

# **Ancient Review on Jalauka Avacharan (Leech Therapy)**

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## **ABSTRACT**

**Ayurveda** speaks about many modes of healing art, even surgery and Para-surgical techniques. Among the Para-surgical measures, *Raktamokshana* or bloodletting enjoys a pride of place from the dawn of medical history. *Raktamokshana* is a technical term employed to denote a Para-surgical procedure to expel out the vitiated blood from selected areas of the body, by specific methods, types of *Jalauka*, their habitat etc. has been described first time in detailed in this chapter. *Sushruta Samhita*, the oldest available manual on surgery has devoted an entire chapter for the description of *Jalauka*, and a chapter on *Jalaukavacharaniya* for the purpose of bloodletting. *Sushruta* has dealt in clear detail with *Raktamokshana* and its type. He described special chapter only for *Jalaukavacharana*

**Keywords-Para-surgical techniques, Raktamokshana, Jalaukavacharana**

## **INTRODUCTION**

Earliest references of bloodletting are found in the basic works of all systems of medicine. The oldest civilization of the world too used this method to bestow health on its subjects from time immemorial. All the major classics of Ayurveda have dealt the topic with minute details of a scientist.

*Jalaukavacharana* is claimed to be the supreme therapy because of its safety and high efficacy in the disorders involving the vitiation of blood. It is safely indicated even for the king, rich, old, fearful, weak, women and the people of tender nature. A brief description of *Jalauka* is provided in the forth-coming pages on the ancient considerations followed by modern views.

*Vyadhana karma* is one of the *Astavidha Shashtra Karma* described by *Sushruta*<sup>2</sup>. hence, the total word *siravyadha* implies the puncturing of *Sira*. It is a chief method of *Raktamokshana*. Since the time of *Veda*, *Ayurveda* has much productive materials about *Raktavasechana karma* as a part of treatment. The method of application of leech for bloodletting is mentioned in *Kaushika Sutra* (4/26/8) which is a *Sutragrantha* of *Atharvaveda*. The awareness of *Jalaukavacharana* is as old as the *Ayurveda*. The *Pittajavitiated* blood is to be removed by application of *Jalauka* (leech), which are born in water possessed of *Madhura* (sweet or soothing) properties and *Ushana* and *Katu* to expel the *Pitta Dosha*.

All *Samhita* have given detailed description of *Raktamokshana* and *Jalaukavacharana*<sup>1</sup>

*Charka* has enumerated *RaktajaRoga* and their treatment by *Shonitavasechana*<sup>2</sup>. and various techniques of *Raktamokshana* is also mentioned.<sup>3</sup>

## **MATERIAL AND METHODS-**

The famous English poet Words Worth wrote a poem, “The leech gatherer” based on the medicinal use of leeches. Before 5000 yrs ago Egyptian Medicos believed that letting a leech sip a sick patients blood could help cure everything from fever to flatulence and in medieval Europe, leeches were so closely associated with doctors called leeches.

*Hirudomedicinalis* may have first entered the formulary in the Second Century B.C. A significant biomedical advance, leeches not only inflicted less pain than lancets or sacrifiers, but removed a more predictable quantity of blood. They were in such extensive use in the 19<sup>th</sup> century that in 1833 France alone imported over 42 million

Due to the great demand for leeches for medicinal use that are suitable species were even cultured. Nachtrieb (1912) states that around 1850 A.D., one American leech farm disposed of as many as 1000 or more leeches daily. About 7 million in London and 5- 6 million leeches were used in Paris hospital in 1863.

There is indication of therapeutic bloodletting among ancient, Egyptians, Aztec, Babylonians and Hindus although the first written records of the practice is found in the *Corpus Hippocraticum*.

Hippocrates believed that disease was caused by imbalance of the four humors (blood, phlegm, black bile and yellow bile) and that bloodletting played a central part in restoring balance.

According to "Genuineness World Record - 2002 page 23" the life span of 27 years has been reliably recorded for the species *Hirudinea Medicinalis*.

