



Short Review

Hrudaya Marma and Dasha Dhamani in Relation to Contemporary Cardiovascular Anatomy: A Narrative Mini Review of Sinotubular Junction Diameter Variations

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ABSTRACT:

Background: In classical Ayurveda literature, the *Hrudaya* (heart) is conceptualized as a supreme vital node, designated as a *Sadhya Pranahara Marma* (vital anatomical point causing sudden death upon injury). It is intricately connected to the *Dasha Dhamani* (ten great vessels). While the functional anatomy has been explored, the specific metrological and structural correlations of the proximal great vessels—particularly the ascending aorta and its sinotubular junction (STJ)—remain underexplored in integrative medicine.

Objectives: To critically analyze classical Ayurveda concepts of *Hrudaya Marma* and *Dasha Dhamani*, correlating them with the contemporary anatomy and clinical pathology of the aortic root, STJ, and ascending aorta. **Material & Methods:** A comprehensive narrative review was conducted using classical Ayurveda texts, authoritative commentaries (e.g., *Pratyaksha Shareera*), and contemporary cardiothoracic, embryological, and imaging literature sourced from major electronic databases. **Results:** Textual measurements of the *Aarohini Mahadhamani* (ascending great vessel)—documented as two *Angula* (fingerbreadths) in length and five *Angula* in circumference—correspond with striking precision to the human ascending aorta. Its three *Kotara* (alcoves/pockets) represent the aortic sinuses. Furthermore, contemporary observational evidence indicates that the STJ diameter, particularly when indexed to body surface area, is an independent predictor of acute type A aortic dissection. **Conclusion:** Correlating the ancient metrological framework of *Hrudaya Marma* with modern STJ and aortic root paradigms validates traditional Ayurveda quantitative anatomy. This synthesis provides a robust translational framework for preventive cardiology, emergency medicine, and forensic analysis.

KEYWORDS: Ascending aorta, Aortic dissection *Dasha Dhamani*, *Hrudaya Marma*, *Shareera Rachana*, Sino tubular junction.

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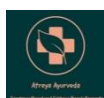
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1. INTRODUCTION

Cardiovascular diseases remain the leading cause of global mortality, necessitating continuous refinement in structural and functional diagnostics. [1] Within cardiothoracic anatomy, the aortic root, sinotubular junction (STJ), and ascending aorta represent critical hemodynamic transition zones. [2] Pathological alterations in the STJ diameter are deeply implicated in catastrophic events such as aortic aneurysm and acute aortic dissection. [3] The ability to predict these events through precise structural analysis is paramount for risk stratification.

Historically, Ayurveda has provided a highly structured quantitative and qualitative evaluation of human anatomy, known as *Shareera Rachana* (anatomy). The *Hrudaya* (heart) is classified as a *Marma* (vital point)—a confluence of vital structures including *Mamsa* (muscle), *Sira* (vein/vessel), *Snayu* (ligament/tendon), *Asthi* (bone), and *Sandhi* (joint), whose injury precipitates catastrophic physiological collapse. [4]

Despite extensive literature reviewing the gross functional anatomy of the heart, the precise structural equivalents of its proximal great vessels, specifically the *Dasha Dhamani* (ten root vessels) and the *Aarohini Mahadhamani* (ascending aorta), require rigorous integrative analysis. [5] This narrative review aims to bridge this knowledge gap by synthesizing the metrological architecture of the *Hrudaya Marma* with modern echocardiographic and tomographic data regarding the STJ.

Objectives

To critically analyze classical Ayurveda concepts of *Hrudaya Marma* and *Dasha Dhamani*, correlating them with the contemporary anatomy and clinical pathology of the aortic root, STJ, and ascending aorta.

2. MATERIAL & METHODS

A comprehensive narrative review methodology was employed to capture classical and modern perspectives.

