



## RESEARCH ARTICLE

### 'Dehasya Rudhiram Moolam': Surgeon's Perspective

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#### ARTICLE INFO

##### Article History:

Received 20<sup>th</sup> September, 2023  
Received in revised form  
27<sup>th</sup> October, 2023  
Accepted 15<sup>th</sup> November, 2023  
Published online 30<sup>th</sup> December, 2023

##### Key words:

Rakta, Raktasrava, Raktstambhana,  
Panchamahabhoota.

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#### ABSTRACT

According to *Ayurveda*, *Dosha*, *Dhatu* and *Mala* are *Moola* (basic elements) of the body. Among seven *Dhatu*s, *Rakta* (blood) is the most vital component of our body. According to *Acharyas*, it gives and sustains the life of any individual and is also included in *Dashavidha Pranayatana* by *Acharya Charka*. So, one should protect *Rakta* (blood) by all means, because its loss (*Raktasrava*) will ultimately lead to death. Many references are mentioned in Ayurvedic literature for controlling internal as well as external haemorrhage, in addition to these *Acharya Sushruta*, has described four different measures i.e., *Skandana*, *Sandhana*, *Pachana*, and *Dahana* for *Raktstambhana*. Various methods described in modern literature for haemostasis also work on almost similar principles described by our *Acharyas*. In this article, an effort has been made to describe in detail about *Rakta* (i.e., its derivation, formation, constituents i.e., *Panchamahabhoota*, functions), *Raktasrava* and different measures of *Raktstambhana* (haemostasis) along with their mode of action.

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Citation: Gopal Singh and Ajay Kumar Gupta. 2023. "Dehasya Rudhira Moolam": Surgeon's Perspective. International Journal of Current Research, 15, (12), 26756-26760.

## INTRODUCTION

Ayurveda is the science of life and according to *Ayurveda*, *Dosha*, *Dhatu* and *Mala* are the *Moola* (basic elements) of the body (Shastri, 2017a). *Doshas* (i.e., *Vata*, *Pitta*, and *Kapha*), when gets vitiated cause various diseases (Vagbhatta, 2019a). *Dhatu* is the entity that does *Dharan Karma* i.e., supports the body (Shastri, 2017b). *Acharyas* have described a total of seven *Dhatu*s i.e., *Rasa*, *Rakta*, *Mansa*, *Meda*, *Asthi*, *Majja*, and *Shukra* (Vagbhatta, 2019b). Among these, *Rakta* is the second one and is the most vital component of the body as described by *Acharya Sushruta*, (देहस्यरुधिरंमूलं) *Dehasya Rudhiram Moolam* i.e., it is the basis of life. So, one should protect *Rakta* (blood) by all means, because its loss (*Raktasrava*) will ultimately lead to death (Shastri, 2017c). Similarly, *Acharya Charka* has included *Rakta* under *Dashavidha Pranayatana* indicating its importance (Shastri & Chaturvedi, 2018a). *Acharya Charaka* and *Sushruta* have elaborated the significance of *Rakta* in individual chapters, which also highlights its importance in medicine as well as in surgical aspects.

देहस्य रुधिरं मूलं रुधिरैवै धार्यते  
तस्माद्यत्नेन संरक्ष्यं रक्तं जीव इति स्थितिः || (Su.su 14/44)

**Etymology and derivation** – *Rakta* simply refers to blood. The word '*Rakta*' is derived from the Sanskrit root '*Ranj*' i.e., to dye or colour, to affect or move, to excite/glad/charm/delight (Deole Y.S., 2020).

**Synonyms** – *Acharyas* have used many other words to describe *Rakta* like *Shonita*, *Rudhira*, *Asrika*, *Lohita*, and *Kshataja*.