#### **INDICATION**

<i>Dosha</i>	<i>Pitta</i> (Ch.), deep located ( <i>GrathitaRakta</i> ) (Su. Su.) Person having most delicate constitution (Su. Su.)
<i>Dhatu</i>	<i>Rasa, Rakta, Lasika, Mamsa</i>
<i>Prakriti</i>	<i>Sukumar</i> , child, woman, old man, king like etc.
Diseases	<i>Kushtha, Arsha</i> etc.
Research	Piles venous congestion, manifestation of ear and nose, headache, whooping cough, thrombosis, brain tumor, skin disease, tonsillitis, swelling and local inflammation etc.
<i>Kala</i>	<i>Sharada ritu</i> (Autumn), not in extremely hot or cold season, In winter season – at noon; summer season – at cool time; In rainy season – at clear sky.

#### **Local bleeding by use of leeches**

The word leech comes from an Old English word "laece" meaning physician. In 1668 the veterinarian was known as a horse-leech. The spelling later became leech and was used to name a worm used in bloodletting. The leech belongs to the class "Hirudinea" and phylum "Annelida." The technical name for the medicinal leech is "Hirudomedicinalis." Leeches release an anticoagulant known as hirudin, and are found in many parts of the world including North America, Sweden, and Portugal. The Swedish leeches were said to draw four times the blood an American leech could extract. The leeches were stored in special porcelain jars with perforated lids, which contained spring water and were kept in a cool place.

An instrument known as an artificial leech was used for the over-sensitive patient who objected to live leeches; the device consisted of a pointed lancet inside a glass syringe cylinder or "sucker."

The following paragraph is a translation of the Old English from the 1634 text of Ambroise Pare.

In those parts of the body where to cupping-glasses and horns cannot be applied, to those leeches may for the most part be put, as to the fundament to open the coat of the hemorrhoid veins, to the mouth of the womb, the gums, lips, nose, fingers. After the leech being filled with blood shall fall off, if the diseases require a large evacuation of blood, and the part affected may endure it, cupping-glasses, or horns, or other leeches shall be substituted. If the leeches be handled with the bare hand, they are angered, and become so stomach full as that they will not bite; wherefore you shall hold them in a white and clean linen cloth, and apply them to the skin being first lightly scarified, or besmeared with the blood of some other creature, for thus they will take hold of the flesh, together with the skin more greedily and fully. To cause them to fall off, you shall put some powder of Aloes, salt or ashes upon their heads. If any desire to know how much blood they have drawn, let him sprinkle them with salt made into powder, as soon as they are come off, for thus they will vomit up what blood so ever they have sucked. If you desire they should suck more blood than they are able to contain, cut off their tails as they suck, for thus they will make no end of sucking, for that it runs out as they suck it. The leeches by sucking draw the blood not only from

the affected part whereto they are applied, but also from the adjacent and distant parts. Also sometimes the part bleeds a good while after the leeches be fallen away, which happens not by scarification after the application of cupping-glasses or horns. If you cannot stop the bleeding after the falling away of the leeches, then press the half of a bean upon the wound, until it stick of itself, for thus it will stay; also a burnt rag may be fitly applied with a little bolster and fit ligature.

The application of leeches was described by William Bennett in 1886. The leech was removed from water and dried in a soft towel for 30 minutes before use. The skin of the affected area was sponged with warm water to increase the flow of blood to that part. Milk, or milk and sugar, was applied to the skin to encourage the leech to attach. The small end of the leech was held between the thumb and index finger, and the leech was placed against the desired area of skin. If several leeches were needed, they were placed in a teacup or wine glass which was then inverted over the skin. For application of a leech inside a body cavity such as the vagina, a leech-glass was used. Into this test-tube shaped cylinder of glass, a leech was placed and directed to the desired location. A rolled tube of paper served the same purpose. When leeching in the immediate vicinity of an orifice, the use of a plug of cotton wool was advised to prevent the leech from escaping through the opening. Thomas 18 cautioned that this should be done when placing leeches on the cervix for the treatment of amenorrhea. A quotation from his text is as follows:

