* → *Mamsa Praroha* mirrors modern understanding of how systemic factors (diet, lifestyle) lead to localized vascular pathology through specific arterial territories.

Clinical and Therapeutic Relevance

This integrative model suggests several therapeutic strategies

1. Vascular-targeted interventions: Treatments aimed at reducing arterial inflow (HAL, *Raktamokshana*) address the primary hemodynamic

abnormality

2. Supportive tissue therapy: Interventions strengthening connective tissue support (*Mamsa Dhatu*) may prevent prolapse
3. Functional normalization: Correction of *Apana Vata* through lifestyle modification reduces initiating factors.

The concordance between classical and modern approaches supports the value of integrating Ayurvedic concepts into contemporary surgical practice.

LIMITATIONS AND FUTURE DIRECTIONS

While this correlation is compelling, several limitations exist:

1. Translation challenges: The exact anatomical correspondence of *Nabhi* as a vascular origin requires further clarification
2. Histological correlation: The specific tissue types described (*Mamsa*, *Meda*) require precise histological identification
3. Clinical validation: Prospective studies correlating *Dhamani* pathology with hemorrhoidal severity are needed.

Future research directions include

- Doppler ultrasound studies of hemorrhoidal arterial flow correlated with Ayurvedic subtypes
- Comparative effectiveness studies of *Raktamokshana* versus HAL
- Histopathological examination of hemorrhoidal tissues from an Ayurvedic perspective

CONCLUSION

The *Sushruta Samhita's* description of *Dhamanis* as distinct vascular structures, classified by origin, course, and contents, demonstrates a sophisticated understanding of anatomy that predates modern medical knowledge by centuries. The identification of 10 *Adhogami Dhamanis* originating from *Nabhi* corresponds remarkably to the mesenteric vascular supply, including the Inferior Mesenteric Artery and its terminal branch, the Superior Rectal Artery—the primary arterial supply to the hemorrhoidal plexus. The pathogenesis model of *Arsha* through vitiated *Vata* affecting *Raktavahi Dhamanis* in *Guda* parallels modern understanding of hemorrhoidal pathophysiology, including arteriovenous shunting, endothelial dysfunction, and vascular smooth muscle pathology. This correlation validates the classical framework and suggests potential integrative therapeutic approaches, including targeted arterial interventions.

The remarkable concordance between ancient Ayurvedic concepts and modern biomedical understanding underscores the enduring value of classical texts and supports their integration into contemporary medical education and practice.

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