



# SUSHRUTA'S HEMOSTATIC PROCEDURES: A BOON TO MODERN SURGERY

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## ABSTRACT

Management of effective hemostasis during surgery is one of the major components that provide many benefits to both the surgical team and the patient in terms of early recovery. Hemostasis has been given a lot of focused attention since prehistoric times, and numerous techniques as well as their practices are documented in one of the para-surgical procedures bloodletting therapy (*Raktamokshana*) by *Acharya Sushruta*. *Sandhana* (Binding), *Skandana* (Clotting), *Pachana* (Dusting the Bhasma/ashes), and *Dahana* (Cauterization) are the four hemostatic procedures. In this regard, modern medical science has described its mechanism through the three steps: vasoconstriction, temporary blockage of a break by a platelet plug, and blood coagulation, or formation of a fibrin clot, as well as various hemostasis approaches and their indications based on the type of hemorrhage. *Sandhana* produces vasoconstriction and bridging of wounded vessels, *Skandana* aids in clotting, while *Pachana* and *Dahana* treatments may aid in blood coagulation. As a result, it is critical to examine the hemostatic procedures mentioned in ancient Indian science, which will aid in better understanding and application for the advancement of the medical sector in the modern day.

**KEYWORDS:** Ayurveda, Hemostasis, Shalya tantra, Raktstambhan, bleeding

## INTRODUCTION

Haemostasis is the complex process whose function is to limit blood loss from an injured vessel while maintaining blood in the fluid state within the vascular system. The Process is rapid and localized include four major Events in Haemostasis:

- 1) Vascular spasm
- 2) Formation of platelet plug
- 3) Formation of fibrin plug - Blood clot
- 4) Re-establishment of endothelium

Acharya Susruta has even considered raktadhatu as important as Tridoshas in the etiopathology of diseases, its curative measures and in maintenance of health. The haemostatic measures in Ayurveda are categorised under four headings by Acharya Susruta To be used as per severity and type in the order- Skandana, Sandhana, Dahana, pachana. Along with absolute haemostatic measures, ancient Indian surgeons also addressed the replenishment of lost volume and nutritional supplements that contribute to haemopoiesis. It has been suggested that cold water, cold decoctions produced with sweet and astringent medications, jaggery, honey, sugarcane juice, milk, meat soups, and other foods rich in glucose, proteins, potassium, sodium, magnesium, iron, and a variety of other minerals and nutrients be consumed. Wherever there is blood loss in large quantity, then Rakta-basti has to be given, Raktabasti does not have any extra risk than that of Blood transfusion. Charaka has further stated that fresh blood extracted from living deer, rabbit, ox, male buffalo, male goat etc. may be given orally (Rakta-prashan), to treat the conditions caused due to blood loss.

## MATERIAL AND METHODS

Coagulation or clotting is defined as the process in which blood loses its fluid and becomes a jelly like mass few minutes after it is shed out or collected in a container. It involves multiple physiological and clotting factors.

### Virchow's Triad

1. Stasis of blood
2. Endothelial injury
3. Hypercoagulability

### Hemostasis Can Be Divided Into Two Stages

#### Primary Hemostasis

- Response to vascular injury
- Formation of the "platelet plug" adhering to the endothelial wall
- Limits bleeding immediately

#### Secondary Hemostasis

- Results in formation of a stable clot
- Involves the enzymatic activation of coagulation proteins that function to produce fibrin as a reinforcement of the platelet plug
- Gradually the stable plug will be dissolved by fibrinolysis
- Coagulation of blood occurs through a series of reactions due to the activation of a group of substances necessary for clotting are called clotting factors.

- Thirteen clotting factors are identified.

#### Production Of Clotting Factors

- Fibrinogen liver
- II, VII, IX, X liver with vit K
- VIII, V, XII endothelium
- XIII platelets

#### Role Of Calcium

- Except for first two steps in the intrinsic pathway Ca<sup>2+</sup> ions are required for the promotion/acceleration of all the blood-clotting reactions
- In the living body Ca<sup>2+</sup> ion concentration seldom falls low enough to significantly affect the kinetics
- Plasminogen or profibrinolytic when activated forms plasmin (fibrinolysin)
- Plasmin is a proteolytic enzyme that digests fibrin fibers and protein coagulants such as fibrinogen, Factor V, Factor VIII, prothrombin & Factor XII.

#### The Haemostatic Measures In Ayurveda

देहस्य रुधिरं मूलं रुधिरैणैव धार्यते ।  
तस्माद्यत्नेन संरक्ष्यं रक्तं जीव इति स्थितिः ॥४४॥

Acharya Susruta has even considered raktadhatu as important as Tridoshas in the etiopathology of diseases, its curative measures and in maintenance of health. He states 'the life is sustained by proper functioning of blood, and the body itself is rooted to Rakta'.