Three or four large leeches, or a sufficient number of small ones, to take from three to five ounces of blood, may be applied in the following manner: A cylindrical speculum, of sufficient size to contain the entire vaginal portion of the cervix, being passed and the part thoroughly cleansed, a small pledged of cotton, to which a thread has been attached for removal, should be placed within the os, so as to prevent the entrance of the leeches to the cavity above. A few slight punctures, sufficient to cause a flow of blood, should then be made in the cervix, and all leeches to be employed thrown in, and the speculum filled at its extremity by a dossil of cotton pushed toward the bleeding surface. The speculum should be watched until they cease sucking, for if left for a very short time, even with the mouth of the instrument filled with cotton, they will escape. After their removal all clots of blood should be removed by a sponge or a rod wrapped with cotton, the speculum withdrawn, a large sponge squeezed out of warm water placed over the vulva, and the patient directed to remain perfectly quiet.

Leeches usually fell off when they became engorged with blood. If not, salt, snuff, or vinegar was applied to discourage their hold. The bleeding was arrested by pressure, a drop of per chloride of iron, a suture, or cautery with a red hot needle

Leeches extract the blood of their victims in a painless manner. For this reason, leeches were extensively used, in the past, in surgery for bloodletting (Phlebotomy) under the mistaken belief that removal of bad blood may cure the disease. From the time of early Greek medicine there are records of leeches for bloodletting. They were also used to reduce swellings and discolorations from bruises. In fact they were employed for the partial exsanguination of patients suffering from every variety of ailments from common cold to cancer. *Hirudomedicinalis* was commonly used for phlebotomy in Europe in olden times and the practice, at one time spoken as "leechery", was so common that doctors themselves were often called "Leeches". Besides *Hirudomedicinalis*, other species were used in various parts of the world.

Leeches are also said to be used as *materia medica* in the Unani medicine aims at restoring the equilibrium of the various elements and faculties of the human body. It also presumes the presence of "*medicatrix naturae*" (the body's self healing capacity) in the human system and attempts to call it into action to restore normal health. Unani medicine has also described the surgery – *Ilaj-bil-Yad*. In this, they had mentioned leeching as a *Taleeq*. According to them, leech application is a unique method for removal of toxic matter from the blood. It is useful in *Slun* diseases i.e. is baldness and ring worm & certain conditions have been laid down by the physicians for applying this method i.e. the kinds of leeches to be applied, water from where they are to be obtained etc.

#### **Medicinal leech - *Hirudomedicinalis*:**

Phylum	-	<i>Annelida</i>
Class	-	<i>Hirudinea</i>
Order	-	<i>H. Limnobdella</i>
Family	-	<i>Hirudinae</i>
Species	-	<i>H. medicinalis</i>
General	-	<i>Hirudinaria</i>

#### **History of *Siravedhana* (Bloodletting)**

Bloodletting is a procedure that was performed to help alleviate the ills of mankind. For an operation with a 3,000-year history, bloodletting has attracted little attention in recent historic accounts of medicine. Bloodletting began with the Egyptians of the River Nile one thousand years B.C., and the tradition spread to the Greeks and Romans;

its popularity continued throughout the Middle Ages. It reached its zenith during the beginning of the nineteenth century, but had virtually died as a therapeutic tool by the end of that century.

The custom of bloodletting as practiced over the centuries might seem repulsive to the modern practitioner of medicine. However, the physician and his treatment must be judged in the light of the contemporary theory of disease. Primitive man looked on disease as a curse cast on him by an evil spirit; his treatment consisted of driving out the demon that possessed him. Neolithic man of the late Stone Age used flint tools for trepanning the skull as a method for releasing the demon; the logic of the treatment was sound, but the premise on which it was based was wrong. The premise was that the evil spirit of disease was contained within the skull and could be drawn out. In much the same way as trepanning allowed demons to escape from the head, bloodletting was supposed to facilitate the release of evil spirits from elsewhere in the body. Later use of bloodletting in hypertension, apoplexy, dropsy, and nervous disorders had a more physiologic explanation.

