

## REVIEW ARTICLE

# Anatomical Consideration of Dhamani Marma with Special Reference to Vidhur Marma in Ayurveda

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### ABSTRACT

*Marma* sharira is known as the science of traumatological anatomy. Injuries to various structures of the body such as arteries, muscles, nerves, bones, and visceral organs may result in fatal injuries and death. *Marmas* in *Ayurvedic* classics are illustrated as the vital points in human body injury of which leads to termination of life. *Acharya Sushruta* has presented five types of *marmas* on structural basis, that is, *Mansa-marma*, *Sira-marma*, *Snayu-marma*, *Asthi-marma*, and *Sandhi marma*. Whereas according to *acharya Vagbhata*, there are six types of *marmas*. He has enumerated a sixth group of *marma* known as *Dhamani Marma*. Under the *Dhamani Marmas* which are nine in number he has presented *Vidhur marma*. The injury to which leads to deafness. The possible cause of deafness may be due to injury of an arterial structure that is *Dhamani* or *snayu*, that is, nerves. This article focuses on co-relating various anatomical structures such as arteries and nerves with *Dhamani Marma* explained by *acharya Vagbhata* with special reference to *Vidhur marma* injury.

## 1. INTRODUCTION

*Ayurveda* is the “Science of life.” *Marma* is one of the important topics of *Ayurveda* described by various *Acharayas*. *Marma vinyan* is known as the science of traumatology. Different school of thoughts have analyzed this subject from different angles and developed their own views. This article also aims at establishing a different view regarding various anatomical structures related to specifically *dhamani marmas* in our body.

*Marma* is known as the “*Shalya vishyardha*”<sup>[1]</sup> as *Vasti* is known to be *Chikitsa-ardha* in *Kaya Chikitsa*. *Marma* is defined as the confluence of *Mamsa* (muscles), *Sira* (vessels), *Snayu* (ligaments), *Asthi* (bone), and *Sandhi* (joints) forming the seat of life.<sup>[2]</sup> *Marma* in *Ayurvedic* classics is illustrated as the vital point in the human body, the injury of which leads to death and disability. The cause of fatality is usually hemorrhagic. The hemorrhage plays a vital role in traumatic conditions therefore *acharya Sushruta* has recognized the role of blood by naming *Rakta* as fourth *dosha*. *Acharya Sushruta* has described *rakta* as the root (*moola*) of the body, body is sustained by blood and said that it should be protected carefully. *Acharya Sushruta* also gave a four-fold measure for the coagulation of blood in order to stop excessive bleeding from

the body, that is, coldpack (*Skandan*), astringent drugs (*Sandhan*), desiccating ash (*Pachan*), and lastly cauterization (*Dahan*).<sup>[3]</sup> Thus, *Acharya Sushruta* highlighted the significance of blood in human body by stating that blood is life (*Jeev*).<sup>[4]</sup>

107 *marmas* are mentioned by *acharya Sushruta* in *Sharir sthan* 6<sup>th</sup> chapter *Pratyek Marma Niradesh sharir*.<sup>[5]</sup> In the same chapter, he has classified *marmas* on the basis of traumatic effect and prognosis into five types<sup>[6]</sup> - *Sadhyapranhar Marma*, *Kalantar pranhar Marma*, *Vishalyaghana Marma*, *Vaikalyakar Marma*, and *Rujakar Marma*. On the basis of morphology, *acharya Sushruta* mentioned the following five types of *marmas*:<sup>[5]</sup>

- *Mamsa Marma* (11),
- *Sira Marma* (41),
- *Snayu Marma* (27),
- *Asthi Marma*(8),
- *Sandhi Marma* (20).

