



## Case Study

### JALAUKAVACHARNA (MEDICINAL LEECH THERAPY) IN DUSHTA VRANA W. S. R. DIABETIC FOOT ULCER - A CASE STUDY

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#### ABSTRACT

Ancient Indian medicine has a long and wide history but modern medicine has just recently emerged with focusing on their possible modes of action. *Jalaukavacharna* or Medicinal Leech Therapy or Hirudotherapy is an old technique of bloodletting and is being widely studied by many researchers for possible effects on numerous diseases as *Dushta Vrana Ropana*, inflammatory diseases, osteoarthritis, various diseases according to different *Doshas* etc. Detailed description of the *Jalaukavacharna* and *Jalauka* is given in *Sushruta Sutra Sthana Thirteen*. Researchers have described various properties of leech therapy like anti-inflammatory, analgesics, platelet inhibitory, anticoagulant etc. A 61 years old male patient with history of DMII since 10 years came to RGGPG Ayurvedic College and Hospital, Paprola, Himachal Pradesh, with the complaints of wound over left foot with pustular discharge and smell accompanied by fever. After thorough debridement, leech therapy was done for 4 weeks, twice per week followed by once every week for 6 weeks. Strict limb elevation was advised along with strict diabetic management. The treatment followed may be adopted in the future for various cases.

#### INTRODUCTION

In this scenario, modern medicine is on its peak, but nothing can beat Indian Ancient Medicine. Acharya Sushruta "The Father of Surgery" defined *Vrana*<sup>[1]</sup> as phenomenon causing destruction or rupture or discontinuation of tissue in a particular part of the body which is termed as *Vrana* leading to discoloration.

There is a natural course of wound healing but *Vrana* which does not heal in its natural healing time along with other pathological manifestation is known as *Dushta Vrana*<sup>[2]</sup>.

*Dushta Vrana* has localization of *Dosha*. Acharya Sushruta has described signs and symptoms of *Dushta Vrana*. Sushruta described *Dushta Vrana* as widened or concised, very hard, very soft, elevated or depressed, very cold or very warm, black, red, white, having either of the color, having purulent discharge and smell includes *Mansa*, *Sira*, *Snayu*, having foul smell, pustular discharge, exudates creating abnormal paths, elevated with overgranulated tissue, ugly looking and unpleasant smell, accompanied by severe pain, burning sensation, suppuration, redness, itching and swelling, various eruptions and various other complications, amantate vitiated blood and with long time persistence are the features of *Dushta Vrana*.

Sushruta has described *Jalauka* in *Sushruta Sutra* 13 in *Jalaukavacharna Adhyaya*<sup>[3]</sup>. Detailed description of types of *Jalauka* is present in *Sushruta Samhita*. 12 types of *Jalauka* have been described by Acharya out of which 6 are poisonous (*Savisha*) and 6 are non-poisonous (*Nirvisha*). *Sushruta Sutra Sthana, Adhyaya* thirteenth and fourteenth speaks about various methods of bloodletting along with use of medicinal leech therapy to treat painful inflammatory

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conditions and also seen effective in diabetic foot management.

In ongoing scenario many researches are going on leech to access its properties, bioactive substances, mode of action, breeding, storage etc., as this is one of the elaborated and interesting topics of research.

Leeches secrete more than 20 identified bioactive substances such as Antistasin, Eglins, Gaumerin, Hirudin, Saratin, Bdelins, Complement and Carboxypeptidase Inhibitors, etc.<sup>[4]</sup>

They are having anticoagulant, analgesic, anti-inflammatory, platelet inhibitory and thrombin regulatory functions as well as antimicrobial effects and extra cellular matrix degradative effects<sup>[5]</sup>. Various studies have been carried out which shed light on mechanism of leeches. Only few active substances have been fairly identified out of more than 100 particular proteins with different molecular masses which are observed in leech's secretions. Widely mechanism is divided into 6 types for easy understandable evaluation of mechanism and should be assessed as whole. Leech bite followed by sucking pathway establishment (extra cellular matrix degradation) inhibits adhesion, and anticoagulant effect, increase blood flow, protect itself (antimicrobial activity), and avoid detection (analgesic and anti-inflammatory effects).