Electronic databases, including PubMed, Scopus, Web of Science, Google Scholar, and the AYUSH Research Portal, were systematically queried. Search terms included combinations of: "Hrudaya Marma", "Dasha Dhamani", "Ascending Aorta", "sinotubular Junction", "Aortic Root", "Aortic Dissection", and "Ayurveda Cardiology" with Boolean operators AND, OR. Classical foundational data was extracted from the *Brihatrayee (Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya)* and authoritative commentaries, notably *Pratyaksha Shareera* by Acharya Gananath Sen. Inclusion criteria focused on literature detailing anatomical dimensions, topographical relations, and the clinical prognosis of the *Hrudaya* and its root vessels.

3. RESULTS

Classical Ayurveda perspective on *Hrudaya Marma*

The ontological development of the *Hrudaya* is established early in gestation, acting as the *Chetanaadhithana* (foundational locus of consciousness). [6] Topographically, it is an *Urosthita Marma* (thoracic vital point) situated in the *Uras* (thoracic cavity), precisely *Sthanamadhy*a (between the breasts) and superior to the *Amashayadvaram* (cardiac orifice of the stomach). [7] Its macroscopic architecture is likened to an *Adhomukha Pundarika* (inverted lotus bud). [8] According to Acharya Charaka, the organ measures four *Angula* (fingerbreadths) in dimension. [9] Functionally, the heart is governed by *Vyana Vayu* (a vital bio-energy responsible for circulation), which is responsible for the rapid circulation (*Mahajava*) of *Rasa-Rakta Dhatu* (plasma and blood tissues) throughout the body. [10]

Review of *Dasha Dhamani*:

The *Hrudaya* acts as a central hub for the *Dasha Dhamani*. [11] Classical texts describe ten *Moola Sira* (root vessels) that facilitate the influx and efflux of vital fluids. These ten vessels are critically interpreted in contemporary anatomy as the major vessels traversing the pericardial cavity. [12] Acharya Gananath Sen's *Pratyaksha Shareera* isolates the *Aarohini*

Mahadhamani as emerging directly from the *Vaama Nilaya* (left ventricle), ascending forward and obliquely. This vessel features three *Kotara* (alcoves/pockets) at its base, which

yield the *Hardhika Dhamani* (coronary vessels) providing *Anuposhana* (nutrition) to the heart itself. [5]

Table 1: Search terms used in databases

Database	Search terms used	Filters applied	Note
PubMed	Hrudaya Marma AND Dasha Dhamani OR (Ascending Aorta) OR (Sinotubular Junction) OR (Aortic Root) OR (Aortic Dissection) OR (Ayurveda Cardiology)	Language English, Less than 10years	Free Full text articles,
Scopus	Hrudaya Marma AND Dasha Dhamani OR (Ascending Aorta) OR (Sinotubular Junction) OR (Aortic Root) OR (Aortic Dissection) OR (Ayurveda Cardiology)	Language English, Less than 10years	Free Full text articles,
Web of Science	Hrudaya Marma AND Dasha Dhamani OR (Ascending Aorta) OR (Sinotubular Junction) OR (Aortic Root) OR (Aortic Dissection) OR (Ayurveda Cardiology)	Language English, Less than 10years	Free Full text articles,
Google Scholar	Hrudaya Marma AND (Dasha Dhamani) (Ascending Aorta) (Sinotubular Junction) (Aortic Root) (Aortic Dissection) (Ayurveda Cardiology)	Any Type	
AYUSH research portal	Hrudaya Marma AND Dasha Dhamani OR (Ascending Aorta) OR (Sinotubular Junction) OR (Aortic Root) OR (Aortic Dissection) OR (Ayurveda Cardiology)	Ayurveda, Cardiovascular System, Language English	Free Full text, screened manually

Table 2: Classical references to *Hrudaya Marma*

Source	Sanskrit Text / Concept	Translation / Metrology	Clinical Significance
<i>Sushruta Samhita</i>	<i>Sadhya Pranahara Marma</i>	A vital point causing sudden death.	Injury precipitates mortality within 7 days; analogous to cardiogenic shock.
<i>Charaka Samhita</i>	<i>Dashadhamani Moola</i>	Central origin points for the 10 great systemic vessels.	Represents the central hemodynamic hub of the cardiovascular system.
<i>Ashtanga Hridaya</i>	<i>Mahajava/ Vyana Vayu</i>	Kinetic force initiating violent projection.	Correlates to coordinated myocardial contraction and systemic ejection.
Acharya Gananath Sen	<i>Aarohini Mahadhamani</i>	Ascending great vessel; 2 <i>Angula</i> length, 5 <i>Angula</i> circumference.	Morphological exactitude matching the ascending aorta.