*Acharya Vagbhata* in *Ashtang Hridaya sharir* sthan 4<sup>th</sup> chapter *Marma Vibhag sharir* has classified *marmas* into six types.<sup>[7]</sup> He has described the number of *marmas* 107 only but added one more category of *marma* that is *Dhamani Marma*. In the same chapter of *Ashtang Hridaya sharir* sthan *Dhamani Marma* are described as nine in number<sup>[8]</sup>-*Guda-1*, *Apasthambha-2*, *Shringatak-4*, *Vidhur-2*. *Dhamani marma* is not explained by any other *acharya* except *acharya Vagbhata*

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in *Astang Hridaya sharira sthan*. So a more deep study is needed to find out the significance of explaining one more type of *marma*, that is, *Dhamani marma* by *acharya Vagbhata*. Description of similarity of *Sira, Dhamani and Srotas* is given in *Sharira sthan* of *Sushruta samhita* in the same chapter he has also defined *sira* different from *dhamani* and *srotas*.<sup>[9]</sup> Structurally and functionally *dhamani* (artery) and *sira* (vein) are explained different in modern literature also. *Acharya Vagbhata's* separate description regarding *Dhamani marma* shows the importance of *Dhamani*. Sudden death (*Sadya pranhar*) or death after few days (*kalantar pranhar*) may occur after trauma on *Dhamani marma* due to excessive bleeding. If one goes through the *Ayurvedic* literature cognizable anatomy regarding these structures is described, which is very precise and not in detail. *Dhamani marma* has been explained by *acharya Vagbhata* in a summarised form. So it is felt that the above brief description of *sira, dhamani* structures, their anatomical co-relations and post traumatic effect needs more explanation on the basis of updated knowledge available in modern anatomy. The present article has been taken up to lay emphasis on all the anatomical structures relating with *dhamani marmas* and especially focusing on traumatic effects of *vidhur marma*.

## 2. MATERIALS AND METHODS

This article's contents are based on a review of several contemporary books, journals, and classical *Ayurvedic* literature.

## 3. DISCUSSION

*Ayurveda* accepts two types of *Vrana shaarir* and *Agantuj*.<sup>[10]</sup> Trauma comes under *agantuj vyadhi*, where disease appears first with *ruja* and vitiation of *doshas* occurs later on. In today's time trauma is classified under two categories blunt and penetrating. Under blunt trauma road traffic accidents are most common assaults. Regarding the mechanism of injury head injuries, chest trauma and lower abdominal injuries are frequent. These traumas involve many tissues such as skin, muscles, bones, lungs and lung roots, and great vessels of the body. Among all penetrating wounds head injuries and abdominal injuries are life threatening. While some other injuries may not be fatal for life but they may lead to lifelong physical deformities and even death.

The common effect of trauma on the body are as follows: Muscle tear, tendon can tear or rupture, veins can rupture, bone can break in many splinters, joint can dislocate, skull can be smashed, eyes can be gorged out, eardrum can rupture, and nerve centers can be injured.<sup>[11]</sup>

*Ayurveda* believes that ideal management of any disease requires deep knowledge of anatomy and physiology. The physician who understands this can initiate early management of the patient. *Acharya Sushruta* and *Vagbhata* both recognized this concept. The most dramatic and urgent symptoms in an injured patient is asphyxia. It is quickly fatal if not relieved and death can ensue in minutes. This phenomenon is seen in *vidhya lakshana* of *Vaksho-marmani* (chest *marma*). The surgical conditions of chest injuries produce asphyxia which is recognized as *Shwas*. Hemorrhage is next in importance and should be rapidly controlled by all the necessary measures. The above various traumatological effects can be understood while describing *Dhamani marmas* mentioned by *acharya Vagbhata*.

### 3.1. Guda Marma

*Guda marma* comes under the category of *sadyapranhar marma* on the basis of prognosis and categorised as *Dhamani marma* on the basis of structural classification. The *abhighaat* on this *marma* leads to

immediate death of the person. This condition clinically relates to the pathophysiology of hypovolaemic shock resulting from trauma due to hemorrhage.<sup>[12]</sup> The derangements due to clinical condition of shock if remain untreated it will lead to progressive deterioration, multisystem failure and ultimately death.