'Rakta is life' hence it is to be protected by any means. Acharya Susruta the father of ancient surgery, was the first to name, classify and describe the Chaturvidha Rakta Sthambhana Upayas.

#### Chaturvidha Rakta Sthambhana Upayas

चतुर्विधं यदेतद्धि रुधिरस्य निवारणम् ।  
सन्धानं स्कन्दनं चैव पाचनं दहनं तथा ॥ ३६ ॥

- 1) Sandhana
- 2) Skandana
- 3) Dahana
- 4) Pachana

To be used as per severity and type in the order- Skandana, Sandhana, Dahana, Pachana

#### Skandanam

It is the first method of haemostasis achieved through blood coagulation caused by cold treatment. External bleedings and contusions can be treated using this approach. As the initial line of defence in Jaloukavacharana Atiyoga, it is controlled by pouring cold water (Sheetabhiradbhihi Parisheka). This approach

is also used to treat haemorrhoids and ulcers.

**Mechanism:** Cold lowers blood flow and capillary permeability by producing arteriole vasoconstriction, allowing blood to coagulate and thereby establishing haemostasis.

#### Sandhanam

Sandhana means 'to unite'. That is to approximate wound edges in this context. That is described by Acharya Susrutha; it can be accomplished by the usage of Kashaya Rasa Dravyas.

Suturing procedures are mechanical wound approximation methods. As a result, Sandhana Karma includes applying pressure bandages, suturing, applying a haemostatic clamp on a blood artery, and ligation. As in Jalouka Atiyoga, the application of a pressure bandage is described. Lodhradi, Priyangu, Patanga (Caesalpinia sappan), Sarjarasa (Shorea robusta), Salmalipushpa, Masa (Vigna mungo), Yava (Alhagi camelorum), Hareetakyadi, and Panchavalka Dravyas are used internally and externally as both local and systemic haemostatic agents.

The technique may be effective in capillary haemorrhages, peptic ulcer bleeding, tropical haemorrhages such as abrasions, haemorrhage owing to systemic sickness such as intracranial bleeding, bleeding disorders (Raktapitta) such as thrombocytopenia, and so on.

**Mechanism:** When mucous membranes or tissues are subjected to astringent medications, they shrink and are frequently used to control the discharge of blood, serum, or mucous fluids in Sandhana. Similarly, externally applied astringents promote minor coagulation of skin proteins, as well as drying, hardening, and protecting the skin. Similarly, the astringent medications listed in the Sandhana Karma may have effects such as vasoconstriction or increasing prothrombin net formation, which aids in retaining platelets at the site of damage, absorbing water from the tissue, or shortening bleeding time. Suturing, Ligation, and pressure bandages all work by causing a mechanical obliteration of the vascular lumen.

#### Pachana

Pachana is the third kind of haemostatic measure, which is to ripen or digest utilising Bhasmas (ash) Bhasmas of Kshouma, Vastra, Mrutkapala, Anjana, Mruduksharas (mild caustic alkali preparations) such as Shankha, Shukti, Kapardhika, Spatika bhasmas.

This approach can be used to treat capillary haemorrhages, submucosal haemorrhages, tropical haemorrhages, and other types of haemorrhages.

**Mechanism:** The application or dusting of Bhasma/Ksharas in the afflicted area, as described in Pachana Karma, may breakdown protein in the local tissue, stimulating blood coagulation as in bleeding haemorrhoids.

Skandana and Pachana, in addition to their chemical qualities, operate as physical inhibitors, much like bone wax and gelatine matrices.

#### Dahana

If haemostasis is not achieved, Dahana is the best of the four. Dahana is a term that implies to burn or cauterise. Dahanopakaranas such as Agnikarma shalaka, Taila, Guda, and Sneha are employed. Such allusions may be found in Kadara Chikitsa, which refers to excision followed by Taila Dahana to obliterate the feeding vessel and achieve haemostasis. Tailadi Dahana is instructed to control excessive bleeding during amputations. Electric thermal cautery is now commonly employed. In most cases, the combination of the foregoing measures is advised. Mechanism: Dahana with Tapta Shalaka (red hot metallic instrument) is described in fragments. The Dahana technique raises the local temperature, causing coagulation necrosis of tissue protein and obliteration of blood vessels. Furthermore, it aids in blood coagulation.

#### RESULTS AND DISCUSSION

Ayurvedic traditions Acharya Sushruta emphasised and specifically defined four basic hemostatic methods: Sandhana, Skandana, Pachana, and Dahana. These procedures will be tested with current hemorrhagic conditions to ensure their practical usefulness.