The story of bloodletting is intertwined in the mysterious fabric of medical lore; it originated from magic and religious ceremonies. The physician and priest were one and the same since disease was thought to be caused by supernatural causes. Witch doctors and sorcerers were called on to drive out the evil spirits and demons. Bloodletting was a method for cleansing the body of ill-defined impurities and excess fluid. The early instruments included thorns, pointed sticks and bones, sharp pieces of flint or shell, and even sharply pointed shark's teeth. Miniature bow and arrow devices for bloodletting have been found in South America and New Guinea. A small bloodletting instrument resembling a crossbow was once used in Greece and Malta. Wall paintings dating from 1400 B.C. depict the use of leeches for drawing blood from human beings.

**Bloodletting can therefore be listed under the following headings:**

**I. General bloodletting**

- A. Venesection
- B. Arteriotomy

**II. Local bloodletting**

- A. Scarification with wet cupping
- B. Leeches

***Raktamokshana* by appliances considering the state of *Rakta***

The vitiated blood in any part of the body should be abstracted therefore by scarifying (*Prachhanna*) it, by cupping it with syringe (pipe), a horn, a gourd, or leeches or by the opening of the vein respectively, according to the density of the blood. Other assert is that leeches should be applied in the case of the blood being confined deep into the body, scarification with a surgical instrument should be made in the case of clotted blood. In the case of extensive vitiation of blood through the body and with a horn or a gourd in the case of the deranged blood having seated in the skin<sup>4</sup>.

In this regard the commentator *Dalhana* gives his view that the vitiated blood should be sucked following the site of blood, as deep, deeper, deepest, from the skin to the parts of the body by *Prachhanna*, *Jalauka*, *Alabu* and *Shringa* respectively. *Siravyadha* should be applied in the whole vitiated blood<sup>5</sup>.

**Regimen**

The digestive fire (*kayagni*) of a person naturally grows dull after the exhibition of *Vamana* (emetics), *Virechana*(purgation), after the administration of a *Niruh Basti*, after a internal application of *Sneha* and after s bloodletting.(su.chi.39/3) It is further lessen by the eating of extremely heavy articles of fare, just as low or dull fire is extinguished by a heavy load of fuel<sup>6</sup> So, on the other hand, light meal taken in small quantity, increase the digestive fire under this circumstances just as light fuel in small quantities serves to rekindle a low fire<sup>7</sup>.

Regarding the restoration of *Agni*(digestive fire), *Vagbhata* says giving an excellent example that the same should be restored just like restoration of a immature egg, and full pot of oil.(ah.ka.5/51) So light *Agnideepak* (Appetizer) food should be prescribed. *Yavagu*(gruel) prepared with a small quantity of rice should be given once, twice or thrice respectively in case of the eliminated *Dosha*. In addition to *Takra* (mediated curd), *Yusha* (boiled decoction) etc. and *Rakta Vardhaka Dravya* (drugs to increase blood) should be administered<sup>8</sup>.

An ideal diet consisting of cooked *Shastigrain* or matured *Shalirice* *Mudga* pulse as well as the soup of the flesh of an *Ena*, *lava*, Peacock, *Tittir*, or deer and such other light food should be prescribed and the complications should be subdued according to the nature of the deranged bodily humors.<sup>9</sup>

A patient should observed a proper up to one month or of recouping of his health, after having been subjected to a course of blood-letting or treated with a course of *Shodhanatherapy*.

#### ***Apathyā***

The patient should be advised to avoid use of cold water and cold things, *Katu*(pungent), *Atilavana*(excess salty), *Atiama*(excess sour) food, *Kshara* (Alkali), *Virudha-ahara*(unfavorable diet), *Asatmya-Ahara* (unsuited diet), specially *Guru*(heavy), *Vistambhi*(constipative), *Vidahi*(acidic), food *Vyayama* (exercise), *Divaswapa* (day sleep), *Maithuna* (gratification of sexual desire), *Krodha* (irritate mood or fit of anger), *RatriJagrana* (sleepless at night) *Uchhasambhasana* (talking in a loud voice), *Aswarohana*(riding on horse etc), *Atichakramana* (excess starveling), an undue exposure to the sun and wind etc. The use of uncongenial fire undoubtedly leads to the deterioration of the strength and complexion of the body. In all these instances, the real cause of the distress should be first ascertained, which should be then remedied with proper antidotal measures and remedies.<sup>10</sup>

#### **JALAUKA – ETYMOLOGY:**

The word *Jalauka* is a compound word with two components *Jala* + *Ayu*; i.e. the animals having water as the life. The term *Jalauka* can be split into *Jala* + *Oka*; i.e. water dwelling animals.

