

**REVIEW ON CONCEPT OF *HRUDAYA* IN *AYURVEDA* WITH
SPECIAL REFERENCE TO MODERN PERSPECTIVE****Dr. B. M. N. Kumar***

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ABSTRACT

The term '*Hrudaya*' itself has been controversial since ages and continues to be so even today. The scholars subscribe to an astonishing range of opinions. The term has been assigned to at least a dozen organs in the body, each claim being backed by reasoning and commonsense. *Ayurveda* considers *hrudaya* as one of the vital organ of the body. As it is one among the *trimarams*, any injury to the *hrudaya* leads to severe complications & even death. *Hrudaya* is an organ which draws blood from all over the body and then supplies it to all parts of the body. The *hrudaya* being a muscular organ derives its nutrition from *rasa*, its oxygen from *rakta* and its vital energy from

ojas. Its movements are controlled by *vyanavata*. Different references available in *Ayurveda samhitas* regarding situation, shape, size, colour, structure, functions etc. of *hrudaya* suggest that heart is the similar structure of *hrudaya* in modern science.

KEYWORDS: Hrudaya, Rasa, Rakta, Heart, Artery.**INTRODUCTION**

A considerable knowledge regarding the *hrudaya* can be made available in *Ayurveda*, but very confusing array of glossary used by *Ayurvedic acharyas* in various places to describe the anatomical term *hrudaya*. *Ayurveda* considers *hrudaya* as one of the vital organ of the body.^[1] *Hrudaya* is an organ which draws blood from all over the body and then supplies it to all parts of the body. The *hrudaya* being a muscular organ derives its nutrition from *rasa*, its oxygen from *rakta* and its vital energy from *ojas*. Its movements are controlled by *vyanavata*. Thus, when we, go through different references about *hrudaya* in *Sushruta samhita*, it denotes *urohrudaya* (heart) only whenever *Sushruta* uses the word '*hrudaya*'. But references from texts like *Charaka*, *Bhela*, *Sarangadhara*, *Madhava nidana* etc. the word *hrudaya*

indicates *sirohrudaya* (brain) and several other organs in different contexts. In this present article scholar try to correlate the *hrudaya* with *urohrudaya* only and whenever the term *hrudaya* appears it should be taken for granted that it is synonymous with Heart.

Review of literature

In *Ayurveda* *hrudaya* is well known structure and it is elaborately available anatomical, functional and clinical aspects of *hrudaya*.

A. Derivation

The term *hrudaya* was explained many years ago in *Satapada brahmana* for the first time and that gives the functional analysis of *hrudaya*. The term *hrudaya* is composed of the three words viz *Hra Harane*, (to take, or to acquire.), *Da Dane* (to give) and *Ya Gatau* (one in which transport takes place). The *hrudaya* performs all the three activities in a sequence. The cycle is completed by receiving, giving and transport in itself.^[2]

B. Situation

Hrudaya has also been recognized as one of the *Koshtanga*. *Hrudaya* is situated between the two breasts in the chest (thorax) at the opening of *amasaya*.^[3] The *pliha* and *puppusa* are situated below and beneath the *hrudaya* on the left side and the *yakrut* and *kloma* below and beneath the *hrudaya* on the right side.^[4]

Ashtanga Hrudayakara opines the same that the *satvaididhama hrudaya* is situated in the *madhya bhaga* of *stana*, *ura* and *koshta*.^[5] According to *Sarangadhara* *hrudaya* is *jivaraktasaya*, the seat for lively blood, is situated in the chest.^[6]

C. Development

Embryologically *hrudaya* is produced from the essence of *rakta* and *kapha*. The *dhamanis* carrying *prana* to the body part are attached to *hrudaya*.^[4] *Charaka* believes that complete development of *hrudaya* takes place either at the end of third month^[7], whereas *Sushruta* believes that it develops in the beginning of fourth month.^[8] According to him *hrudaya* is derivative of *matruja bhava* (maternal factor).^[9]

D. Shape and position

The shape of *hrudaya* resembles like *pundarika* (lotus bud) facing downward.^[10]

E. Measurement

In *Ayurveda* *hrudaya* is measured as two *angulies*. While *Sushruta* has mentioned the size of *hrudaya marma* is *panitala* (four *anguli*).^[11]