The mechanism of action of the Sandhana procedure can be understood as a vasoconstriction and mending of the damaged blood vessels. Broadly it can be employed in capillary hemorrhages, tropical hemorrhages and systemic internal hemorrhages. Furthermore, the medications described in Vranaropaka (boosting wound healing) should be evaluated in terms of hemostasis, as the first stage of wound healing is blood clotting, and these treatments may produce hemostasis initially before promoting wound healing. The Skandana technique only helps with vascular constriction and blood clotting. The Sandhana procedure's method of action can be described as vasoconstriction and repairing of damaged blood vessels. It can be used to treat capillary haemorrhages, tropical haemorrhages, and systemic internal haemorrhages in general. Furthermore, the pharmaceuticals indicated in Vranaropaka (raising wound healing) should be considered in terms of hemostasis, as blood clotting is the first stage of wound healing, and these treatments may initially generate hemostasis before

increasing wound healing. The Skandana approach only works to reduce vascular constriction and blood coagulation.

#### CONCLUSION

Doctors must deal with bleeding on a regular basis, ranging from moderate to severe. A thorough review of the literature reveals that the major two goals of bleeding therapy, as understood, handled, and documented by Ayurvedic surgeons, particularly Acharya Susruta, are to achieve haemostasis and to replace the lost blood. The haemostatic measures described in Shalyatantra classics such as the Chaturvidha Rakta Sthambhanopaya are extremely scientific, practical, and effective, and they still hold true in the twenty-first century, the era of modern technologies. Thus, Skandana, Sandhana, Pachana, and Dahana are the absolute haemostatic measures, and understanding them will allow clinicians to deal with haemorrhage with the fewest resource as fluid therapy (jaggery, honey, sugarcane juice, milk, meat soups) mention by acharya sushrut. Wherever there is blood loss in large quantity, then Rakta-basti has to be given.

#### REFERENCES

1. Yadavji Trikamji .2008. Sushruta Samhita with Nibandhasangraha commentry Sutrasthana Doshadhatmalakshayavridhidi Vigyaniya adhyaya 15/3 Chaukhamba Surbharti, Varanasi; Pg No. 67.
2. Yadavji Trikamji .2008. Sushruta Samhita with Nibandhasangraha commentary Sutrasthana Shonitvarniya adhyaya 14/20 Chaukhamba Surbharti, Varanasi; Pg No. 64.
3. Yadavji Trikamji .2008. Sushruta Samhita with Nibandhasangraha commentary Sutrasthana Shonitvarniya adhyaya 14/21 Chaukhamba Surbharti, Varanasi ; Pg No. 64.
4. Yadavji Trikamji .2008. Sushruta Samhita with Nibandhasangraha commentary Sutrasthana Shonitvarniya adhyaya 14/44 Chaukhamba Surbharti, Varanasi ; Pg No. 66.
5. Churchill Livingstone .Davidson's principles and practices of Medicine, 21st edition, imprint of Elsevier, page no.992.
6. Guyton and Hall, textbook of Medical Physiology, 12th edition, Saunders an imprint of Elsevier, page no. 451.
7. Yadavji Trikamji .1997. Sushruta Samhita with Nibandhasangraha commentary Sutrasthana Shonitvarniya adhyaya 14/27 Chaukhamba orientalia, Varanasi , page no. 65.
8. Kaviraj Ambikadutta Shashtri .Sushruta Samhita edited with Ayurveda-Tatva-Sandipika, Sutrasthana Shonitvarniya adhyaya 14/43 Chaukhamba Sanskrit Sansthan Varanasi, page no. 56.
9. Brohi K, Cohen MJ, Davenport RA. 2007. Acute coagulopathy of trauma: mechanism, identification and effect. Curr Opin Crit Care;13:680-685.
10. Kulkarani R. 2013. Comprehensive care of the patient with haemophilia and inhibitors undergoing surgery: practical aspects. Hemophilia. ;19(1):2-10.
11. Federicini AB, Mannucci PM. 2007. Management of inherited von Willebrand disease in 2007. Ann Med. ;39(5):346-358.
12. Girolami A, de Marinis GB, Bonamigo E, Lombardi AM. 2012. Recombinant FVIIa concentrate-associated thrombotic events in congenital bleeding disorders other than hemophilias. Hematology. ;17(6):346-349.
13. Dr. Sarita Gaikwad. Impact Of Raktabasti On Severe Anemia And On Reduction Of Serum Creatinine Level In Ckd Stage 5: A Clinical Trial ejpmr, 2020,7(8), 671-676