#### **DEFINITION:**

*Shabdakalpadruma* has considered *Jalauka* in feminine gender and defined it as an aquatic creature employed to expel out the vitiated blood.

*Bhagavadgomandal* defines *Jalauka* as an animal living either in water or in mud with distended abdomen.

#### **SYNONYMS:**

*Jalauka* is called by different names, which are as below –

*Jalayuka*, *Jalaua*, *Jaluka*, *Jalaluka*, *Jaalalauka*, *Jalita*, *Jaloka*, *Jalauga*, *Jalatani*, *Jalauka*, *Jalasuchi*, *Jalaukasu*, *Jalasarpini*, *Raktapata*, *Ruktapa*, *Raktapayini*, *Vanini*, *Vedhini*, *Venika*.

#### **TYPES OF JALAUKA:**<sup>11</sup>

In Ayurvedic literature, *Jalauka* have been classified into two main groups:

1. *Savisha* (Venomous)
2. *Nirvisha* (Non-venomous)

Each group containing six in number.

#### **1. *SavishaJalauka*:**

The *SavishaJalauka* originates in the decomposed urine and fecal matter of toads and poisonous fishes in ponds of stagnant and turbid water.

#### **General characters of *SavishaJalauka*:**

Such types of *Jalauka* are having the following characters according to the Ayurvedic texts:

- a. Thick
- b. Slow locomotion
- c. Fatigues
- d. Middle part elongated
- e. Delay in sucking
- f. Not commendable type
- g. Sucks little quantity of blood.

#### **Individual features of *Savisha Jalauka*:**

1. *KRISHNA*: i. Thickness ii. Resemble in black color.

2. *KARBURA*: i. Resemble the fish of vermin type. ii. Ventral surface is convex (*Ayata*)

3. *ALAGARDA*: i. Thick ii. Hairy iii. Round at sides iv. Black at the mouth.

4. *INDRAYUDHA*–

- i. Having different colours like rainbow.
- ii. Number of linings on the body.

5. *SAMUDRIKA*:

i. Blackish yellow with dotted skin.

6. *GOCHANDANA*:

- i.Narrow mouth ii.Marked by bifurcating lines.
- iii.Bottom (end Part) like the scrotal sac on a bull.

#### **FEATURES OF SAVISHAJALAUKA BITE:**

If *SavishaJalauka* is applied then a person suffers from following clinical symptoms:

1. Burning
2. Itching
3. Swelling
4. Drowsiness
5. Fever
6. Delirium
7. Unconsciousness
8. Irresistible inclination to scratch the seat of bite.

#### **NIRVISHA JALAUKA:**

*NirvishaJalauka* originates in decomposed vegetable matter, as the purified stems of the several aquatic plants known as *Padma*, *Utpala*, *Nalina*, *Kumuda*, *Pundarika* and common zoophytes, which live in clear water.

#### **GEOGRAPHICAL DISTRIBUTION<sup>12</sup>:**

According to Sushruta, the leeches are found in *Yavana*(*Turkesthana*, *Pandya*, *Sahya*, *Pautana*etc.)

#### **Habitat:**

Such leeches swim about in sweet scented water, live on, non-poisonous weeds, and lie on the leaves of flowering water plants in spite of on the dark and oozy beds of pools and suck blood from the affected part of a human being without causing any discomfort.

#### **General characters of *NirvishaJalauka*:**

Such types of *Jalauka* are characterized by following points:

1. Strong and large bodied.
2. Ready suckers
3. Greedy

#### **Individual features of *NirvishaJalauka*:**

##### **1.KAPILA:**

- I. Colour like *Manahshila* at the sides ii. Dorsal surfaces are slimy and coloured like *Mudga* pulse.