- **Rudhira**: The term is derived from the root '*Rudh*' meaning to stop or hold. *Acharya Sushruta* has used this term to describe *Rakta*, it sustains the life of human beings, hence it is called '*Rudhira*' (Shastri, 2017c).
- **Shonita**: It is derived from '*Shonah Sanjata Asya Iti Shonitam*', which indicates a red colour liquid. *Acharya Sushruta* has also used this term to describe *Sreebeeja* (ovum).
- **Lohita**: The term indicates the coppery red colour of blood (Deole Y.S., 2020). Besides this, the word *Lohita* is derived from '*Loha Sanjayate Asyam*' which indicates that it contains *Loha*, so named *Lohita*. This also indicates that from *Vaidika Kala*, ancient *Acharyas*, knew that *Loha* (iron) is essential for blood formation.
- **Asrika/Asra**: The term is derived from the Sanskrit root '*Ashukshepane, Srijivisarge*'. It means to get ejected or expelled. This synonym is used in the context of excessive bleeding. E.g., menorrhagia (*Asrigdara*), and bleeding disorders (*Asrapitta/Raktapitta*, etc.).
- **Kshataja**: It originates from trauma (*Kshata*) or wound/ulcer (*Vrana*). After injury the first element that will be visible is *Rakta*, so it is called *Kshataja*.

So the word *Rakta* is not only used to describe blood but also used in different contexts like the word *Rakta* denotes blood tissue (*Rakta*

*Dhatu*), menstrual blood (*Raja* or *Artava*), ovum (*Shonita* or *Streebeeja*), etc.

**Utpatti of Rakta Dhatu:** According to *Acharya Charaka*, it is produced from the *Prasada Bhaga* of *Rasa Dhatu* with the help of *Bhutagni* and *Rasa Dhatvagni* (Shastri & Chaturvedi, 2018b). Further, *Acharya* has also described that the nourishing portion of *Rasa Dhatu* and *Aahara Rasa* are transformed into *Rakta Dhatu* by the action of *Ranjaka Pitta* (Shastri & Chaturvedi, 2018c). So, it can be said that the formation of *Suddha Rakta* depends upon the quality of *Rasa Dhatu Poshaka Ansa* and *Aahara Rasa*. According to *Acharya Sushruta*, this process takes place in the *Yakruta* (liver) and *Pliha* (spleen) (Shastri, 2017d). In addition to this *Acharya Charak*, in *Vidhishonitreeya Adhyaya* described that other factor like *Asta Ahara Vidhi Visheshaytana*, *Desha Satmya*, *Kala Satmya* and *Oka Satmya* are also responsible for the formation of *Suddha Rakta* (pure blood) (Shastri & Chaturvedi, 2018d). All these can be understood as existence of life not only depends upon the quantity of *Rakta Dhatu* instead its quality is equally important. According to modern science, the formation of *Rakta* (blood) takes place in the bone marrow. Aforesaid, as per *Ayurveda*, it is formed in the liver and spleen. The function of these *Moola Sthana* can be understood as they help in maintaining the quality of *Rakta*. As per modern literature, spleen acts as the graveyard of RBC i.e., it annihilates the fragile RBC that has crossed 120 days. Along with this it also has one distinct function that it stores the blood in it and drains it into systematic circulation in emergency conditions. The liver has multifarious functions that help in maintaining the quality of the blood like it produces the clotting factors, heparin, vitamin-k etc., which are essential for regulating the quality of blood.

**Quantity and circulation of Rakta:** According to *Acharya Charaka*, the quantity of *Rakta* is eight *Anjali* and one *Anjali* is equal to the quantity that can be filled in a space formed from joining one's palms together. So, the quantity of blood differs in every individual (Shastri & Chaturvedi, 2018e). *Acharyas* have described that it circulates in the body through the channels i.e., *Raktavaha Srotas*. According to *Acharya Sushruta*, it circulates in the body through the *Dhamni* (arteries) (Shastri, 2017e), which originates from the *Hridaya* (heart) and according to modern science also heart pumps blood to the whole body through arteries. Moreover, according to *Sharangdhara*, *Rasa* reaches *Hridaya* with the help of *Samana Vata* and after reaching there it gets *Pachita* and *Ranjita* by the *Pitta* and attains *Raktata* and then circulated to the whole body (Tripathi, 2016a). All these structures, responsible for blood circulation are situated in *Raktadhra Kala* (layer of tissue situated between skin and muscles (*Mansadhra Kala*) (Shastri, 2017f).