Table 3: *Dasha Dhamani* and modern anatomical correlation

Ayurveda Structure	Classical Description	Modern Equivalent
<i>Dasha Moola Sira</i>	10 root vessels originating/terminating at the heart.	SVC (1), IVC (1), Pulmonary Trunk (1), Aorta (1), Pulmonary Veins (4), Coronary Arteries (2).
<i>Aarohini Mahadhamani</i>	Main ascending vessel (2 <i>Angula</i> long).	Ascending Aorta (~5 cm long).
<i>Vaama Nilaya</i>	Left chamber from which <i>Aarohini</i> emerges.	Left Ventricle.
<i>Kotara</i>	Three pockets at the base of the ascending vessel.	Aortic Sinuses (Sinuses of Valsalva).
<i>Hardhika Dhamani</i>	Nutritive vessels arising from the <i>Kotara</i> .	Right and Left Coronary Arteries.

Modern cardiovascular anatomy of the aortic root: In contemporary anatomy, the aortic root is the direct

continuation of the left ventricular outflow tract. It comprises the aortic valve leaflets, the sinuses of Valsalva, and

terminates at the STJ, where the tubular ascending aorta begins. [13] The sinuses of Valsalva are structurally equivalent to the classical *Kotara*, and they contain the ostia for the coronary arteries, homologous to the *Hardhika Dhamani*. [5] The ascending aorta subsequently spans approximately 5 cm—strikingly parallel to the two *Angula* classical metric—before transitioning into the aortic arch.

Sinotubular diameter and clinical implications: The STJ represents a critical anatomical and physiological boundary. A healthy STJ maintains the geometric configuration of the aortic valve commissures, ensuring valvular competence. Measurements of the STJ are routinely acquired via echocardiography, CT angiography, and MRI. [14] Recent observational evidence underscores the critical prognostic value of STJ metrology. The ratio of STJ diameter to body surface area (BSA) is independently associated with acute type A aortic dissection and serves as a highly sensitive risk stratification parameter. [1] Pathological dilatation or effacement of the STJ compromises aortic valve coaptation and increases parietal wall stress, governed by Laplace's Law. Various conditions precipitate these biomechanical failures, including ascending aortic aneurysms, Marfan syndrome, chronic hypertension, and bicuspid aortic valve pathophysiology. [14]

4. DISCUSSION

The depth of anatomical specificity achieved by classical Ayurveda scholars requires a paradigm shift in the interpretation of ancient texts. The classical metric of two *Angula* (approximately 5 cm) for the *Aarohini Mahadhamani* confirms that *Pramana Sharira* (quantitative anatomy) was grounded in empirical observation. (Table no 2) The integration of *Marma Vigyana* (science of vital points) with modern hemodynamics reveals profound clinical synergies. [12] The classification of the *Hrudaya* and its root vessels as a *Sadhya Pranahara Marma* accurately reflects the absolute structural vulnerability of the aortic root. (Table no 2) In *Vidhi*

Vaidyaka (forensic medicine), the sudden decompensation following acute aortic dissection manifests clinically as cardiogenic shock. [9] This identically matches the Ayurveda symptomatology of *Hrudaya Marma Abhighata* (injury to the heart vital point): *Shvasa* (severe dyspnea), *Moorcha* (acute syncope), and *Balakshaya* (profound loss of strength). [3, 7] Integrating *Ayurveda Marma Sharira* with advanced cardiothoracic imaging offers novel pathways for predictive cardiology.