##### **2.PINGALA:** i.Colour – Reddish ii.Shape – Round iii.Locomotion – Speedy.

##### **3.SANKUMUKHI:** Colour – blackish red like that of liver.

1. Provided with the greatest swiftness.

##### **.MUSHIKA:**

1. Color – like the common blind moles
2. Emit a foetid smell from the body.

##### **5.PUNDARIKAMUKHI:** Color – like *Mudga* pulse.

1. Presence of resemblance of the mouth of the full-blown lotus lilies.

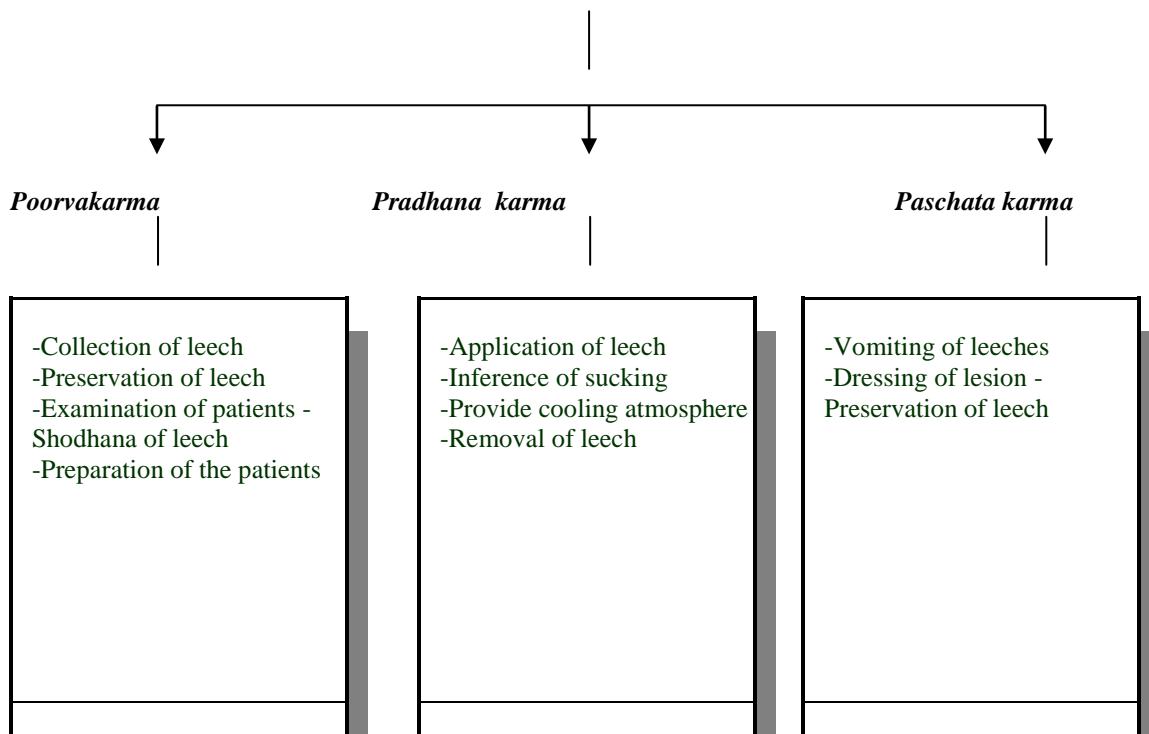
##### **6.SAVARIKA:**

1. Marked with impressions like lotus leaves.
2. Measured eighteen fingers in length.
3. Directed to apply only in the lower animals.

The leeches are further classified according to sex by Acharya Vaghbhatta. Those which are delicate, having thin skin, small sized head, the lower body being large are female leeches and the ones with opposite characters along with being semi lunar in look with large front portion are male.

