

CONCEPT OF COAGULATION IN AYURVEDA

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ABSTRACT

Objective- To study blood coagulation in *Ayurveda* along with its management.

Discussion- The concept of blood and coagulation is not systematically discussed in *Ayurvedic* classics. In this study, we are trying to find out those concepts which are scattered in classics along with modern elaboration.

Conclusion- It can be concluded that *Vata*, *Pitta*, and *Kapha* have a great role in normal blood flow, bleeding and coagulation. Management as per *Ayurveda* should apply clinically in further study.

Key words: Hemostasis, Hypercoagulation, Hypocoagulation, *Rakta*, Blood.

INTRODUCTION

Blood is the most important element in a living being. Blood circulates all over the body and supplies oxygen to the tissue which needs it. Ultimately blood gives nourishment to the body tissue.¹ Normally, blood is present in liquid form because of the inhibitor of coagulation. But after any cut injury effect of procoagulation dominate and blood clotted. Any defect in the coagulation process leads to the development of hypocoagulation or hypercoagulation.² According to *Ayurveda*, *Rakta* (blood) is the second *Dhatu* among seven

Dhatu. *Rasa dhatu* is formed from *Ahara rasa*, after the formation of *Rasa dhatu*, *Rakta dhatu* is formed, chronologically other *Dhatu* is also formed. Any defect in *Rakta dhatu* may cause a problem in the formation of other *Dhatu*.³

The concept of coagulation is described in *Ayurvedic* classics though it is scattered. In this study, we are going to describe the coagulation concept in *Ayurveda* and its relationship with modern science.

AIM AND OBJECTIVES-

1. To study the concept of coagulation in *Ayurveda* with the modern counterpart.
2. Study on the coagulative disorder and its management principles and procedure in *Ayurveda*.

DISCUSSION-

Concept of Coagulation in Modern and Ayurveda-

Blood circulates and discharges oxygen into the tissue which needs it. The carbon dioxide produced in tissue is discharged into the blood and ultimately discharge into the lungs. Various waste products of the body are removed by blood through the kidney. End products of digestion are absorbed from the gastrointestinal tract and transported by the blood to the tissues. Blood also transports various drugs, hormones, etc to various tissues. It helps to maintain various homeostatic processes in the body.¹

Normally, blood is present in liquid form because of the inhibitor of coagulation. But after any cut injury effect of procoagulation dominate and blood is clotted.²If there is any defect in the coagulation process, it causes the development of hypocoagulation or hypercoagulation.

Hemostasis can be defined simply as the process by which clot formation occur at the site of vascular injury. Hemostasis is essential for life and its abnormality leads to the development of varying degrees of disorders, which can be divided into two groups. In hemorrhagic disorders, characterized by excessive bleeding has blunted or insufficient hemostatic mechanisms. In thrombotic disorders, blood clots (thrombi) form within intact blood vessels or the chamber of the heart.⁴

Normally blood does not clot within the vessel but blood clots during injury.

Blood contains 2 sets of materials, a procoagulant, and an inhibitor of coagulation. Normally inhibitors of coagulation dominate but after cutting injury, the effect of procoagulant dominated at the site of injury. So, blood does not clot within the blood vessel and clots during injury.²Normal anticoagulant present in the blood is antithrombin, heparin, protein c, TFPI / Tissue factor pathway inhibitor, and thrombomodulin.⁵

Spontaneous arresting of bleeding is called hemostasis.

Hemostasis is achieved by 4 methods- vasoconstriction, increased tissue pressure, formation of platelet plugs in case of capillary bleeding, coagulation, and clot formation.⁶

Platelet plays an important role in homeostasis coagulation. Injury of the blood vessels leads to removal of

the vascular endothelium so that subendothelial tissue becomes exposed⁴. In the subendothelial tissue, there are structures like collagen which have an extreme affinity for platelets. Binding between collagen receptors of platelets and collagen occurs. This is called adhesion. After adhesion, some chemical changes occur which cause secretion of the contents of both alpha granules and dense granules. Dense granules secrete ADP and Calcium ions. ADP causes platelet aggregation, thus forming a platelet plug.

As fibrin clot begins to form, there is enough thrombin, and platelet on their surface. Ultimately firm platelet plug is formed. In coagulation, fibrinogen is converted to fibrin which forms a mesh that traps more platelets and erythrocytes, producing a clot.⁷

Coagulation of blood is secondary haemostasis. It starts a little after the onset of primary Hemostasis. Fibrin must be formed through intrinsic and extrinsic pathways.⁸

Coagulopathy is a condition in which the blood's ability to coagulate is impaired. They are hypocoagulation and hypercoagulation. Hypocoagulation is associated with abnormal bleeding from primary and secondary defects in platelet production or coagulative factors. For example- Hemophilia A, Christmas disease, purpura, and petechiae. Hypercoagulation is associated with an increased tendency for coagulation which may develop obstruction of the vein and arteries.⁹To know the concept of coagulation according to Ayurveda, we should know about *Rakta dhatu*. *Rakta* is one among *Saptadhatu*. Pure *Rakta* gives energy, complexion, happiness, and longevity. So, *Rakta* is the life of a living being.¹⁰

Rasa dhatu is formed from *Ahara rasa*³, *Rakta dhatu* is formed from *Rasa dhatu*^{3,11}, chronologically other *Dhatu* also formed one after another.³The *Apya rasa* (water-like) after getting red colour by *Tejas* (in liver and spleen) remaining not vitiated (pure) and clear, comes to call as *Rakta* (blood).¹²

Blood is the root of the body and body is supported or maintained by blood itself. So, it should be protected by all efforts. Blood itself is life.¹³

