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**Jalaukavacharan (Indian medicinal leech application) in the management of Raynaud’s disease- A single case Report**

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**Abstract**

In Ayurveda, Sushruta has described the uses of Jalauka (medicinal leech) for the treatment of various medico-surgical disorders. About 700 leech species were identified and among them only 5 leeches are used for medicinal purpose. In Ayurveda, 2 varieties of Jalauka are found i.e. poisonous group (Savisha) and non-poisonous group (Nirvisha) while in modern science, poisonous leech are known as stinging land leeches (*Hemadipsa picta* and *Hemadipsa ornate*). The species *Hirudomedicinalis* is commonly used for therapeutic purpose which is a NirvishaJalauka. During the process of sucking, leeches secrete various biological enzymes in to the blood stream through its saliva. Hirudin is one important component which acts as anti-coagulant. In addition to that several other properties are found in leech saliva like anesthetic, antibiotic, analgesic etc. Therefore it is advised to use in ischemic, inflammatory conditions, skin grafting, chronic fatigue, pain, non-healing ulcers, etc.

In this case report, female patient aged 80 years diagnosed of having Raynaud’s disease with complaints of gangrenous changes in left digital phalanges (three fingers), swelling and pain in forearm since 20 days. Three leeches were applied in each digit of gangrenous part. Total three setting once in every week was done. After 1st sitting of Jalauka application pain and swelling was reduced. After second sitting the line of demarcation was developed and the necrosed part was dried up. After third sitting all necrosed part was sloughed out without surgical debridement. This single case manifests that gangrenous digit due to Raynaud’s disease can be managed with Jalauka application.

**Key words:** Ayurveda, Gangrene, *Hirudomedicinalis*, Jalauka, Leech, Raynaud’s disease.

**Key Massage:** The purpose of this article is to see the effect and importance of leech therapy in Raynaud’s disease which described an ayurvedic approach of leechapplication for the management of Raynaud’s disease. Jalauka (medicinal leeches) have been used since ancient times for treating various diseases. Total three setting once in every week was done in this case. After 1st sitting of leechapplication pain and swelling was reduced. After second sitting the line of demarcation was developed and the necrosed part was dried up. After third sitting all necrosed part was sloughed out.
without surgical debridement. The study concluded that Jalaukavacharan (Leech application) is a safe, effective and easy OPD para-surgical and non-pharmacological procedure in the management of necrosis due to Raynaud’s disease in geriatric patient.

INTRODUCTION

Jalauka (medicinal leeches) have been used since ancient times for treating various diseases. The word Jalauka is a compound word with two components- Jala + ayu i.e. the animal having Jala (water) as a life.\(^1\) The term Jalauka can be split into Jala + oka i.e. water dwelling animals. Jalauka means leech and avacharan means application. It is a method where impure blood is removed from body which is being sucked by leech. At first Leech sucks only impure blood and leave the pure blood and so this method is a blood purification therapy. Later when it starts sucking pure blood, the patient feels pain. This traditional method of blood purification which cures the large number of diseases is still thriving today.

Jalauka was previously used in treating the disorders of children, old age persons, female, rich people, kings, etc. Sushruta has considered this Jalauka among both Anushastra (substitute of sharp instrument) and Upyantra (substitute of blunt instrument). Both Sushruta and Vagbhattahave broadly divided Jalauka into two types - Savisha (poisonous) and Nirvisha (Non-poisonous) Jalauka which are further subdivided into 6 types each (Table-1).\(^2\)

Acharya Sushruta combined the two types of Basti (purification method in Ayurveda) into one category and added Raktamokshan (blood letting) as the fifth major procedure used in Panchakarma therapy. The majority of leeches live in freshwater environments, while some species can be found in terrestrial and marine environments. Leeches such as Hirudomedicinalis have been used historically in medicine to remove blood from the diseased part of the patients. Leeches are segmented worms that belong to the Phylum Annelida and comprise the subclass Hirudinea.\(^3\) Leeches are thought to be “wonder doctors” of science. This therapy is considered as a “magical therapy” because of its wide range of application in almost all the diseases.\(^4\) During the process of sucking, leeches secrete various biological enzymes in to the blood stream though its saliva. Hirudin is one important component which acts as an anti-coagulant. In addition to that, several other properties are found in leech saliva like anesthetic, antibiotic, analgesic etc.\(^5\) Therefore it is advised to use leech in ischemic, inflammatory conditions, skin grafting, chronic fatigue, pain, non-healing ulcers, eczema, filariasis etc.\(^6-8\) Leeches are successfully being used in various ailments related to arterial disorders, venous disorders, lymphatic system disorders, crush injury, thrombosed piles, and non-healing ulcers in IPGT&RA, Hospital, Jamnagar.