F. Structure

In *Ayurveda* described structure of the *hrudaya* following way

1. The *hrudaya* is an assemblage of fleshy muscular structure. While describing the *peshi*, *Sushruta* has clearly mentioned that there are two *peshies* within the *hrudaya*.^[12] In *Ashtanga Hrudaya* it is mentioned that the *hrudaya* is constituted predominantly by the *peshi*.^[13]
2. The *hrudaya* resembles like a *pundarika* (red lotus), with its apex turned downwards (*adhomukha*). *Dalhana* has also described *hrudaya* like a lotus bud facing downwards.^[14]
3. It has *mandala sandhi*.^[15]
4. The *nadis* spread all over body are related to the *hrudaya*.^[16]
5. In *Ashtanga Sangraha Vagbhata* said that *hrudaya* has '*sushira*' (hallow organ).^[17] *Sarangadhara* also considered the same; according to him *hrudaya* is *jivaraktasaya* present in *uraha*.^[6]
6. *Acharya Vagbhata* has referred a word *samvrtta* (closed orifice) and *asamvrtta Dwara* (Open orifice).^[5]

G. Functions

In *Ayurveda* explained the functions of *hrudaya* in following way

1. The *hrudaya* has been especially described as the seat of *chetana* in all human beings. It is considered as a seat of *chetana* based on its un-interrupted work throughout the entire period of life and stop working at the end of life leading to death, which then makes body *achetana* (non-conscious, lifeless). *Hrudaya* is only place where is stored the life activity (*chetana*).^[18]
2. *Hrudaya* and its attached vessels provide life by supplying the *jiva tatva* (blood) to whole of the body.^[19]
3. *Sankocha* or *nimilana* or contraction and *vikasa* or *vikasita* or relaxations are the properties of *hrudaya*, described by *Sushruta*.^[10] *Sankocha* or contraction or systole and *vikasha* or relaxation or diastole both are generated repeatedly and automatically.
4. The functioning of heart during day and night time has been narrated by *Bhela* like a lotus which opens in day time and closes in night time.^[20] *Charaka* said *hrudaya* becomes *mlana*

and *samvrrta* in the night.^[21] *Sushruta* and *Vagbhata* also considered the same. *Hrudaya* opens when a person is awake (*jagrata*) and closes when he is asleep (*svapata*).

5. *Acharya Sarangadhara* explained circulatory system in *Sarangadhara samhita*. The contraction and relaxation are the two stages of the heart he quoted it as *sankocha* and *vikasha*. During contraction, the *hrudaya* expels out blood from *hrudaya* to *dhamanis*. During relaxation period, the blood fills back by the *siras* in the heart again.^[22]

6. It is a seat of the vital force (*ojas*) in the body; this vital force is the soul of all vital activities ever thought of. *Charaka* said; “The *dasah mahamula dhamanis* are the channels of transport of *ojas* to the entire body”.^[23]

7. The *rasa* which is purified is collected in the *hrudaya* and thrown away by the action of *vyana vayu*, passes everywhere in the body.^[24]

8. *Hrudaya* and *dhamani* are common *mula* of *pranavaha Srotas* and *rasavaha srotas* for achieving both the common objectives i.e. supply of oxygen and nutrition up to cellular level of body.^[25]

DISCUSSION

Thus, when we go through different references about *hrudaya* in *Sushruta samhita*, it denotes ‘heart’ only whenever *Sushruta* uses the word ‘*hrudaya*’. But references from texts like *Charaka*, *Bhela*, *Sarangadhara*, *Madhava nidana* etc. the word *hrudaya* indicates several other organs in different contexts. The structures which are referred to as *hrudaya* are-umbilicus, chest, lungs, pericardium, brain, lower end of oesophagus, epigastric region, mind and soul. But the following different references about *hrudaya* available in *Ayurveda samhitas* regarding derivation, situation, shape, size, colour, structure, functions etc. is very similar to structural and functional description about heart in modern science but not any other organs.

- Seeing the derivation of *hrudaya* *Hri* comes from *Harati* which means ‘to receive’, *Da* is the short form of *Dadati* which means ‘to give’ and *ya* stands for *Ayati* which means ‘to go’, ‘to move’ or ‘to circulate’. It is interesting to note that the heart performs exactly these three functions of giving blood, receiving blood and circulating blood by acting as a pump.

