



**International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)**

'A Bridge Between Laboratory and Reader'

www.jbpas.com

A STUDY OF VASCULAR INJURIES IN *AYURVEDA* W.S.R TO *Sira marma*

Dr. KUMAR BMN

Associate Professor, Department of Rachana Sharir, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi (U.P.), India

*Corresponding Author: Kumar BMN: E Mail: drbmnkbhu123@gmail.com

Received 22nd Feb. 2021; Revised 20th Mar. 2021; Accepted 19th April. 2021; Available online 1st Dec. 2021

<https://doi.org/10.31032/IJBPAS/2021/10.12.5757>

ABSTRACT

Ayurveda is India's traditional healing system, its profound system of mind-body and natural living. The science of *marma* (vital point) is another extraordinary and dynamic *ayurvedic* traditional therapy that has tremendous value in health, disease, and everyday living. The early reference to the word *marma* (vital point) is seen in *Atharva Veda*. *Acharya Sushruta* has said to be the father of surgery; he has described the structural, functional, and clinical aspects of *marma* (vital point). *Sira marma* is a structurally vascular predominant vital area in the body. The features develop due to application by external injuries, to the *sira marma* as which may be severed as per the quality and intensity of the injury. That the injuries to blood vessels being on the *marmas* (vital points) cause excessive loss of blood resulting in *dhathukshaya* (damage of the tissues of the body) is the apt comparison to the condition of shock. Even the science of *sira marma* is necessary for diagnosis, prognosis, and for therapeutic measures. So this study mainly aimed as traditional knowledge of *sira marma* is correlated with modern medicine.

Keywords- *marma, raktasrava, sira, shock, hemorrhage*

INTRODUCTION

Acharya Charaka says that those *vaidyas* (physicians) who are well versed in Anatomy and Physiology of every organ will never commit mistakes in treatment due to

ignorance [1]. All vital functions of the body perform through the vital points, on which life locates. The prime goal of any physician/surgeon is to save *prana* (life).

Ayurveda narrates that the vital points of our body in terms of *marmas* (vital points), one the seat of *prana* (life). Which sustains the energy of health and enlightens life in healthy that through the history of *marma* (vital point) can be traced back to the stone age, the history of scientific, research on it is continuing. The science of *marma* (vital point) is very essentially known by physicians especially all surgeons [2].

A. *Marma*

The word *marma* (vital point) has been used in the classical as well as non-classical books. It is the as old word as *Vedas*. It seems that *acharyas* have described the regional anatomy with the surface anatomy of *marma* (vital point). The term *marma* (vital point) is defined as that spot which, when injured, kills the person [3]. *Ayurveda* describes the *marma* (vital point) as the seat of *prana* and any injury major or minor to these brings about many troubles and even death. All such spots do not cause death, some cause deformities and pain [4]. According to *Sushruta marma* (vital point) is the vital spot in the body where the confluence of *mamsa* (muscle), *sira* (blood vessel), *snayu* (ligament), *asthi* (bones), and *sandhi* (joint) present. By nature *prana* resides especially in these places, therefore any trauma on any one of these *marmas*

(vital points) invariably causes death [5]. *Marmas* (vital points) are 107 in number. According to *Sushruta* structurally these are divided into 5 types.

- *Mamsa marma* (vital points of muscles) - 11
- *Sira marma* (vital points of blood vessels) - 41
- *Snayu marma* (vital points of ligaments) - 27
- *Asthi marma* (vital points of bones) - 08
- *Sandhi marma* (vital points of joints) - 20

These *marmas* (vital points) are classified after their structure predominance. But this does not mean that the other constituents like *mamsa* (muscle), *sira* (blood vessel), *snayu* (ligament), *asthi* (bones), and *sandhi* (joint) are not present there besides the constituent.

B. *Sira marma*

According to *Ayurveda sira* (blood vessel) is a tubular structure to carry material such as *rasa* (plasma) & *rakta* (blood) [6]. *Sira marma* is a structurally vascular predominant vital area in the body. *Sushruta* has mentioned the 41 *sira marmas*, their places and the effects of the injury. In this context, *Sushruta* has considered the *sira* (blood vessel) word for blood vessels i.e. arteries, veins, and capillaries.