#### 3.1.1. Shock

It is a life-threatening clinical syndrome of cardiovascular collapse and multisystem failure characterized by: An acute reduction of effective circulating blood volume (hypotension) and an inadequate perfusion of cells and tissues (hypoperfusion). If uncompensated these mechanisms may lead to impaired cellular metabolism and DEATH.<sup>[13]</sup>

### 3.2. Apasthambha Marma

*Acharya Vagbhata* categorized *Apasthambha marma* as a *kalantar pranhar marma* on prognostic basis and considered as *Dhamani marma* on structural basis. *Apasthambha marma abhighaat* leads to death from accumulation of blood inside the chest, cough, and dyspnea.<sup>[14]</sup> These traumatic symptoms clinically relate to fatal conditions such as hemothorax and pneumothorax in pleural cavity caused by a penetrating chest wound or rupture of the lung.

### 3.3. Hemothorax

Accumulation of pure blood in the pleural cavity is termed as hemothorax. The most common cause of hemothorax is trauma to the thoracic cavity. It is important to remove the blood from the pleural cavity as early as possible. The clinical picture may be similar to that of patients with a pneumothorax and includes rapid shallow respirations. If the blood is not removed it will clot resulting in obliteration of the pleural cavity. Hemothorax is dangerous not only because it can lead to hypovolemic shock, compression of the injured lung and ultimately leads to reduction in vital capacity. Bleeding may arise from lacerated pulmonary parenchyma from systemic arteries such as the intercostal or the internal mammary or from the heart and great vessels. Bleeding from the latter may be so massive as to create a rapidly fatal condition best characterized as a tension hemothorax. These patients may have dull heart and lung sounds or may be in shock secondary to hemorrhage. If both air and blood are present in the pleural cavity, the condition is called hemopneumothorax.<sup>[14]</sup>

### 3.4. Shringatak Marma

*Shringatak marma* is categorized as *sadyapranhar marma* by *acharya Vagbhata* on the basis of prognostic classification and considered as a *Dhamani marma* on structural classification. *Shringatak marm abhighaata* results in immediate death. The symptoms of this *marm abhighat* relates to the features seen in external or internal injury of cavernous sinus inviting many life threatening conditions such as intracranial hemorrhage, thrombosis, internal carotid artery fistula, and strokes. In traumatology the head is a very significantly lethal point and if a proper intensity of force is applied with accuracy the person may undergo concussion to instant death. There is a similar point in *marma vgyan* which is known to be *Shringatak marma* situated within the confluence of *sira* nourishing the *Ghrana* (nose), *Shrota* (ear), *Akshi* (eye), and *Jiwha* (tongue). The location of this *marma* is difficult to understand as the exact landmark is not mentioned like other *marma*. The classical description is indicating the only vascular constitution of the *shringatak marma* and its structural link with the sense organs. With regard to *Ghrana, Shrota, Akshi* and *Jiwha* only Cavernous Sinus seems to have vascular connections directly or indirectly with the sense organs.

According to description in *Ayurveda Shringatak marma* is *sadyapranhar Marma*. On injury of this instant death can occur or person will die within 7 days after trauma. Consequences and severity of trauma are depending upon the force, direction and region involved. External or internal injury of cavernous sinus invites the acute thrombosis which is a life threatening condition. The thrombosis of sinus system severely hampers the circulation of CSF which has further life threatening consequences. Pressure around the brain may rise, causing papilloedema which may be experienced as visual obscurations. If such conditions are not managed properly death is inevitable. As classical description states the vascular communication with the sense organs; infections of the face including the nose, tonsils and orbits can spread easily by this route. This intimate juxtaposition of veins, arteries, nerves, meninges, and paranasal sinuses accounts for the characteristic etiology and presentation of cavernous sinus thrombosis.<sup>[15]</sup>