Diabetic foot ulcer is most devastating complication of diabetes mellitus, while affecting 15% if diabetic patients throughout their life. Classical triad of neuropathy, ischemia and infection are characteristics of Diabetic foot. Almost 85% of the amputations are preceded by diabetic foot ulcers<sup>[6]</sup>. Number of risk factors for the development of foot ulcers have been suggested, the most important being peripheral sensory neuropathy followed by peripheral vascular diseases. The proportion of neuropathic, neuroischemic and purely ischemic lesions in diabetics is 54, 34, 10% respectively.<sup>[7,8]</sup>

Infection in a diabetic foot is a limb threatening condition because the consequences of deep infection in a diabetic foot are more disastrous than elsewhere mainly because of certain anatomical peculiarities. The foot has several compartments, which are intercommunicating and the infection can spread from one into another and lack of pain allows the patient to continue abulation further facilitating the spread.<sup>[9]</sup>

#### **Meggitt's Classification of Diabetic Foot**<sup>[10]</sup>

Grade 0- Foot pain only

Grade 1- Superficial ulcer of the foot

Grade 2- Deep ulcer of the foot

Grade 3- Ulcer with bone involvement

Grade 4- Forefoot gangrene

Grade 5- Whole foot gangrene

Early effective management of DFU and advanced strategies can reduce the severity of complications such as escapable amputation and possible mortality and this can also upgrade overall quality of life.<sup>[11]</sup>

Multidisciplinary team should evaluate the patient of DFU as holistic approach to wound management required.

#### **Case Report**

A 61 years old male patient came to Shalya Tantra Department of RGGPG Ayurvedic College, with complaints of wound over right foot with purulent discharge and smell. Patient has known history of Diabetes Mellitus and on medications since 10 years. History of previous treatment at regional medical college was also given by the patient. On examination wound was open with purulent discharge and smell, discolored forefoot, necrosed tissue, gangrenous 2<sup>nd</sup>, 4<sup>th</sup> and 5<sup>th</sup> toe. Complete blood examination was done followed by debridement of the wound along with 4<sup>th</sup> and 5<sup>th</sup> toe amputation. Patient was admitted to the ward of Shalya Tantra at RGGPG Ayurvedic College Paprola, Himachal Pradesh.

**History of Past Illness:** Patient has type II Diabetes mellitus since 10 years and on continuous medication.

#### **Treatment**

After thorough debridement of the wound on the very first day, leech therapy was followed weekly twice for 4 weeks and once a week for next 6 weeks along with daily dressing of the wound with conventional method.

Anti-hyperglycemic drugs were given as previously with continuous monitoring on blood glucose level and other blood investigations.

#### **OBSERVATION AND RESULT**

Wound was because of diabetic foot gangrene thus irregular in shape, with discoloration, slough, swelling, purulent discharge and smell and unhygienic in nature. After use of leech therapy new healthy granulation tissue started appearing, wound margins contracted in healthy manner and there was reduction in slough formation, discharge, smell and discoloration around the wound.

Leech attached with the initial usually painless bite, and sucked between 5-15ml of blood in the attachment of 25 to 45 minutes.



Fig 1: Before the Treatment



Fig 2: 4<sup>th</sup> sitting



Fig 3: 8<sup>th</sup> sitting



Fig 4: 10<sup>th</sup> sitting



Fig 5: 14<sup>th</sup> sitting



Fig 5: Healed Wound

## DISCUSSION

*Sushruta* mentioned *Raktavisravana* in the cases of *Dushtarakta*. *Jalaukavacharna* is the type of *Rakta Visravana* hence helps to remove *Dushta Rakta* which is responsible for various inflammatory conditions. *Sushruta* in *Chikitsa Sthana Sadhyovrana Chikitsa Adhyaya* mentioned *Raktamokshana* in *Prameha* and *Kushtha Dushta Vrana*.<sup>[12]</sup>

With the advancements of science and technology the mechanism of leech how it work have started to be clarified. After the leech bite, the tissues and blood vessels allow access to the hyaluronidase and collagenase enzymes; action of histamine like molecules leads to vasodilatation; platelet inhibition. Its therapeutic benefits are not from blood removed during the bite but from the saliva which contain anticoagulants and vasodilators.<sup>[13]</sup>

Leech saliva includes various bioactive substances like hyaluronidase which is a spreading factor and has antibiotic properties. Hirudin a potent anticoagulant, enables the blood flow by inhibiting blood coagulation by binding to thrombin. Callin inhibits blood coagulation by blocking the binding of

von willebrand factor to collagen. Destabilase dissolves fibrin and has thrombolytic effects. Bdelins has anti-inflammatory effect and inhibits trypsin, plasmin acrocin. Acetylcholine is a vasodilator. Eglins are anti-inflammatory, inhibits activity of alpha-chymotrisin, chymase, elastase, substilisin and cathepsin G. Factor Xa inhibitors inhibits the activity of coagulation factor Xa. Collagenase reduces collagen. Carboxypeptidase-A inhibitor increases the inflow of blood.<sup>[14]</sup>

## CONCLUSION

This leech therapy which has been used by our *Acharyas* since ages, now getting tremendous recognition because of its quality of removing venous insufficiency, restoration of venous outflows, pain management, wound healing in infected-noninfected chronic wounds etc. Detailed study is needed to evaluate the elaborated effect of leech therapy on wound healing.



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