Table 1: Showing the *Sira marmas*

<i>Sushruta-41 [7]</i>	<i>Vagbhata -37 [8]</i>
<i>Hridaya, Nabhi and Sthapani- each 1 Apanga, Phana, Stanamula, Apalapa Apastambha and Parshva Sandhi and Bruhati - each 2 Neela Dhamani, Shrungataka, Urvi and Lohitaksha- each 4 Matruka-8</i>	<i>Hridaya ,Nabhi and Sthapani- each 1 Neela, Many, Phana, Stanadhara, Apalapa, Parshva Sandhi, Bruhati, Kaksadhara and Vitapa- each 2 Urvi and Lohitaksa- each 4 Matruka -8</i>

Pathogenesis of injury to the *Sira marma*

According to *Sushruta* the seven hundred *siras* (blood vessels) in the body which are classified into four types as *vatha*, *pitha*, *kapha* and *raktavahi siras* (blood vessels) nourish the whole body and they are said to be circulating all over the body centralizing on the *marmas* (vital points). If any of these *siras* are torn or punctured or injured, sudden *rakthasrava* (hemorrhage) occurs at the site of *marma* (vital point). Therefore the nutrition of that vital part is lost ultimately leading to loss of function, pain, and even death. If a major blood vessel is punctured or injured it may lead to shock and ultimately death, by excessive blood loss. Due to the loss of blood, the patient suffers from vertigo, dyspnoea, unconsciousness, cough and finally, he dies [9]. From the detailed description above it can be enumerated that the mechanism of fatal effects of injuries to *sira marmas* are as under:-

- Excess loss of blood due to injury of the blood vessel.
- *Dhatukshaya* (emaciation of tissues) due to hemorrhage.

- *Vatakopa* (aggregated *vata*) due to emaciation of tissues.
- *Pittakopa* (aggregated *pitta*)
- The manifestation of symptoms or death

Sira Viddha Lakshanas (Symptoms of injury)

The following literature is available in *Ayurveda* regarding injury to *sira marma*-

- The main complications in *sira marma* injury are hemorrhage and unconsciousness. In injury to this *marma* (vital point) *vata* increased and encircles the *siras* (blood vessels). This encircled *vayu* causes severe pain in the body. *Sushruta* has here explained the effects of injury to *sira marmas* as similar to modern science. In vascular injuries the main effect is hemorrhage; it leads to severe blood loss from the body. Because of this, the person goes to unconsciousness/shock, sometimes it causes death [10].
- Wounds on *siras* (blood vessels) are very common in accidents, wars, etc. In injury of the *siras* (blood vessels)

caused by sudden cut, there will be too much of bleeding from the wound, the blood resembling *indragopa* (cochineal insect which is bright red in colour), and the exudates is will be like water coming out from a tube, it will be thin, discontinuous, slimy, adhering and resembling dew drops [11].

- *Vata* localized in *siras* (blood vessels) it produces *shula* (pain), *sira akuncana* and *purana* (contraction and fullness of the blood vessels). Functionally *vata* is correlated with nerve impulse. Blood vessels are supplied by sympathetic and parasympathetic nerves. These nerves are responsible for vasoconstriction and dilatation. If *vata* (nerve impulse) is localized (aggregated) in *siras*, it affects the normal functions of *siras* (blood vessels) [12].
- In injury to *sira marma* blood which is thick flows out continuously and in a large quantity; from its loss, the main complications are thirst, giddiness, dyspnoea pain, paralysis, unconsciousness, cough, anemia, nerve disorders, and death. When *dhamani marma* (vital points of

artery) is injured the blood which is frothy and warm flows out with a sound and the person becomes unconsciousness [13].

DISCUSSION

Trauma is leading cause of death in the first three decades of life and ranks fourth among causes of death over all. The importance of primary treatment of the wound especially at certain vital points has been established by Sushruta, which was followed by research through long experiences of battle wounds which may be confirmed from ancient Indian classical and non-classical references. This may be observed from Sushruta's version that vessels are important from trauma point of view and usually cause fatal result due to haemorrhage and shock.

Vascular Injuries

Peripheral vascular injuries may result from penetrating or blunt trauma to the extremities. If not recognized and treated rapidly, injuries to major arteries, veins, and nerves may have disastrous consequences resulting in the loss of life and limb.

Causes

The highest risk of serious vascular injury is associated with high-energy gunshot wounds such as those produced by military rifles and shotguns. Explosives are a frequent cause of vascular injury in military combat blunt and

penetrating trauma resulting in extremity fractures also has a high incidence of concomitant vascular injuries, even in the absence of clinical signs. The likelihood of serious vascular injury is lower in patients who sustain low-energy wounds such as those produced by handguns and knives.

Major venous injuries accompany 13-51% of significant arterial injuries [14].

Types of vascular injury- Contusion, Puncture, Laceration and transection

Clinical features- Depends on site, mechanism and extent of injury.

- Signs classically divided into 'hard' and 'soft' sign.