- Regarding situation of the *hrudaya* *Ghanekar* said that *Sushruta* has mentioned *amasaya dwara* is because of its near position to the *hrudaya*, not because it as the cardiac orifice.^[26] *Pandit Gananatha Sen* also agrees with *Ghanekar*, has given an elaborate description regarding *hrudaya* in *Pratyaksha sharira*. He explains *hrudaya* along with its covering sheath pericardium is situated in the middle mediastinum just behind the sternum. He elaborated the relations too, i.e. lungs are present in both sides of *hrudaya* along with the principle bronchus. *Annanalika* (esophagus) comes in its posterior aspect.^[27]

Situation of the *hrudaya* is very similar to the heart in modern anatomy. According to modern anatomy heart is a conical muscular organ placed in the middle mediastinum of the thoracic cavity. It enclosed within the pericardium. The heart is placed obliquely behind the body of the sternum and adjoining part of the costal cartilages. So that 1/3 of it lies to the right and 2/3 to the left of median plane. It rests on the central tendon of diaphragm.^[28]

- *Sushruta* described that the *hrudaya* is developed from *kapha* and *rakta prasada*. The word *kapha- prasada* & *rakta- prasada*, means that the *hrudaya* is made up from the gracious elements of *kapha* and *rakta* and a group of muscular fibers. It clearly indicates that *kapha- prasada* & *rakta- prasada* means a specialized musculature tissue which is known as specialized heart muscle tissue or the conductive system of heart, has some white bands in it.

- *Pandit Gananatha Sen* in *Pratyaksha sharira* explains that *hrudaya* is in the shape of inverted lotus bud which is obliquely placed in the mediastinum. Modern anatomy also considered the same that the heart is cone shaped and narrow apex faces downwards.^[29]

- In *Ayurveda* *hrudaya* is measured as two *angulies*. Here two *angulies* might have referred for the apex of heart. While *Sushruta* has mentioned the size of *hrudaya marma* is *panitala* (four *anguli*). The heart is roughly the same size as a closed fist (*panitala*). The heart measures about 12x9 cm and weight about 300 grams in males and 250 grams in females.^[30]

- While describing the *peshi*, *Sushruta* has clearly mentioned that there are two *peshies* within the *hrudaya*. It should interpret with the pericardium and myocardium of heart.

- *Acharya Vagbhata* has referred a word *samvrtta* (closed orifice) and *asamvrtta dwara* (Open orifice) present in *hrudaya*. It is may be considered as valve of the heart.

- Here the word *chetana* can be considered as the source of energy. *Hrudaya* is the source of energy for all the other functions happen in the body. Modern studies reveal that even after the Brain death; the only organ which functions for a while is heart. The conduction system of the heart is functions itself without nerve impulses.^[31]

- When the man is at rest the rate of heart beat comes slow and when at work, the heart rate goes up. That is why *Sushruta* writes that the *hrudaya* blooms when the man is awaking and it closes when he is sleep. *Sri Kanthmurthy*, in his commentary on *Sushruta samhita* considers that the terms *jagrata* and *svapata* should as period of life and death respectively not in general popular meaning of wake fullness and sleep, since the nature of working of the heart does not change significantly during these two states.^[32]

- According to *Charaka*, the *mula sthana* of *pranavaha srotas* is *hrudaya* and *maha srotas*. *Sushruta* explains *hrudaya* and *rasavahini dhamanis* as the *pranavaha sroto mulas*. *Sarangdhara* envisage the importance of *prana vayu* (oxygen) is widely distributed through the body from *hrudaya* and it is constantly nourish the *dhatu* in the presence of air.

In scholars view according to modern medical science, oxygen transportation is the function of blood. Oxygen is the *prana vayu*. As blood is the transporting agent of *prana vayu*, as it is circulated from the Heart, *hrudaya* is the *mula* of *pranavaha srotas*. And thus by supplying *prana* to the whole body, *hrudaya* does the *jivana karma*.

Heart is the only organ by which the Oxygen is able to supply to each and every tissue by its pumping mechanism. Heart accomplishes the function of supplying the Oxygen to tissues of the body and also which functions independently without much dependent on other organs, where no other organ can bring out this function.^[33]

- Heart sounds in the term of *Ayurveda* together called as *dhamana* results due to *spandan* activity of the *hrudaya*. These sounds indicate the life activity (*chetana*) in living beings.