### 3.5. Vidhur Marma

*Vidhur marma* is presented by *acharya Sushrut* as *Snayu marma*. From the modern aspect the *marma* site has no structures except facial nerve as *snayu*, which itself has very remote relation with hearing. An injury involving facial nerve may only cause hyperacusis but not deafness. Quoting *vidhur marma* as *Snayu marma* is not very significant. It has also been observed that a blow over the ear may produce rupture of the tympanic membrane leading to temporary or permanent deafness. If a blow over the external ear is very severe, it may also injure the labyrinth. *Acharya Vagbhatt* has a slightly different opinion about the structure predominantly involved to cause post traumatic effect. This school is of the opinion that the hemorrhage from the arteries supplying tympanic membrane would obstruct healing and the eardrum either would be fibrosed or perforated. The pathophysiology of this *marma* is that injury causes damage to the sound conducting instrument. In this condition the physiology of sound conduction and initiation mechanism by the tympanic membrane and ossicular system is damaged or lost. Fluid accumulation is the most common cause of conductive hearing loss in the middle ear, especially in children. Blocking of the eustachian tube leads to decreased pressure in the middle ear relative to the external ear and this causes decreased motion of both the ossicles and the tympanic membrane. Conductive type of hearing loss may have causes such as trauma, an ear infection or otitis media, hole in the eardrum or upper respiratory tract infections. The Mastoid part forms the posterior border of the temporal bone and is highly pneumatized with a communicating honeycomb in its interior known as mastoid cells.

The trauma is usually result of blunt head injury and can cause damage to the middle and internal ear, facial nerve, and brain. Complications such as hearing loss, vertigo, facial paralysis, intracranial hemorrhage, and CSF leakage can occur.<sup>[16]</sup>

*Acharya Vagbhatt* has explained *Vidhur marma* under *Dhamani marma*. This is very surprising that without sufficient resources available during the ancient period for anatomical studies, how *acharya Vagbhatt* could observe an arterial structure under *vidhur marma*. Even though his performance is very much suggestive to submit that since the trauma is coming from outer side and the important neural structures dealing with function of hearing are located at deeper level, therefore trauma involving some blood vessel which is a branch of posterior auricular artery can only cause deafness. The presence of stylomastoid artery a branch of posterior auricular artery in this relation confirms that the view of *acharya Vagbhatt* regarding *dhamani marma* has no controversy. Nerve structure at the level of the site of *vidhur marma*

existing in the form of facial nerve is having a very little significance and the deafness is very rare with this.

Therefore the value of stylomastoid artery become significant and it is responsible for developing complication of deafness due to trauma.

## 4. CONCLUSION

By observing the above given discussion the following conclusion is drawn. *Dhamani marma* is having its own importance in structural and functional aspect of human body. *Dhamani* is very significant structure which supplies nutrients, hormones, and *Prana* (oxygen) factor to the whole body. The nervous tissue along with other tissues of the body depends on the continuous supply of arterial blood for its normal functioning. Trauma to a *dhamani* causes severe loss of blood leading to a state of anoxia, tissue necrosis, condition of shock and ultimately death. This is the fact that signifies and accepts the value of a *Dhamani*. Hence, *acharya Vagbhatt* gave more importance and considered a new category of *marma*, that is, *Dhamani Marma* in *Marma vighyan sharira*. The morbidity and mortality of the tissue has been highlighted in terms of prognostic status of *dhamani marma*. The significance of blood with respect to trauma has been appreciated by *acharya Sushrut* and *Vagbhatt* which is approved by present trauma surgeons. The prognostic status of the *marma* is definitely helpful in taking decisions of surgical intervention by the trauma surgeon. According to *acharya Vagbhatt vidhur marma* is a *vaikalyakar*, *Dhamani marma* which on injury leads to hearing loss. Whereas *acharya Sushrut* classified *vidhur* as *snayu marma*. According to modern medical literature it is considered that the vulnerable arterial structure present at the site of *vidhur marma* is the stylomastoid artery, a branch of posteriorauricular artery passing superficial to the mastoid process but not a nerve structure which causes deafness due to trauma. In a few words, it can be said that the study of anatomical structures and the traumatic effects of *Dhamani marma* on the body have been described in detail for the purpose of better understanding of the topic, good clinical practices and best management of post traumatic complications. This article focuses on the detailed co-relative study of anatomical structures of *Dhamani marma* along with their post traumatic complications.

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## 7. ETHICAL APPROVALS

This study is review study hence ethical approval is not required.

## 8. CONFLICTS OF INTEREST

Nil.

## 9. DATA AVAILABILITY

This is an original manuscript and all data are available for only research purposes from principal investigators.

## 10. PUBLISHERS NOTE

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