#### Functions of Rakta -

रक्तं वर्णप्रसादं मांसपुष्टिं जीवयति च |  
रक्तं जीवयति प्राणानुवर्तनं करोति ||

- The main function of *Rakta Dhatu* is described as *Jeevana* i.e., it gives and sustains vitality (Shastri, 2017g). *Rakta Dhatu* brings *Prana* to every *Dhatu* (tissues). It can be understood as the air inhaled (i.e., oxygen) during the process of inspiration, is supplied to every organ, tissue, and cell to perform their respective physiological activities through blood so, *Rakta* inhabits life into all the living cells and sustains it. According to modern science also blood carries fresh oxygen to every cell of the body to perform their normal physiological functions.
- The other functions are enhancing complexion (*Varna Prasadana*) and *Mansa Pushti* (Shastri, 2017g). It can be understood as it not only provides fresh oxygen to tissues but also helps in the transportation of nutrients, enzymes, etc. which plays a vital role in maintaining the health of an individual.
- *Acharya Sushruta* has described that although *Tridosha* are considered as *Tristhuna* (basic pillars) for the body, *Rakta* is also equally responsible for *Shareera Sthiti* (existence) and *Pralaya* (destruction) (Shastri, 2017h).

- *Arundatta*, in his commentary on *Ashtanga Hridaya* described that *Ojoviddhikar* is one of the *Karma of Rakta Dhatu* i.e., it increases *Oja* in the body and helps in protecting the body from various diseases by increasing immunity.
- In addition to these *Acharyas* have described that *Rakta* plays a major role in the formation and development of various organs like lungs are formed out of *Phena* of *Rakta*, *Vrikka* (kidney) is formed out of *Rakta* and *Meda*, *Jihwa* (tongue) is formed out of *Kapha*, *Rakta* and *Mansa*, etc (Shastri, 2017i).

**Pancha Mahabhautika constitution and properties:** *Mahabhoota* are the tiniest elements, which constitute every living and non-living matter. Everything, including drugs, herbs, and living beings is made of these basic elements. They are five in number and every matter contains all of these five elements in different proportions. *Acharya Sushruta* has described the *Pancha Mahabhautika* constitutions of *Rakta*, which are responsible for its various properties, like peculiar smell (*Visrta*), liquidity (*Dravta*), red colour (*Raga*), pulsation (*Spandana*) and lightness to get circulated (*Laghuta*) due to *Prithvi*, *Jala*, *Teja*, *Vayu* and *Aakash Mahabhoota* respectively (Shastri, 2017j). Different functions of *Rakta Dhatu* occur due to these constituents as described below –

**Aakasha Mahabhoota** is responsible for *Laghuta* (lightness) of *Rakta Dhatu*, which can be understood as that it helps in keeping various components of blood separated from each other (*Viviktata*) (Shastri & Chaturvedi, 2018f) i.e., avoiding unnecessary aggregation of its various components which is essential for its normal movement through the body. Any imbalance in its *Aakasha Mahabhoota* composition will lead to aggregation of its various components e.g., the presence of clots in the blood, which can further cause many disorders leading to *Guruta* and affecting its normal movement throughout the body.

**Vayu Mahabhoota** helps in *Spandana* i.e., pulsatile movement of *Rakta Dhatu* throughout the body, which in turn provides nutrition to every cellular component of the body. *Vayu* is responsible for all kinds of movements in the human body i.e., *Gamana* (movement), *Prerana* (expulsion), etc., (Shastri & Chaturvedi, 2018f) as described by *Acharyas*. It can be understood as it not only helps in the movement but gives *Prana Vayu* (oxygen) to every cellular component of the body and any imbalance in its normal state will not only lead to stasis of blood but also poor tissue perfusion leading to manifestation of various diseases.