Jalauka secretes many chemicals which are mentioned in table-2 along with their activity.

Raynaud’s disease is an idiopathic condition usually occurring in females and it affects the upper extremities more. In this condition peripheral pulsations are normal due to upper limb (hand) arteriolar spasm as a result of abnormal sensitivity to cold.\(^9\) Features of pallor/blanching (syncope), dusty cyanosis (Asphyxia), rubor/painful red engorgement (recovery) are the presentation in Raynaud’s disease. Occasionally, if vasospasm becomes longer, gangrene or ischemic ulceration
supervenes along the tips of the fingers. The repeated attacks are common due to exposure to cold. The required investigations for confirmation of diagnosis are X-ray of the affected part, arterial Doppler/Duplex scan, finger thermography, antinuclear antibody (ANA assay), and angiogram of hand. The routine investigations for arterial disease like blood sugar/ lipid profile/ hypercoagulability status also helps to detect the cause of disease. Avoidance of precipitating factors, treat the cause, use of vasodilators, calcium antagonist and steroids are used in the treatment. In case of secondary Reynaud’s disease use of nitrates, ACE inhibitors, endothelin inhibitors, antiplatelet drugs and cervical sympathectomy are treatment options.\textsuperscript{[10]}

**Case Report:**

A female patient aged 80 years visited in outpatient department of Shalya Tantra, IPGT& RA Hospital, Jamnagar with complaints of gangrenous changes in left hand phalanges (three fingers), swelling and pain in forearm since 20 days. She was a housewife having strict vegetarian diet with no history of smoking addiction and alcoholism. According to patient she was apparently well 20 days back after that she got pain and discoloration in the fingers. Before consulting to our OPD, The patient visited civil hospital 5 days back and had taken oral antibiotics, analgesics and multivitamins. The surgeon denied for amputation of the fingers. So she came to Ayurveda OPD and was admitted in female surgical ward for further investigations and treatment. Patient reported the history of amputation of second toe of right foot 2 years back due to gangrene. All regular investigations were done for pre procedure assessment. No past history of hypertension, diabetic mellitus, tuberculosis and any drug reaction was noted by patient. The laboratory investigation for blood, urine, and stool were conducted and found within normal limits (Table-3). Patient was with normal Blood pressure (B.P.) 120/58 mm of Hg. On local examination there was pain, tenderness and swelling on left forearm, blackish discoloration on tip of the middle, ring and little fingers(Fig-1). Previously she was investigated for upper limb arterial colour Doppler study and the report was normal showed that left was normal. Chest X-ray and USG of whole abdomen were done and no abnormal signs were detected except moderate ascites in the peritoneal cavity.

Lastly, on the basis of symptoms and above investigative findings the patient was diagnosed of having 3\textsuperscript{rd} stage of Raynau'd's disease. As the patient is old and surgeon refused to do the amputation due to physical unfitness for anaesthesia and surgery the patient was treated with Jalaukacharana (Leech application) Ayurved para-surgical procedure.

**Method of Jalaukacharana (Leech application):**

The treatment that we had selected to manage this condition is Jalaukavacharan (Leech therapy). The procedure of leech application was done as mentioned in classic by Sushruta adopting trividha karma as follow.\textsuperscript{[11]}

**Purva karma (Pre-procedure preparation):**

1. The material used for the procedures were; bowls, surgical gloves, turmeric powder (Curcuma longa), kidney tray, gauze piece, bandage, disposable needle were kept ready.
2. Jalauka (Leeches) were placed in the water mixed with turmeric powder for two minutes so that leech became active.
3. The affected fingers and hand was cleaned with normal saline then dried up and rubbed with dry gauze piece.
4. After wearing the surgical gloves, Jalauka was held at its centre or nearer to the anterior sucker with the help of gauze piece.

