

Leeth Therapy (Jalaukavacharana) - A Novel Gift from Ayurveda for Treatment of Medico-Surgical Diseases

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Abstract

Background: The first description of *Jalaukavacharana* (leech therapy) was found in the text of *Sushruta Samhita* in 800 B.C. Recently, many researches proved that leech saliva have variety of bioactive compounds involving anti-thrombin (hirudin, bufrudin), anti-platelet (calin), factor Xa inhibitors, antibacterial and others property.

Aim: Main aim of present article is to explore about procedures of leech therapy and research works done over few decades on application of leech therapy in different medico-surgical diseases.

Methodology: The procedure of leech therapy is documented from authors own observations and Information of its application in different diseases was gathered from various published work of last ten years.

Result:-Many clinical researches show that leech therapy is very effective in various medico-surgical diseases. Total eight publications were included in the final selection after systematic analysis.

Conclusion: -Leech therapy or *Jalaukavacharan* is an ancient *Ayurvedic* bloodletting technique which having the great potential to manage many inflammatory, ischemic and infectious diseases. Leech's saliva contains many biologically and pharmacologically active compounds which exert effects anti-coagulant, profibrinolytic, anti-platelet, anti-inflammatory and anti-edema in the host's body. Arthritis, venous congestion, vascular diseases, abscess, ischemic heart disease etc. can be successfully manage by leech therapy/.

Key words: - *Jalaukavacharan*, *Leech therapy*, *Hirudin*, *Vidradhi*, *Deep vein thrombosis (DVT)*.

Introduction

Ayurveda is a system of medicine with historical roots in the Indian subcontinent and practiced from 5,000 years ago.¹ Leech sucks only impure blood so this is considered as blood purification therapy. *Sushruta Samhita* (dating 800 BC) is the treatise of surgery in

which "*Jalaukavacharniya*" is one of its chapters, where everything about *Jalauka* and its application are scientifically described.² *Jalaukavacharana* forms by the addition of two words: *Jalauka* and *Avacharana*. *Jalaukavacharana* means the application of Leeches. The word 'leech' is derived from an old English word for physician, "laece".³⁻⁴ Therapeutic application of leech is practiced among the other system of medicine such as in *Unani* and *Siddha* also.⁵ The treatment of disease with medicinal leeches is also known as Hirudotherapy (HT).⁶ The bioactive substances that found in leech's saliva - commonly known as "hirudo substances" and also called Salivary Glands Secretion (SGS). SGS

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contains more than 120 bioactive substances, which have strong anaesthetic, anti-inflammatory, analgesic properties some of them are still being examined. Haycraft (1984) discovered “hirudin” which is most important component.⁷

Aim: - Main aim of present paper is to discuss about leech therapy, its procedures and research works done over few decades in the field application in different diseases.

Leech therapy (Jalaukavacharana):-

Leech therapy (*Jalaukavacharana*) is being used to treat diseases through *Raktmokshan* which is part of *Panchkarm* in surgical stream of *Ayurveda*. This traditional method of curing diseases is considered as magical therapy because of its wide range of application in almost all the diseases.

Indication of leech therapy:-

In *Ayurveda*, *Jalaukavacharan* are indicated in delicate or weak patients, female patients, old aged or too young patients suffering from *Rakta-Pradoshaj vikaras* (blood originated diseases).⁸ *Jalaukavacharan* are very effective in *Vidradhi* (abscess), *Visarpa* (inflammatory skin disorders), *Gulma* (inflammatory condition of abdomen), *Pidika*, *Kustha*, *Charmadala* (skin diseases) etc.⁹

Leech therapy is widely used in modern medicine for treating a variety of challenging medical and surgical conditions such as plastic surgery¹⁰, Arthritis (Osteoarthritis and Rheumatoid Arthritis)¹¹⁻¹², venous congestion¹³, vascular diseases¹⁴, and Thrombophlebitis etc.