**Agni Mahabhoota** helps in maintaining the *Raga* (redness) of *Rakta Dhatu*. It can be understood as it helps in the formation of *Rakta Dhatu* from *Rasa Dhatu* (by the action of *Agni* of *Ranjaka Pitta*). *Agni* has the power to convert states of substances, so it can be correlated to chemical energy (various hormones and enzymes like erythropoietin, etc.) present in the body and are responsible for the formation of various blood components and other physiological functions of the body. According to modern science, blood plays a role in maintaining the normal core temperature of the body, which can be due to its *Ushna Guna* (properties of *Agni Mahabhoota*) (Shastri & Chaturvedi, 2018f) described by *Acharyas*. It can also be understood as, by maintaining an optimal temperature it also helps in smooth flow of blood throughout the body with the help of *Vayu* and *Jala Mahabhoota*. According to *Acharya Charaka*, it is also responsible for maintaining *Aabha* (shine or aura around the body) (Shastri & Chaturvedi, 2018f) and according to *Acharya Sushruta*, *Rakta* is responsible for normal complexion of the body (Shastri, 2017g), which can be due to the presence of its *Agni Mahabhoota*. So, any imbalance in the normal state of *Agni Mahabhoota* will lead to the manifestation of various diseases like abnormal discoloration, *Daha*, etc.

**Jala Mahabhoota** helps in maintaining the *Dravta* (appropriate viscosity) of *Rakta*. It can be understood as any liquid that can flow has a definite viscosity/consistency which is responsible for its movement (flow) through any channel against the resistance offered during its flow. The same has been described by *Acharya Charak* that

*Jala Mahabhoota Dravyas* have specific *Dravta* (liquidity), *Sarata*, *Snigdha* (unctuous), *Mriduta* (soft), and *Pichchhilata* (viscous) (Shastri & Chaturvedi, 2018f). So, due to all these properties of *Jala Mahabhoota*, *Rakta* can reach every cell of the body as, any increase in the viscosity will ultimately lead to decreased movement. Whereas, a decrease in the viscosity will lead to the loss of more blood during any injury or through the normal capillary pores. It can also be understood as *Jala* has *sandhana* properties i.e., keeps various molecules intact along with flexibility in their bond so that they can adapt to any structure and can easily pass through any channel. Similarly, *Rakta* moves through every minute channel in our body and carries its various components intact providing nutrition to all the cells in the body, due to the presence of *Jala Mahabhoota* in it. It can be correlated to the plasma component of the blood as per modern science. So, in *Rakta Dushti* this normal functioning of *Jala Mahabhoota* is disturbed leading to either an increase or decrease in the viscosity of *Rakta Dhatu* causing symptoms like *Shotha*, etc.

**Prithvi Mahabhoota** helps in maintaining *Visrta* (peculiar smell) of the *Rakta Dhatu*. Same has been described by *Acharya Charaka* that all kind of smell are due to the presence of *Prithvi Mahabhoota* only (Shastri & Chaturvedi, 2018f). According to modern science, it can be correlated to solid stratum of blood like RBCs, WBCs, etc.

So, all these *Panchmahabhootas* (elements) when present in balanced state are responsible for maintaining the quantity as well as quality of the *Rakta Dhatu*, which in turn performs various functions in the body as described above, when present in non-vitiated state. In *Rakta Dushti* there occurs an imbalance in the state of these *Panchmahabhootas* (elements) leading to the manifestation of symptoms either by a single *Mahabhoota* (element) or in association with other *Mahabhootas* (elements). It can be said that *Rakta* is not merely blood but it is more than that and that is why *Acharya Sushruta* has said that *Rakta* is *Jeevan* (life) and one should protect the *Rakta* by every possible means. So, one must know the importance of *Rakta* and, at the same time, the complications arising from its loss (*Raktasrava*). *Raktasrava* (haemorrhage) can occur in many forms, and may lead to many complications like *Dhatukshaya*, *Shiro Roga* (disease of the head), *Andhya* (blindness), *Adhimantha* (glaucoma), *Timira* (loss of sight), *Aakshepaka* (convulsions), *Pakshaghata* (hemiplegia), *Ekanga Roga* (paralysis), *Trishna* (thirst), *Daha* (burning sensation), *Hikka* (hiccups), *Kasa* (cough), *Shwasa* (asthma), *Pandu Roga* (anaemia), and can also cause death (Shastri, 2017k). So, *Raktasrava* must be stopped as soon as possible to avoid these complications and in view of this *Acharya Sushruta* has described a detailed description regarding *Raktstambhana* (haemostasis). He has described mainly four ways to control *Raktasrava*, which are *Skandana*, *Sandhana*, *Pachana*, and *Dahana* (Shastri, 2017l). These methods are explained in increasing order of their effectiveness and should be used in the same sequence one by one i.e., if one method fails to achieve *Raktstambhana*, a successive method is adopted until *Raktasrava* is stopped. *Skandana* is done by using *Hima Dravyas* i.e., cold substances, *Sandhana* by using *Kashaya Dravyas*, *Pachana* is done using *Bhasma*, and *Dahana* is done by using *Shalaka*.