Pradhan Karma (Procedure of leech application):

1. Leeches were applied at the affected region or nearer to that of the gangrenous part.
2. Leech bites the affected area spontaneously and sucked the blood. The patient experienced the slight pricking sensation at the site of the bite.
3. Occasionally leeches were so reluctant to bite then small prick was made on the skin to ooze the blood.
4. Once leech started to suck the blood, its neck part looks elevated that indicates that sucking was well and in progress.
5. During sucking gradual distension were observed at its body centre and wavy movement / pulsation was visible throughout its body.
6. The body part was covered with a wet swab except his mouth to create a natural atmosphere and it was maintained throughout the process by pouring of some water on it.

Paschat karma (post procedure):

1. Immediately after removal of leeches there was continuous oozing form the bite sites.
2. The local part was cleaned with PanchavalkalKashaya and then turmeric powder was applied and was bandaged tightly.
3. When Jalauka give up automatically, then it was kept in a kidney tray and turmeric powder was sprinkled on its mouth. Jalauka automatically vomit the ingested blood.
4. Finally leech was squeezed smoothly with right hand to remove all the remnant part of ingested blood from its body.
5. It is very important to remove all ingested blood otherwise leech will die or get diseased as mentioned in classic. [12]
6. Similarly all three applied leeches had vomited and all the used Jalaukas were kept in clean vessel and clean water separately for next sitting.

Follow-up and Outcomes:

Jalaukavacharan (leech therapy) is a para-surgical procedure mentioned in Sushruta samhita-an Indian medical literature written in 2nd century (1800-years ago).Jalauka was applied for five times in this case till the completion of her treatment. In the first sitting three leeches were applied each in three fingers (Fig-2). The severity of pain was reduced from grade 3 to grade -2 (Pain assessment with VAS). Swelling was mildly reduced and wrinkles were observed on dorsum of hand (Fig-3). After seven days three leeches were applied again. Assessment was done on seventh day and it was observed that pain was reduced from grade-2 to grade-1. On local examination, swelling was reduced remarkably and black discoloration was reduced and the line of demarcation was seen. So we find the ray of hope that this case will be definitely cured. Patient was discharged from the hospital and was call on OPD level sitting. We continue the leech application on seventh day as
second sitting and then on 15th day as third sitting (Fig-4). It was noticed that in one sitting approx 8-10 ml bloodletting was done by each leech (Fig-5).

On 15th day patient was free from pain and swelling was reduced completely. The necrosed part was sloughed out without bleeding and no complications were noted. As the necrosed area was removed the movement of figures was free and painless. On 21st day forth sitting of Jalaukavacharan was planned as there was wound after slough out of the necrosed part. Then the wound at tip of finger was also healed. The patient was also called for fifth sitting as there was mild swelling and three leeches were applied again at that part (Fig-6). After seven days follow up was done and all the fingers were observed as normal without any complication (Fig-7-8)

**Result and Discussion:**

Leech application introduced at the juncture of the inflammation which is not decisive as primary immature or finally mature, arrest the critical development of disease. Much effectiveness is seen in blown up stage of diseases, with preliminary Raktamokshan (blood extracting) at the stages of Sthansanshraya (localization) and Vyakti (expression). At that times leech application tenders quick relief. The diseases curable by blood extracting process are completely cured by leech application.

Non healing ulcers can be completely rooted out with the help of Leech application. In critical swollen transitional inflamed prolapsed piles, leech application reduces swelling. Blind external fistula can be transformed into complete fistula within 24 hours. Application of leeches prohibits Keloid formation, viz, in fistula, after performing Ksharsutra, after dissecting in AgantujVrana (traumatic wound) heals up within no time. Leech application in the Amastha(primary stage) of inflammation creates ripening in a very short time; Bheda (opening) takes place naturally so Nadivran (fistula), Kotha(Gangrene) etc. also do not develops. It is observed that blood extraction (Raktamokshan) is introduced along with leech application, expected results are achieved quickly.

There is no doubt that the allopathic management of the necrosis condition is quite helpful in the process of prevention of further destruction of the tissues and regaining the normalcy of its function as well as anatomy of the necrosed tissues. The point to be discussed through this case is the quick result of the recovery of the patient who had taken the previous allopathic treatment for 7 days (Tab. Ciproflasacin 500mg 1 BD, Tab. Ibuprofen 400mg BD, Tab. Vit-C1 OD). But the day after Jalauka (leech) was applied, patient found immediate relief, mainly from the pain and localized swelling. We have stopped all the allopathic medications after admission at our hospital.