**J A L A U K A V A C H A R A N A K A R M A**

**(PROCEDURE FOR LEECH APPLICATION)**



**Bioactive substances of the medicinal leeches<sup>13</sup>:**

1. Hirudin
2. Hyaluronidase
3. Pseudohirudin
4. Destabilase
5. Apyrase
6. Bdellines
7. Eglines
8. Kininases
9. Histamine-like substances
10. Collagenase
11. Leech prostanoids
12. Inhibitor of kallikrein of the blood plasma
13. Proteases
14. Lipolytic enzymes
15. Intibitor of Xa factor of the blood coagulation
16. Triglyceridase
17. Cholesterol esterase
18. Lipase

Hirudin  
Calin

Destabilase

Hirustasin

Bdellins

Hyaluronidase

-Inhibits blood coagulation by binding to thrombin

-Inhibits blood coagulation by blocking the binding of von Willebrand factor to collagen. Inhibits collagen- mediated platelet aggregation

-Monomerizing activity. Dissolves fibrin.

Thrombolytic effects  
-Inhibits kallikrein, trypsin, chymotrypsin, neutrophilic cathepsin G

-Anti-inflammatory. Inhibits trypsin, plasmin, acrosin

-Increases interstitial viscosity. Antibiotic

Tryptase inhibitor Eglins	-Inhibits proteolytic enzymes of host mast cells -Anti-inflammatory. Inhibit the activity of alphachymotrypsin, chymase, subtilisin, elastase, cathepsin G
Factor Xa inhibitor	-Inhibits the activity of coagulation factor xa by forming equimolar complexes
Complement inhibitors	-May possibly replace natural complement inhibitors if they are deficient
Carboxypeptidase A inhibitors	-Increases the inflow of blood at the bite site
Histaminelike substances	-Vasodilator. Increases the inflow of blood at the bite site
Acetylcholine	-Vasodilator
Anesthetics substance	-Anaesthetic

The active leech substances totally block the enzymic processes activated and often exceeding within inflammation and trauma.

The salivary glands of leeches also produce a cornucopia of other pharmacologically active substances, including an antihistaminic, proteases and possibly an anaesthetic and an antibiotic.

The therapeutic effect is not only released by a loss of blood but also by the secretions, which the leech emits into the wound.

#### **Complications:**

The histamine emitted by the leech can lead to an allergic reaction, which may immediately occur, or within four days. A soreness after the bite rarely appears. A small scar at the bitten area may remain for weeks. A plaster allergy is more often found after a treatment with leeches; therefore, it is advisable to use skin preserving, hypoallergenic plasters.)

## **DISCUSSION**

*Jalauka* expels out vitiated blood, very sharply from selected part of the body. So, Leech therapy (*Jalaukavacharana*) takes a pride of place in the list of *Panchakarma* like *Shodhana Chikitsa* from the sunrise of medical history. Saliva of *Jalauka*; containing properties of anti-coagulant, analgesic, anesthesia etc are much helpful in removing congested blood from local lesion quickly and from general circulation also. Dead cells with superficial layer are also been removed from the skin due to rubbing and bloodletting process. Moreover, regeneration of new vessels with pure blood circulation at the site of lesion, may clean up the real skin layer and so derangement of lesion like, *Pidika*, *Kharata*, and *Rukshata* may reduce.

## **CONCLUSION**

*Sushruta* has given great emphasis to **Jalaukavacharana** in the therapy for *Raktapradoshaja Vyadhi* (Blood originated disease), *TridoshaPrakopajanya* (vitiated all three bodyhumor) and *Chirakari*(chronic) diseases. For excess vitiated *Dosha*, *Shodhana* is must. The role of *Vamana* in *KaphajaKushtha*, *Raktamokshana* and *Virechana* in *PittajaKushtha* is highly acclaimed as the best remedies by the classics. *Charaka* further explains various methods to expel out the vitiated blood by *Shringa*, *Alabu*, *JalaukaSiravedhana* and *Prachhanna*.

*Chakrapanidatta* opines that *Shastra karma* is not advisable to expel out the blood as it may damage the *Sparshanendiry*. Among the *Anushastras* (Para surgical measures) *Vagbhatta* considers *Jalauka*(leeches) as the best as all places of the body for all the persons.

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