Contraindication of Leech therapy:-

In *Ayurveda*, Leech therapy is contraindicated in *Pandu Rogi* (Anemic patient), *Sarvanga*

Sotha (generalized edema), *Arsha Rogi* (hemorrhoids patients) *Udar Rogi* (individual suffer from gastro intestinal tract disorders), *Shosha Rogi* (cachexia patient) and *Garbhini* (pregnant women).¹⁵

Leech therapy is absolutely contraindicated in HIV patients or who take immunosuppressive drugs, Hemorrhagic diseases, Hypotension, Hypotonia, Absolute Hemophilia, Pregnancies, Severe Anemia (<5g/dl) and Allergy to Leech.¹⁶

Complication of leech therapy:

In *Ayurveda* not any specific complications are mentions but some complication of *Raktamokshana* such as *Paka* (inflammation) and *Daha* (burning sensation) can occur.¹⁷ but modern sciences mention many complications such as-

§ Excessive bleeding can occur with leech therapy; it can be controlled by applying direct pressure or topical thrombin.¹⁸ Excessive blood loss may necessitate blood transfusion, so patients should be informed of the possibility.¹⁹

§ The most common infections involving leech therapy are caused by *A. hydrophila*, infections with *Serratia marcescens*, *A. sobria*, and *Vibrio fluvialis* have been reported.²⁰

Material and Method

Material Required:-

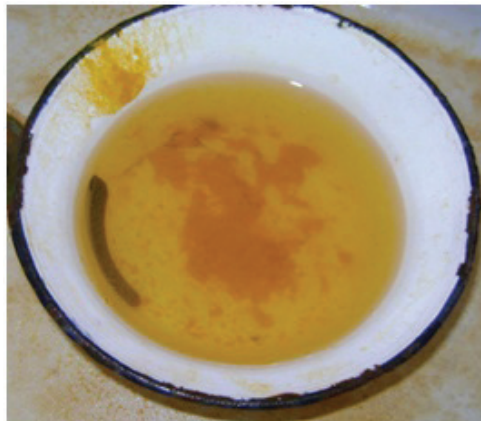
- § Two small glass jar, kidney tray, one big bowl.
- § Sterilized gauze, swab, gloves, Sterile needle, sterile dispovan syringe (10 ml)
- § Savlon and dressing material.
- § Turmeric powder



(Figure 1: Material required in Leech therapy)

Monitoring during leech therapy:-

During leech therapy, it's common to measure and record pulse, blood pressure and skin temperatures every three hours, with the goal of keeping the temperature of the area at or above 86°F. A reduction in temperature below 86°F may indicate problems with either arterial or venous circulation. Baseline laboratory values should also be checked, including a complete blood count (CBC), clotting time (CT), prothrombin time (PT), bleeding time (BT), HIV& HBsAg.

**Method of Jalauka-vacharan (Leech therapy):-**
Method of leech therapy completed in three steps-**A. Purva Karma (Pre-Procedure Protocols):**

In *purvakarma* mainly *snehana* (oleation) and *swedana* (sudation) of the patient is done and cleaning of part of the body to which leech is going to be. For leeches to suck maximum amount of blood very quickly without any problem, they must be stimulated and energized. This is done by applying the paste of mustard and turmeric powder on the body of leech or drop leeches in the water containing turmeric powder and it is found that an inactive leech becomes active.



(Figure 2: Purva Karma in Leech therapy)

B. Pradhana Karma (Main Procedure Protocols):- Main procedure are completed in following steps-

§ Before application of leeches, patient's affected part is clean and sterilize with boiled warm water.

§ First *Shodhita* (Clean) the leeches by putting them in turmeric mixed water for 15 minutes and keep in plain water for 5 minutes.

§ Then affected part of the patient was clean thoroughly with boiled warm water.

§ Then adequate numbers of leeches were applying to the area of maximal congestion one by one.

§ Once the leeches attached, it will remain safely in place until fully distended and then detaches

spontaneously. (30-50 mm.)

§ The blood was allowed to ooze out for 20-25 minutes.

§ If, at the biting site, needling pain and itching appear it indicates that it is sucking pure blood and then it should be removed; if it does not leave due to the smell of blood, the powder of rock salt should be sprinkled up on its mouth.