चतुर्विधं यदेतद्धि रुधिरस्य निवारणम् |  
सन्धानं स्कन्दनं चैव पाचनं दहनं तथा ||  
व्रणं कषायः सन्धते रक्तं स्कन्दयते हिमम् |  
तथा सम्पाचयेद्भस्म दाहः सङ्कोचयेत् सिराः || (Su.su 14/39-40)

According to modern science, Haemostasis is the mechanism that leads to the cessation of bleeding from a blood vessel. It is a process that involves multiple interlinked steps. This cascade culminates in the formation of a “plug” that closes up the damaged site of the blood vessel controlling the bleeding and it begins with the trauma to the lining of the blood vessels. The whole mechanism can be divided into four stages i.e., 1) Constriction of the blood vessel, 2) Formation of a temporary platelet plug, 3) Activation of the coagulation cascade and 4) Formation of fibrin plug or the final clot (LaPelusa & Dave, 2023). After damage or trauma to the blood vessels, vascular spasm ensues leading to vasoconstriction following the release of various

vasoconstrictors to minimize or stop the further loss of blood. At the same time, the extracellular matrix (ECM)/ collagen at the site of the disrupted endothelial lining, becomes exposed to the blood components leading to the release of cytokines and inflammatory markers that lead to adhesion of the platelets and their aggregation at that site, which leads to the formation of a platelet plug and sealing of the defect. Along with platelet aggregation and activation, the coagulation cascade also gets activated leading to the formation of thrombin by intrinsic and extrinsic pathways which then convert fibrinogen into fibrin leading to the clot formation at the site of injury.

Four methods described by *Acharya Sushruta* for *Raktstambhana* help in achieving haemostasis in the following ways -

**Skandana:** *Skandana* means coagulation. *Acharya* has described this as the first step for *Raktstambhana* and for that, *Acharya Sushruta* has advised to use various methods or substances that have cooling effects. *Acharya Dalhana* in his commentary said that *Skandana* means making *Rakta* thicker at that site (i.e., *Styanikarana* of *Rakta*) (Thakrala, 2014/2020) as, it will lead to decreased blood loss (*Raktstambhana*) due to increase in its viscosity by application of *Hima Dravyas* (cold substances) at the site the *Raktasrava*. *Acharya Sushruta* has described the use of cold water after *Jalukavacharan* to control *Raktasrava* at that site (Shastri, 2017m), *Sheetal Padartha Aachhadana*, *Sheeta* place for *Shayan* and *Sheetal Aushadhi Lepa*, and *Sinchana* with *Sheetal Aushadhi Kashaya* has also been advised after *Raktamokshana* (Shastri, 2017n). *Acharya Charaka* has also described the use of various drugs like *Kamala*, *Utpala*, *Ushira*, etc. in the form of decoction for *Prisechana*, *Avagahana*, etc. in the treatment of *Raktapitta* (Shastri & Chaturvedi, 2018g). So, the application of cold substances helps in *Raktstambhana* by increasing the viscosity of blood, by causing constriction of vessels leading to reduced blood loss. *Skandana* helps in achieving the first step of haemostasis, which is vasoconstriction as per modern science. It can be applied over visible bleeding and contusions.