Table 2: Signs of vascular injuries

Hard Signs of Vascular injuries	"Soft" Signs
<ul style="list-style-type: none"> • Bruit or thrill: These are present in an arteriovenous fistula. <ul style="list-style-type: none"> • Active or pulsatile hemorrhage. • Pulsatile or expanding hematoma. • Signs of limb ischemia and elevated compartment pressure including the 5 "P's": Pallor, paresthesias, pulse deficit, paralysis, and pain on passive extension of the compartment." Pain on passive extension is the earliest and most sensitive physical finding. <ul style="list-style-type: none"> • Diminished or absent pulses 	<ul style="list-style-type: none"> • Hypotension or shock <ul style="list-style-type: none"> • Neurologic deficit due to primary nerve injury occurs immediately after injury. In contrast, ischemic neuropathy is delayed in onset, developing within minutes to hours after injury. <ul style="list-style-type: none"> • Stable, nonpulsatile or small hematoma • Proximity of the wound to major vascular structure

Symptoms

Vascular injury has a laceration, contusion, puncture, or crush injury to an artery to vein.

An injured artery typically results in more blood loss than an injured vein, because the blood pressure in arteries is greater than in veins. In addition, nerves are commonly located nearby arteries. In general, vascular injuries to arteries are more serious than injuries to veins.

Symptoms vary with the location of the injury. Symptoms of a vascular injury may include bruising, swelling, pain, pale skin, fainting and bleeding. Additional injuries may include numbness or weakness near the

injury. Prolonged interruption of blood flow to a limb leads to cellular ischaemia and edema.

When blood is seen to flow from the whole surface of a wound, oozing out like juice from a cut orange, and not escaping from definite points which can be recognized as the mouths of severed vessels, it is usually spoken of as capillary haemorrhage. The blood is generally bright red in colour, and really escapes from the arterioles of the part.

When an artery is wounded, bright red blood is propelled in a forcible stream, which rises with every beat of the heart, and falls in the interval. Haemorrhage is the

symptom of a wounded artery. Where it is a simple incision, the blood escaping from the artery is freely spurted from the wound. The characteristic features of arterial haemorrhage may be lost in one of two ways. When the blood does not escape directly, but flows along a sinuous or narrow wound, it no longer escapes in jets, but flows evenly and continuously.

When a vein is wounded, dark red or purple black blood wells up in a constant stream which is uninfluenced by the cardiac contractions. From a large vein the flow is very rapid, and the blood is projected to some short distance from the wound [15].

According to *Ayurveda*, the symptoms and signs present in *sira viddha* are summarized as following way with modern correlation –

Table 3: Showing the correlation of symptoms and signs of vascular injuries in *Ayurveda* and modern science

According to <i>Ayurveda</i> symptoms and signs of vascular injuries	Correlation with Modern science
<i>Ati Raktasrava</i> (Hemorrhage)	Hemorrhage- Hemorrhage is defined as the excess loss of blood (<i>ati raktasrava</i>) due to the rupture of blood vessels (<i>sira</i>). 1. Arterial hemorrhage- It is recognized as bright red blood, spurting as a jet (<i>sashabda</i>) which rises and falls in time with the pulse. 2. Venous hemorrhage- It is a darker red, a steady and copious flow (<i>bahuasruk sravat</i>) 3. Capillary hemorrhage- It is bright red, often rapid, ooze [16].
<i>Vicetasa</i> (hypovolemic shock)	Acute hemorrhage is the sudden loss of a large quantity of blood. It occurs in conditions like accidents. The decreased blood volume in acute hemorrhage causes hypovolemic shock (<i>vicetasa</i>) [17].
<i>Sira sankocha</i> (vasoconstriction)	During acute hemorrhage when the arterial blood pressure falls, baroreceptors become inactivated and stop discharging impulses. This increases the vasomotor tone leading to vasoconstriction (<i>Sira sankocha</i>) [18].
<i>Svasa and Kasa</i> (dyspnoea and cough)	The hemorrhage causes stagnant hypoxia because of a decrease in venous return, cardiac output, and velocity of blood flow. Hypoxia stimulates the chemoreceptors leading to an increase in respiratory rate.
<i>Pandu</i> (anemia)	Chronic hemorrhage is the loss of blood either by internal or by external bleeding over a long period. Chronic hemorrhage produces different types of effects such as anemia (<i>Pandu</i>).
<i>Pakshaghata</i> (paralysis)	Cerebral ischemia-When the blood flow to the brain is severely affected due to hypoxia, ischemia of the brain tissues develops within 5 minutes. It causes irreversible damage to brain tissues. It leads to nerve disorders like delusion, giddiness, paralysis, etc. [19].
<i>Marana</i> (death)	Lack of blood flow to brain tissues produces ischemia resulting in fainting and irreparable damage to brain tissues. This leads the cardiac arrest and finally kills the victim [20].
<i>Ruja</i> (pain)	Pain is produced by real or potential injury to the body due to ischemia (inadequate blood flow to an organ). During ischemic reactions, bradykinin and proteolytic enzymes are released and these stimulate the pain receptors of viscera [21].
<i>Shoda</i> (edema)	Poor blood supply leads to a lack of oxygen. It results in poor function of cell membranes and edema.
<i>Sira shaidhilya</i> (loose are emptiness of blood vessels).	In hemorrhage, superficial veins lose their tone and look empty because of low pressure.