§ Leeches were again applied to the patient on every 4th day as required.

§ So maximum of five times leeches were applied to a single patient with dressing with Haridra.



(Figure 3: Pradhana Karma in Leech therapy)

Paschatya-Karma:-

- § Removal of blood from the leeches (*Jaluakas*) and when leech fallen away, its body should be massaged with rice powder and its mouth massaged with oil and salt and gently squeezed till signs of proper vomiting appear.
- § The properly vomited one should be placed as before. *Vagbhata* described that the solution of *Haridra* and *Sarsapa* is also helpful to them to void their excreta.



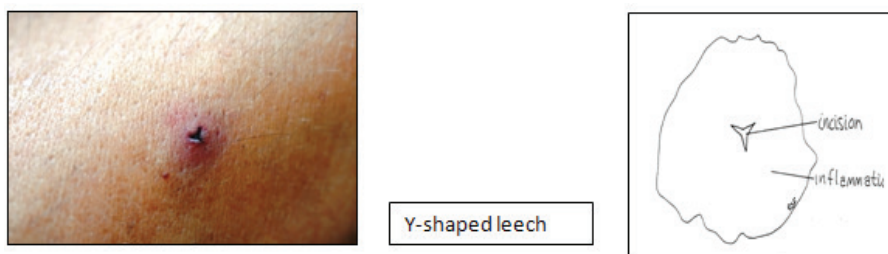
(Figure 4: Paschata Karma in Leech therapy)

Amount of blood sucked by leech—

§ In person who are strong, who have great accumulation of *Doshas* and who are of suitable age (middle age) more than 16 and less than 70 years of age, experts desire, and after *Vaman*, *Virechana*, one *Prastha* (Thirteen and half pal i.e. 540 ml) of blood be allowed to flow out.

§ For calculating the amount of blood sucked, leeches were weighed before and after application.

Bite of the leech during leech therapy- After detachment of leech it leaves “Y” shape scar at leech site. The leech saliva is filled with a chemical that contains a painkiller, which stops you from feeling the bite. The saliva also has a chemical, which keeps the blood from clotting.



(Figure 5: Bite of the leech during leech therapy)

Observation and Result:-

Various published articles on “application of leech therapy (*Jalaukavacharana*) on various diseases” were studied and analyzed according to aim of the study. Total eight publications were included in the final selection after systematic analysis.

Leech therapy in various diseases: - Medicinal leech is a small “factory” manufacturing many biologically active substances. Leech saliva contains several compounds that exert effects in the host’s body.

Table 1: Components of Leech saliva that exert effects in the host’s body –

Hirudin	Inhibits blood coagulation by binding to thrombin
Calin	Inhibits blood coagulation and collagen- mediated platelet aggregation
Destabilase	Dissolves fibrin and have thrombolytic effects
Hirustasin	Inhibits kallikrein, trypsin and chymotrypsin
Hyaluronidase	Antibiotic, increases the permeability of the host skin
Tryptase inhibitor	Inhibits proteolytic enzymes of host mast cells
Factor Xa inhibitor	Inhibits the activity of coagulation factor Xa.
Carboxypeptidase’ A inhibitors	Increases the inflow of blood at the bite site
Histamine like substances	Vasodilator and increases the inflow of blood at the bite site
Acetylcholine	Vasodilator
Anesthetics substance	Anesthetic, this is equally potent to morphine.
Chloromycetyn	Potent antibiotic.