**Sandhana:** *Sandhana* means to unite the *Vrana* or *Shastrapada*. *Sandhana* is done with the help of *Kashaya Dravyas* i.e., drugs that are *Kashaya Rasa* dominant. *Acharyas* have described that *Kshaya Rasa* has *Sheeta* (cold) *Guna*, *Sangrahi*, *Sandhana*, *Ropana*, *Shoshana*, *Sthambhana*, *Twaka Mansa Shirikarana* properties (Shastri & Chaturvedi, 2018h) (Shastri, 2017o). So, the use of *Kashaya Rasa Pradhana Dravyas* will help in *Raktstambhana* due to the above-mentioned properties. they can be used externally (local application) as well as internally for *Raktstambhana*. For external application, *Acharyas* have described to use of various drugs like *Lodhra*, *Madhuka*, *Priyangu*, *Patanga*, *Sarjarasa*, *Rasanjan*, *Salmalipushpa*, *Masa*, *Yava*, *Haritakyadi* and *Panchavalkala Dravyas* in the form of *Churna*, *Kashaya* (decoction), and along with *Ghrita* (Shastri, 2017n). *Sandhana* is not only limited to the use of *Kashaya Dravyas* but *Sevan Karma* (application of ligature) can also be studied under *Sandhana* as via suturing cut margins are united using different suture materials leading to closer of defect and stoppage of bleeding at that site. According to modern science, *Kashaya Dravyas* (astringent substances), contract the tissues or channels of the body, thereby diminishing discharges, as of mucus or blood (Mondal, 2017). These substances precipitate proteins (denature proteins, forming the protein tannate) but do not penetrate cells, thus affecting only the superficial layer. They toughen the surface, making it mechanically stronger, and decreasing exudation. Tannic acid and tannins are examples of astringents. By considering the points above, this method can be adopted in topical haemorrhage, and during surgery for ligation of vessels.

**Pachana:** *Pachana* means metabolic transformation by the action of *Agni*. For *Pachana*, *Acharyas* have advised to use *Kshouma Vastra Bhasma* or *Kshara* (Thakrala, 2014/2020). *Bhasma* is an ash obtained through incineration, the starter material undergoes an elaborate process of purification and is followed by the reaction phase, which involves the incorporation of some other minerals and/or herbal extract and then the material in pellet form is incinerated in a furnace. The product obtained is *Bhasma* (Pal et al., 2014). They are claimed

to be biologically produced nanoparticles. They can be used in both forms locally (external use) and orally (internal use). The most common example of this is *Tankan Bhasma*, used in the case of haemorrhoids for sitz baths. *Kshara* action can be understood as chemical cauterization due to its properties it has *Pachana* and *Sthambhana* properties (Shastri, 2017p), which enhance the process of coagulation. According to modern science, *Kshara* is basically alkaline in nature and has haemostatic properties, as alkaline substances can promote blood clotting and constrict blood vessels, which may contribute to stopping bleeding in the treated area. Alkalosis at the local site induces platelet aggregation, platelet calcium, and serotonin release, as well as platelet factor III availability. In modern science, local haemostatics like fibrin (prepared from human plasma and dried as a sheet or foam), gelatin foam, and oxidised cellulose (as strips that can be cut and placed in the wound) are used. It acts as a meshwork to activate the clotting mechanism and prevent bleeding (Tripathi, 2019). This can be used in capillary haemorrhage and in submucosal haemorrhage.