Jalauka have been found to secrete saliva containing about 60 different proteins. These achieve a wide variety of goals useful to the leech as it feeds, helping to keep the blood in liquid form and increasing blood flow to the affected area. Several of these secreted proteins serve as anticoagulants (hirudin), which prevents or dissolves the formation of clots and thrombi in the necrotic cases. [13] Saliva of the Jalauka also contains platelet aggregation inhibitors like apyrase, collagenase and Calin. [14] These proteins helps in the events leading to the formation of a thrombosis in this case, they dilates the constricted part of blood vessels and release the arteriospasm so that the nourishment of the affected tissue takes place.

**Conclusion:**
The study concluded that Jalaukavacharan (Leech application) is a safe, effective and easy OPD para-surgical and non-pharmacological procedure in the management of necrosis due to Raynaud’s disease in geriatric patient. This traditional Ayurveda procedure is being practised regularly in different disorders and further evidence based data is the demand for its scientific validation.

References:


Table-1: Types of Jalauka in Ayurveda:

<table>
<thead>
<tr>
<th>SavishaJalauka (Poisonous)</th>
<th>NirvishaJalauka(Non Poisonous)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krishna</td>
<td>Pingala</td>
</tr>
<tr>
<td>Karbura</td>
<td>Savarika</td>
</tr>
</tbody>
</table>
Table-2: Enzymes/chemical present in Jalauka:

<table>
<thead>
<tr>
<th>Enzymes/chemicals</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hirudin</td>
<td>A powerful anticoagulant in existence than heparin</td>
</tr>
<tr>
<td>Hyaluronidase</td>
<td>Act as factor for diffusion and as antibiotic</td>
</tr>
<tr>
<td>Bdellin</td>
<td>Protease inhibitor thus act as anti-inflammatory.</td>
</tr>
<tr>
<td>Eglin</td>
<td>Anti-inflammatory but at same time it is also act as antioxidant</td>
</tr>
<tr>
<td>Apyrase</td>
<td>A powerful platelet anti-aggregate factor</td>
</tr>
<tr>
<td>Destabilase</td>
<td>Platelet anti aggregating activity which act by dissolving the blood clots</td>
</tr>
</tbody>
</table>

Table-3: Laboratory Investigations:

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Observed values</th>
<th>Normal values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb%</td>
<td>10.3</td>
<td>13.5 -18 g/dl</td>
</tr>
<tr>
<td>WBC</td>
<td>6200</td>
<td>4000-10500 micro litre</td>
</tr>
<tr>
<td>DLC (Neutrophilla with toxic granulation)</td>
<td>N:62 %</td>
<td>50-70%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0-7%</td>
</tr>
<tr>
<td></td>
<td>E: 19 %</td>
<td>&lt;1 %</td>
</tr>
<tr>
<td></td>
<td>B: 0 %</td>
<td>20-40%</td>
</tr>
<tr>
<td></td>
<td>L: 15 %</td>
<td>&lt;10%</td>
</tr>
<tr>
<td></td>
<td>M: 4%</td>
<td></td>
</tr>
<tr>
<td>Platelet</td>
<td>579000/cu mm</td>
<td>150000-45000/cu mm</td>
</tr>
<tr>
<td>ESR</td>
<td>22 mm in 1 hour</td>
<td>2-13 mm in 1 hour</td>
</tr>
<tr>
<td>CT</td>
<td>3 min 55 sec</td>
<td>8-15 min</td>
</tr>
<tr>
<td>FBS</td>
<td>87 mg/dl</td>
<td>70-120 mg/dl</td>
</tr>
<tr>
<td>PPBS</td>
<td>112 mg/dl</td>
<td>120-150 mg/dl</td>
</tr>
<tr>
<td>Sr. Cholesterol</td>
<td>110 mg/dl</td>
<td>&lt;200 mg/dl</td>
</tr>
<tr>
<td>Sr. Triglyceride</td>
<td>96 mg/dl</td>
<td>&lt;150 mg/dl</td>
</tr>
<tr>
<td>Sr. urea</td>
<td>15 mg/dl</td>
<td>15-37 mg/dl</td>
</tr>
<tr>
<td>Sr. Creatinine</td>
<td>0.9 mg/dl</td>
<td>0.5-1.5 mg/dl</td>
</tr>
<tr>
<td>Sr. Uric acid</td>
<td>1.9 mg/dl</td>
<td>3.5-7.2 mg/dl</td>
</tr>
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