A. Leech therapy in Deep vein thrombosis:-

Deep vein thrombosis (DVT) is semisolid clot in the vein which has more chance to develop pulmonary embolism due to thrombosis formation in the calf muscle.²¹ Leech therapy is very effective in DVT because saliva of leech contain much bio-active substance like Hirudin, calin, factor Xa inhibitor which hampers the coagulation of blood. Leech dissolves clots of blood by its thrombolytic effect. Leech saliva contains three compounds that act as a vasodilator agent like acetylcholine etc. The saliva of leeches also

contains anaesthetic substance. All compound work together to decrease the viscosity of blood, making thinner consistency of blood to promote better flow.²²

B. Leech therapy in Non healing ulcer:-

Leech saliva provides Carboxypeptidase A inhibitors enzyme to ulcer area which reduces vascular congestion. Leech saliva has Histamine like substances and Acetylcholine like substance which act as peripheral vasodilator effects, improves blood circulation and manage ischemia around the wound, thus promotes

wound healing.²³ It was found that leech application improves the hypoxic condition and provides a moist environment for wound healing. It was also observed that it stimulates the enzymatic debridement of the slough material present in the wound.

C. Leech therapy in Abscess (Vidradhi):-

Vidradhi is a clinical condition can be correlated with spreading inflammation of skin & subcutaneous tissue. In modern system of medicine there is no alternative of antibiotic and anti-inflammatory drugs to manage inflammation. Some compound of leech saliva such as Bdelein etc. has anti-inflammatory effect by inhibits trypsin, plasmin and acrocin.²⁴ As per *Ayurveda* probable mode of action of *Jalaukavacharana* is due to its capacity of removing *Rakta Dhatu* along with *Pitta Doshas*.

D. Leech therapy in Micro-vascular & Reconstructive Surgery:-

Micro-vascular reconstructive surgery involves the relocate of autogenous vascularized tissue to renovate extensive tissue defects. The most obvious developments have been procedures developed to allow anastomosis of successively smaller blood vessels and nerves. It has been used by different specialists today, like plastic surgery, gynecological surgery, general surgery, ophthalmoscopic surgery, neurosurgery etc. Leeches are used to reduce that congestion by removing blood that can't exit via the venous system.²⁵

E. Leech therapy in Arthritis: -

Leech saliva have factor Xa inhibitor which inhibits the activity of coagulation factor Xa. It have very important role during the treatment of Osteo-arthritis and Rheumatoid arthritis. Anti-inflammatory effect of Eglins compound inhibits the activity of alpha-chymotrypsin, chymase, substilisin and elastase. So Leech is very effective in osteoarthritis, peri-arthritis and rheumatoid arthritis.²⁶

F. Leech therapy in cardiovascular diseases (CVD):-

Cardiovascular diseases mainly related to heart, veins and arteries. Leech saliva contains thrombin inhibitors and hirudin which improves blood flow by its thrombolytic and anti-platelet activity.²⁷ Many studies exposed that hirudin is more effective than heparin in preventing deep venous thrombosis (DVT) and cardio-

vascular patients with unstable angina.²⁸

Leech therapy is also effective in Cellulitis (*Vranashotha*), Hypertension, Hemorrhoids, Thrombophlebitis (*Shirashotha*), Hematomas, External ear and chronic ear infections, dental problems, like gingivitis, gingival edema etc. and Chronic skin diseases, like scabies, psoriasis, eczematous dermatitis.²⁹

Conclusion

Jalaukavacharan (Leech therapy) is an ancient *Ayurvedic* bloodletting technique which having the great potential to manage ischemic, inflammatory and infective disease by in removing the blood pertaining to the deep seated regions. Saliva of leech contains a numerous bioactive constituents which possess analgesic, anti-inflammatory antiseptic & antibacterial property etc. Leech therapy in the effective in the field of plastic surgery, Arthritis (Osteoarthritis and Rheumatoid Arthritis), Venous congestion, vascular diseases, Thrombophlebitis, cellulitis, sciatica, inflammatory reactions, blood purification, ischemic heart disease and hypertension is expected to be of paramount importance due to the ease of leech application and minimum side-effect. Leech therapy is of *Ayurvedic* origin but it is equally acknowledged by modern medicine due to its effectiveness in healing various kinds of diseases and it is also considered as wonder therapy.

Future plan: Till date some of the bioactive ingredients are still unknown and there is only limited knowledge of mechanisms of action of bioactive compounds present in Leech Saliva. Hence, widespread studies are essential to find out the exact mode of action of other bioactive compound to re-establish the leech therapy on scientific ground.

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