Previous study done on *Hridaya Marma* with special reference to modern anatomy where it was concluded that *Hridaya Marma* lies in thoracic cavity between two *Stana* and *Amashaya* and Heart can be correlated to *Hridaya*. It is the seat of *Chetana* and various structures like *Mamsa*, *Sira*, *Snayu*, *Asthi*, *Sandhi* and *Dasha Dhamani* are present in *Hridaya Marma*. [16]

A review on *Hridaya Marma* and its structural and functional significance was done which shows the anatomical relation of *Hridaya Marma* with Heart where cardiovascular system helps in regulating cardiac functions and well-being of heart. Physiologically it shows its potential effect in autonomic nervous system, stress response and emotional regulation. But further research is needed to check the relation between heart and Brain. [17]

An observational study was done on 408 patients with cardiovascular risk factors to know the potential influencing factors of aortic diameter at specific segments was done, which revealed that High density lipoprotein cholesterol had a positive effect on the diameter of ascending and abdominal aorta, diastolic blood pressure was observed for the positive associations with diameters of five thoracic aortic segments, while systolic blood pressure was independently related to mid arch diameter. [18]

Future research should leverage AI-based echocardiography and automated CT measurements to map *Angula* metrics against varying demographic BSAs, standardizing ancient

measurements. Furthermore, exploring the concept of the heart's intrinsic neural network in relation to *Manas* (mind) and *Sadhakapitta* (bio-energy of cognition) provides fertile ground for psychosomatic cardiovascular therapies.

Clinical applications: Measurement of the sinotubular junction (STJ) diameter and its index to body surface area may aid in the early identification of individuals at increased risk of acute type A aortic dissection, facilitating timely preventive interventions. The classical description of Hrudaya Marma *Abhighata* (injury to the cardiac vital point) closely resembles the clinical presentation of acute aortic dissection, cardiogenic shock, severe myocardial injury, and sudden cardiovascular collapse. This correlation may support clinical interpretation in emergency settings.

Limitations: 1. This review is narrative in nature and does not include a systematic review methodology or meta-analysis. 2. Direct clinical studies evaluating the relationship between Hrudaya Marma, Dasha Dhamani, and specific cardiovascular outcomes are limited.

5. CONCLUSION

The ancient Ayurveda concept of *Hrudaya Marma* and *Dasha Dhamani* represents a highly sophisticated, structurally accurate model of cardiovascular anatomy. The classical measurements of the *Aarohini Mahadhamani* correlate precisely with the modern human ascending aorta. The *Kotara* identified in *Pratyaksha Shareera* anatomically and functionally mirror the sinuses of Valsalva, yielding the *Hardhika Dhamani*, which are directly homologous to the coronary arteries. Contemporary imaging confirms that the STJ diameter, particularly when indexed to body surface area, is a critical predictor of acute type A aortic dissection. The catastrophic symptomatology of aortic root trauma mirrors the classical signs of *Marma Abhighata*. Bridging *Pramana Sharira* with modern cardiovascular science validates traditional empirical knowledge. This integrative correlation establishes a robust framework for personalized, preventive

cardiology and provides historical validation beneficial to forensic pathology and *Vidhi Vaidyaka*.

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REFERENCES:

1. Wang W, Liu Y, Wang X, Ran H, Huang F, Zhou J, Chen X, Su C. The diameter of sinotubular junction to body surface area is independently associated with incident acute type a aortic dissection. J Cardiothorac Surg. 2025 Jun 18;20(1):263. doi: 10.1186/s13019-025-03502-x. PMID: 40533791; PMCID: PMC12177952. DOI: [10.1186/s13019-025-03502-x](https://doi.org/10.1186/s13019-025-03502-x)
2. Charitos EI, Sievers HH. Anatomy of the aortic root: implications for valve-sparing surgery. Ann Cardiothorac Surg. 2013 Jan;2(1):53-6. DOI: 10.3978/j.issn.2225-319X.2012.11.18. PMID: 23977559; PMCID: PMC3741810. DOI: [10.3978/j.issn.2225-319X.2012.11.18](https://doi.org/10.3978/j.issn.2225-319X.2012.11.18)
3. Wang W, Liu Y, Wang X, Ran H, Huang F, Zhou J, Chen X, Su C. The diameter of sinotubular junction to body surface area is independently associated with incident acute type a aortic dissection. J Cardiothorac