JivaRakta is *Panchabhautik*, as *Bisrata* (bad smell), *Dravata* (liquidity), *Raga* (red colour), *Span-dana*(throbbing), *Laghuta*(levity) – this quality of *Prithvi* and other *Bhutas* (*Apa, Agni, Vayu, Akash*) respectively are found in the blood.¹⁴

Normally, *Rakta* should not be excess thin or solid.¹⁵

Vitiated *Rakta* and Its Relationship with Coagulation and Bleeding:

Blood vitiated with *Vata* is flowing quickly (*Shighragami*) and not clotting in nature (*Askanda*). Blood vitiated with *Pitta* is also non clotting in nature,¹⁶ takes longer time for coagulation¹⁷. Blood vitiated with *Sleshma* is slimy,^{16,17} flowing slowly and resembling a muscle (*Mamsapeshipabham*),¹⁶ thready (*Tantumad-dhanam*) and thick.¹⁷

Ashriksravana is described as the function of *Vyana vayu*.¹⁸ So, *Vyanavayu* is responsible for blood circulation along with bleeding. According to the modern concept, an inhibitor of coagulation is normally dominated but after a cut injury at the local site effect of procoagulant dominates.² Any abnormality in platelets and coagulation factor can lead to development of hypocoagulation (more bleeding and delay or less clotting).⁷

According to the *Ayurvedic* concept, *Pitta* (*Ushna, Tikshna, Katu* quality) and *Vata* (*Sukshma, Cala* quality) *Dosha* are responsible for bleeding.^{16,17} *Kapha dosha* is responsible for coagulation. *Kaphadushita rakta* is thread-like (*Tantu*), thick, and resembling like muscle.^{16,17} According to modern concept, it can be correlated with fibrin clots.

The imbalance state of *Vata, Pitta* and *Kapha* can lead to development of hypocoagulation and hypocoagulation. According to the above concept balance *Vata, Pitta*, and *Kapha* helps in blood circulation and coagulation.

Asriksravan and *Abhighata* are the *Vatakarak nidan*.¹⁹ After injury, there may be the presence of bleeding and *Vata* will be vitiated. Normally, after bleeding hemostasis and coagulation occur. Involvement of *Kapha dosha* with *Rakta* can help in coagulation according to the *Ayurvedic* concept.

Management Of Bleeding According to *Ayurvedic* Classics (Hypocoagulation)

Cold (*Hima*) makes the blood clot.²⁰

If the cold substance isn't sufficient for clotting then *Sandhan* with *Kasaya* substance should use, if there is no improvement with *Sandhan* then *Pachan Kriya* should be done by *Bhasm*(ash). If all the 3 procedures for clotting fail, then *Dahakriya* (cauterisation) should be done.²¹

Drugs with the following quality will be helpful for hypocoagulation-

Kasaya rasa-sleshma and *Raktapitta Prasaman*. They absorb body fluid (*kleda*).²²

Raktapitta hara– *Saribadigan*²³ *Ballipandamool* or *Kantakpanchamool*²⁴ (Group of herbs), *Kaphagun-pradhandravya karma aushadhi*- *Kakolyadigan*.

Vata saman dravya karma aushadhi- *Parusakadigan* (*Parusak, Katphal, Dadima, Rajadan, Katak phal, Shakaphal, Triphala*).²³

Concept of hypercoagulation in Modern and Ayurveda-

According to modern, hypercoagulation can be defined as an increased tendency for coagulation which may develop obstruction of veins and arteries. This condition is called thrombosis. Sometime a small part of the thrombus (emboli) travels in the blood stream and obstructs distant site vessels.

Causes of hypercoagulations are,

Mutation in the gene for factor V, congenital absence of protein C leads to uncontrolled intravascular coagulation, resistance to activated protein C, a mutation in protein S and antithrombin III, and disseminated intramuscular coagulation.²⁵

According to the *Ayurvedic* concept, *Rakta* vitiates with *Kapha* and is responsible for hypercoagulation. The characteristics of *Rakta* vitiates by *Kapha* are slimy, thread, and thick, resembling muscle.^{16,17}

Management Of Hypercoagulation or Thrombosis According to *Ayurvedic* Classics-

In *Kaphanubandha Rakta*, *Rakta* becomes clotted. *Utpalanala* (*Nelumbo nucifera Grerm.*) *Kshara* (Alkali) with honey and ghee can cure hypercoagulation.²⁶ If *Rakta* is *Grathita* then honey with *Paravat sakrit* (stool of pigeon).²⁷

Blood mixed with *Darbha* and is used as *Basti*.²⁸

Drugs with the following quality will be helpful for hypercoagulation-

- *Katudravya*- a function of *Katudravya* is to break bloodclot (*Shonita sanghatam bhinatti*). *Katu rasa* is *Vayu*(*ruksha*) and *Agni*(*tikshna*) *Mahabhuta pradhan*.²⁹

- *Pitta vataguna pradhandravya karma aushadhi*.

- *Apa* and *Agnimahabhuta pradhan dravya karma aushadhi*.

Examples of Some Bleeding Disorders in Ayurveda-

- *Raktapitta*.

- *Kshatakshin*.

- *Raktapradar*.

- *Arsha*.

- *Nasa arsha*.

- *Raktaatisara*.

- *Sokajaatisara*.

- *Raktameha*.

CONCLUSION

Blood circulates all over the body and it gives nourishment to the body. Normally blood does not clot within the blood vessels and blood clotted during cut injury. The normal state of *Rakta* (blood) gives life. Any abnormality of *Rakta* along with coagulation defect leads to death. As per this study, we can say that *Vata* and *pitta* are responsible for bleeding, and *Kapha dosha* is responsible for clotting

Management as per *Ayurvedic* classics is already described. The management can apply clinically in the future study.

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