Both the systems i.e. *Ayurveda* and modern science are agreed that main symptom in blood vessel injury is hemorrhage; it leads to all the complications and death

CONCLUSION

The knowledge of *sira marma* is the existing clear evidence of the vast knowledge of vascular injuries acquired by ancient scholars of Indian Medicine. The above statements help to derive the conclusion that there are certain very vital anatomical points in the body, which are having a secret and significant life values and they are composed of nerves, muscles, blood vessels, joints, ligament, and bones. *Sira marma* is a structurally vascular predominant vital area in the body. The surgeons are advised not to disturb any *sira marma* for the successful completion of surgery. If by any chance these *marmasthanas* (vital point) were disturbed by any of the instruments, the patient probably dies or may be deformed due to hemorrhage. Proper knowledge of the structure, dimension, lesion or injury and location contributes much to the perception and practice of surgeons. Not only surgeons but the traditional knowledge of the *Sira marma* is also certainly a need for even everyone to avoid day to day injuries. The wrestlers, martial artists, judos, karatetist, acupuncturist and even layman one very well required to be aware of the injuries and management of the *sira marmas*.

REFERENCES

- [1] Sharma PV. Charak Samhita sutrasthana English translation. Revised edition. Chowkhamba orientalia, 2007.
- [2] Raakhee M. Significance of Ayurvediya Marma: Vital Body Points. 1st edition. Readworthy Publisher, 2008.
- [3] Lad Vasant, Durve A. Marma Points of Ayurveda. 1st edition. The ayurvedic press, 2015.
Mishra JN. Marma and its Management. 1st edn. Chaukhamba Orientalia, 2013.
- [4] Sharma PV. Sushruta Samhita Sharira sthana English translation, and Nibandha sangraha commentary of Dalhana. 1st edition. Chaukhamba Orientalia Publishers, 2007.
- [5] Sen Gananath. Pratyksha sharirm. 1st edition. Chaukhamba Krishnadasa Academy, 2007.
- [6] Ghanekar. Sushruta Samhita sharirasthana Hindi commentary. 1st edition. Meharcanda Laksamanadas publications, 2015.
- [7] Srikantha Murti KR. Ashtanga sangraha Sharira sthana English translation. 1st edition. Krishnadasa Academy, 1997.

- [8] Thatte DG, Sushruta Samhita sharirasthana English translation. 1st edition. Caukhambha orientalia, 2005.
- [9] David F, Subash R, Avinash L. Ayurveda and Marma Therapy: Energy Points in Yogic Healing. Publisher Lotus Press, 2009.
- [10] Sharma PV. Sushruta Samhita Sharira sthana English translation, and Nibandha sangraha commentary of Dalhana. 1st edition. Chaukhambha Orientalia Publishers, 2007.
- [11] Pradeep KP, Neera S, Awasthi HH. Critical appraisal of sira marma with special reference to vidhura marma. IMPACT: IJRHAL, 2018; 6(6): 347-352.
- [12] Srikantha Murti KR. Ashtanga sangraha Sharira sthana English translation. 1st edition. Krishnadasa Academy, 1997.
- [13] Norman SW, Christopher JKB, Ronan P. Bailey's and Love's Short Practice of Surgery. 27th edition, CRC Press, 2012.
- [14] Frederick T. A Manual of Surgery. 2nd edition, Cambridge Scholars Publishing, 2012
- [15] Tortora and Angasontakos. Principles of Anatomy and Physiology. 12th edition, Harper and Row publishers. 2013.
- [16] Sembulingam K, Sembulingam P. Essentials of medical physiology. 6th edition, Jaypee Brothers Medical Publishers (P) Ltd. 2012.
- [17] Das SA. Manual on Clinical Surgery. 13th edition, Publisher: S. Das. 2019.
- [18] Mamatha TS, Shankar S, Swamy SV, Shailaja. Understanding the concept of marma and their clinical application in shalya tantra w.s.r. to vital points. JAISMS, 2019; 4(2): 89 – 92.
- [19] Mohd LW, Ab GA, Farooq AG, Shadab NW, Nasir-ud-din W. Vascular Injuries: Trends in Management. Journal of Trauma and emergency Medicine. 2012; 17(2): 266–269,
- [20] De Silva WDD, Ubayasiri RA, Weerasinghe CW, Wijeyaratne SM. Challenges in the management of extremity vascular injuries: A wartime experience from a tertiary center in Sri Lanka. World Journal of Emergency Surgery. 2011; 6(1): 24.