- Surg. 2025 Jun 18;20(1):263. doi: 10.1186/s13019-025-03502-x. PMID: 40533791; PMCID: PMC12177952. DOI: [10.1186/s13019-025-03502-x](https://doi.org/10.1186/s13019-025-03502-x)
4. Yadavaji Trikamaji (editor). Sushruta Samhita of Sushruta, Sharirasthana, chapter 6, verse no.15. 7th edition, Varanasi; Chaukhambha Orientalia; 2002;371
 5. Sen G. Pratyaksha Shareeram. Dhamani Khanda, chapter 3, Choukhamba Krishnadas Academy Varanasi;68
 6. Yadavaji Trikamaji (editor). Sushruta Samhita of Sushruta, Sharirasthana, chapter 3, verse no.18. 7th edition, Varanasi; Chaukhambha Orientalia; 2002;342
 7. Yadavaji Trikamaji (editor). Sushruta Samhita of Sushruta, Sharirasthana, chapter 4, verse no.30. 7th edition, Varanasi; Chaukhambha Orientalia; 2002;357
 8. Yadavaji Trikamaji (editor). Sushruta Samhita of Sushruta, Sharirasthana, chapter 4, verse no.31. 7th edition, Varanasi; Chaukhambha Orientalia; 2002;358
 9. Yadavaji Trikamaji (editor). Sushruta Samhita of Sushruta, Sharirasthana, chapter 6, verse no.30. 7th edition, Varanasi; Chaukhambha Orientalia; 2002;375
 10. Paradkar HS (editor). Ashtanga Hridaya of Vagbhata, Sutrasthana, chapter 12, verse no.6. 8th edition, Varanasi; Chaukhambha Orientalia; 1998;193
 11. Ravi Dutt Tripathi (editor). Charaka samhita of Charaka, Sidhisthana, chapter 9, verse no 4. Varanasi; Chaukhambha Orientalia;2017;945
 12. Bachikwar PR, Wanare A, Selokar YN, Sharma G. Study of Hriday Marma with special reference to modern anatomy. World Journal of Biology Pharmacy and Health Sciences. 2024;19(3):589-594. DOI: <https://doi.org/10.30574/wjbphs.2024.19.3.0684>
 13. Gerard JT, Bryan D, editors. Anatomy and Physiology. 2015 edition, chapter 21. Noida: Shree Maitrey; 2016;679.
 14. Isselbacher EM, Preventza O, Hamilton Black J, et al. 2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease. Circulation. 2022;146(24):e334-e482. Available from: <https://doi.org/10.1161/CIR.0000000000001106>
 15. Erbel R, Aboyans V, Boileau C, et al. 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases. Eur Heart J. 2014;35(41):2873-2926. Available from: <https://doi.org/10.1093/eurheartj/ehu281>
 16. Study of Hriday Marma with special reference to modern anatomy Pragati R Bachikwar, Aparna Wanare, Yajurved N Selokar, and Gopal Sharma Article DOI: <https://doi.org/10.30574/wjbphs.2024.19.3.0684>
 17. Hridaya Marma: A Review of its Structural and Functional Significance Vd. Dnyanda Bhujbal, Vd. Arun Bhujbal, Vd. Vishal Madhukar Khandre Available from: https://jiirt.org/publishedpaper/IJIRT173143_PAPER.pdf
 18. Chen T, Yang X, Fang X, Tang L, Zhang Y, Weng Y, Zhang H, Wu J, Mao P, Xu B, Jiang J, Chen X. Potential influencing factors of aortic diameter at specific segments in population with cardiovascular risk. BMC Cardiovasc Disord. 2022 Feb 5;22(1):32. doi: 10.1186/s12872-022-02479-y. PMID: 35120453; PMCID: PMC8817600. <https://pubmed.ncbi.nlm.nih.gov/35120453/>