- In *svabhava vipratipatti* chapter, *Acharya Sushruta* has been recognizing a serious medical problem. The development of pain at the base of the breasts, heart and chest are indicative sign of death.^[34] Now with the devolvment of the science it is clear that incomplete obstruction (usually due to spasm of coronary artery) causes angina pectoris which are associated with the agonizing pain in the pericardial region and down to the medial side of

the left arm. It affects annually seven million people and causes nearly half a million death in united state.

- *Hrudaya* has been described as one of the *marma* of the thorax. It is *sira marma* and *sadya pranahara marma*. as the central supports the wood and bamboo form work of the roof, so the heart represents the substratum of all the entities and qualities of individual. And even a small injury to the *hrudaya* results in the fainting and any serious injury to it lead to death. According to *charaka* *hrudaya* is the one of the main *marma* among *tri marmas* because *marmas* of limbs are depend on *hrudaya* for nutrition. injury to this leads to immediate death.^[35]

- According to *Ayurveda* *nadis* are encircles the *hrudaya* like a spokes of wheel. This statement indicates *nadis* means tubular structures, it surrounds the *hrudaya*. *Hrudaya* is the *mula* (root) of *dasa* (ten) *maha dhamanis* as they spring from the heart. Modern science also conforms this statement of *Ayurveda*; arteries encircle the heart in the manner of a crown, hence the name coronary arteries^[36] (Latin word corona - crown). The statement of *Charaka* regarding *dasa* (ten) *maha dhamanis* is true because the vessels emerging out of the heart are the nutrition agents of the body. As far as the number of ten vessels attached to the heart is concerned, vessels bringing blood to the heart and taking blood out of the heart can be enumerate as aorta, superior vena cava, inferior vena cava, pulmonary vessels and coronary arteries.

Table. I: Correlation in between *hrudaya* and heart.

Feature	<i>Hrudaya</i>	Heart
Derivation	<i>Hri</i> means, <i>Haran</i> (to receive) and <i>Dadati</i> means to pump out.	Blood vessels form a close circuit of tubes that carries blood away from the heart to tissues of the body and then return back to the heart.
Situation	<i>koshtanga</i> , <i>uraha pradesha</i> , in between two breasts.	In thoracic cavity, Inferior middle mediastinum; the place in between two lungs.
Shape	Like lotus bud (<i>pundarika</i>) facing downwards (<i>adhomukha</i>).	Cone shape with narrow apex faces downwards
Size	<i>panitala</i>	Size of closed fist
Colour	Red	Red
Structure	(i) fleshy muscular structure (ii) Has <i>sushira</i> or <i>asaya</i> (iii) <i>Samvrtta</i> (closed orifice) and <i>asamvrtta dwara</i> (Open orifice)	(i) Cardiac muscle(myocardium) (ii) Hollow organ, chambers of heart (iii) Opening and closing of valves
Relations	Inferiorly: Opening of <i>amasaya</i> . Left side: <i>pliha</i> and <i>puppusa</i> Right side: <i>yakrut</i> and <i>kloma</i>	Right side and left side: lungs Inferiorly: cardiac orifice of stomach, liver and spleen

Structures taking Origin	Ten <i>maha dhamani</i> and origin of <i>siras</i> .	Venae cavae, aorta, pulmonary veins, pulmonary trunk and coronary arteries
Functions	(i) <i>Pranavahana</i> and <i>rasavahana</i> (ii) <i>Jagrata</i> and <i>svapata</i> (iii) <i>Dhatu poshana</i>	(i) Carrying of <i>rasa</i> (lymph) and <i>rakta</i> (blood) (ii) Contraction and dilatation (iii) Nutrition of tissues

CONCLUSION

It has so many controversies about *hrudaya* regarding modern correlation. So many scholars interpreted the different structures for *hrudaya* in modern science. These types of controversies arise due to different opinions of *samhitakaras* and different commentators of *samhitas*. In scholars view the different references about *hrudaya* available in *Ayurveda samhitas* regarding derivation, situation, shape, size, colour, structure, functions etc. is very similar to structural and functional description about heart in modern science but not any other organs.

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