**Dahana:** *Dahana* means to apply heat or thermal energy i.e., to cauterize. *Acharya Sushruta* has advised to use it if all other methods (i.e., *Skandana*, *Sandhana* and *Pachana*) of *Raktstambhana* fail to achieve haemostasis. It can be done using *Shalaka* and various other instruments advised by *Acharya Sushruta* for the *Agnikarma*. *Dahana Karma* causes *Sankochan* (constriction) for *Sira* (i.e., blood vessels), leading to the cessation of *Raktasrava*. In *Kadar Chikitsa* after *Shashtra Karma*, *Dahana* by *Sneha* is advised (Shastri, 2017q). According to modern science, it can be correlated with electric cauterization, which is commonly used nowadays during various surgical procedures for checking haemostasis. This technique raises the local temperature, which coagulates tissue proteins resulting in blood vessel constriction. In addition to this, it also aids in blood coagulation. Besides these four methods, there are some other references regarding the management of *Raktasrava* (treatment of *Rakta-atistrava* to avoid complications) as mentioned below (Shastri, 2017n) *Acharyas* have described various drugs (like *Priyangu*, *Lodhra*, *Anjana*, *Gairika*, etc.) that can be used for external application in many ways like *Vrana Mukha Avachoorana*, *Lepa* (use of *Sal*, *Sarjrasa*, *Arjuna* etc., mixed with honey), *Parisheka* (using *Sheetal Jala* or decoction of *Kashaya Dravyas* and *Sheetal Dravya* like *Chandan*, *Hribera*, etc.). For internal use (oral intake), *Acharyas* have described the use of *Kakolyaadai Gana Dravyas Kwatha* after mixing with *Sharkara*, and various other formulations described in the treatment of *Raktapitta*, *Rakta Arsha*, etc. can also be used. Along with these *Acharyas* have described the use of other methods, like the application of pressure at the bleeding site using *Angulya-agrena Avapeedana* (pressing with the tip of finger at the bleeding site), *Gada Bandha* (pressure bandaging) (Shastri & Chaturvedi, 2018i).

In the end, *Acharyas* have advised for *Raktapana* (blood of deer, buffalo, pig, etc.) (Shastri, 2017n) to compensate for the blood loss (as per the principle that *Sarvda Sarvbhavanama Samanyama Vridhhi Karnama* (Shastri & Chaturvedi, 2018j)) and to avoid complications. Similarly, in modern science, blood transfusion is being advised to avoid serious complications after excessive blood loss from the body. The same has been described in the treatment of *Bhinna Kostha* that when there is *Ati Rakta Srava*, *Asrikpana* is indicated to prevent *Upadravas* (Shastri, 2017r).

## DISCUSSION

*Rakta* is a vital component of our body that gives and sustains life (*Jeevana*). *Rakta* is one of the seven *Dhatus* of our body and is not just blood, it is more than that. So, its loss (*Raktasrava*) must be protected by all means to sustain life as described by *Acharya Sushruta*. The same has been mentioned in modern literature that haemorrhage can lead to hypovolemic shock and ultimately can lead to death. Keeping in view the importance of *Rakta*, *Acharya Sushruta* has separately described the four basic principles of *Rakta Sthambhana* i.e., *Sandhana*, *Skandana*, *Pachana* and *Dahana*. The

methods used for achieving haemostasis in the present era are very similar to these four *Rakta Sthambhana* methods described by *Acharya Sushruta*. In addition to these also, there are few references regarding other methods of *Rakta Sthambhana* like the use of *Gaadha Bandha* (which is one of the important steps to stop bleeding i.e., pressure application), the use of *Kshara* (chemical cauterization), topical applications in the form of *Churna*, decoction, *Lepa*, etc. and many oral formulations has also been mentioned. Along with these, *Acharyas* have described the importance of *Aahara* in the condition of blood loss like the use of *Sheeta Pradhana Aahara*, *Ksheera* and *Mansa Rasa*. These different methods of haemostasis should be used in different haemorrhagic conditions based on the source of bleeding i.e., arterial, venous or capillary and stages of haemorrhage i.e., primary, reactionary, or secondary haemorrhages. In case of emergency, management of bleeding can be done by proper positioning and by tying a tourniquet, as a temporary measure for control of haemorrhage. Bleeding in the abdominal viscera can be managed by suturing in simple laceration, and ligating the bleeding vessels. Balloon inflating devices can also be used in internal bleeding of various pathological conditions.

## CONCLUSION

*Rakta* is a vital component of our body. *Acharyas* described that *Rakta* is life and for that, it's essential for a surgeon to know the methods of checking bleeding (*Raktasrava*) and for that, *Acharya Sushruta* has described *Raktstambhana* methods and these methods still hold the basis of various haemostatic procedures used in today's era. The other methods mentioned by our *Acharyas* like *Sheetopachara*, *Gada Bandhana*, *Agnikarma*, etc. are also very similar to the haemostatic measures used nowadays. The most important thing is to remember that any bleeding must be controlled urgently at once.

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