

## EFFICACY OF LEECH APPLICATION IN THE MANAGEMENT OF PERIPHERAL ARTERIAL OCCLUSIVE DISEASE (PAOD) - A RARE CASE REPORT

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### ABSTRACT

PAOD (Peripheral arterial occlusion disease) is a chronic disease with compromised haemodynamic state. Prevalence of PAOD increases with aging; it affects 4.6 % of people between the ages of 45 to 50 and 15% of people between 85 to 90 years of age. The high cost of medical and surgical interventions, the probability of recurrences, management of disease involving multiple arteries, threat of limb loss associated with rapidly progressive PAOD, are some important concerns in the management of this disease. So, there is a need of developing an alternative method of treatment which should be cost effective and improve the quality of life of the patients. A 60 years old male patient came to outpatient department with complains of a blackish patch (scab like) on left thumb since last 3 months, discoloured left hand, tingling sensation and cold upper extremity since last 2 months. Disturbed sleep due to pain since last 3 months. The peripheral angiography report showed occlusion in right and left radial artery and palmar arch filled by ulnar artery, plaque in the left subclavian and left axillary artery. So, patient was diagnosed as PAOD Stage IV (Fontaine classification). Leech application was done for duration of two months. 13 times and dressing of ulcer on thumb by *Jatyadi taila*. Assessment was done before every setting. After 13<sup>th</sup> sitting, patient got complete relief in pain, discoloration, tingling and numbness of hand and wound healed completely. This case study bespeaks the successful management of PAOD by leech application.

**Keywords:** Ayurveda, claudication, *Jalauka*, *Jatyadi Taila*, leech, PAOD, *Raktamokshan*

### INTRODUCTION

As per Ayurveda classics the basis of life for 'leeches' is water, they are called *jalayuka* or since they are accustomed or habituated to water they are called *jalauka* (leech).<sup>1</sup> Leech live in cold so they are useful in *pitta* predominant condition.<sup>2</sup> A leech has got an anti - coagulation chemical called hirudin.

During sucking the blood by leech this hirudin through saliva of leech circulation in blood of human that inhibits blood coagulation by binding to thrombin.<sup>3</sup> Ayurveda believes that leeches suck only the impure blood.<sup>4</sup> We can assume the sucking of blood from superficial veins which is deoxygenated or im-

pure one. It is used effectively in the management of non-healing ulcerative lesions like gangrenous ulcer, diabetic ulcer, leprotic ulcer etc. as it helps to improve the local blood circulation and helps to healing. People with heart disease use leech therapy because of its potential to improve inflammation and blood flow. In the last few years, leech therapy has become an acceptable alternative therapy for people with vascular disorder.

Peripheral arterial occlusive disease (PAOD) is blockage or narrowing of an artery in the legs (or rarely in the arms), usually due to atherosclerosis and resulting in decreased blood flow. PAOD is common among older people because it often results from atherosclerosis (plaque or disease build up in the wall of the blood vessel).<sup>5</sup> In 2015 about 155 million people had PAD worldwide.<sup>6</sup> In the developed world it affects about 5.3% of 45 to 50 years old and 18.6% of 85- to 90-year-olds. In the developing countries it affects 4.6% of people between the ages of 45 to 50 and 15% of people between the ages of 85 to 90. In the developed countries PAOD is equally common among men and women while in the developing countries women are more commonly affected.<sup>7</sup> PAOD is also common among men, who have ever smoked regularly for around 15-20 years, with diabetes, high blood pressure, abnormal cholesterol levels, or high blood homocysteine (a component of protein) levels. People who have a family history of atherosclerosis, obese, physically inactive. Each of these factors contributes not only to the development of occlusive peripheral arterial disease but also worsens the disease. Much less commonly, the disease develops in the arteries of the shoulders or arms (Koon K. Teo). Usually, about 70% of the artery's interior has to be blocked before symptoms occur. Gradual narrowing of an artery may result in less severe symptoms than sudden blockage, even if the artery eventually becomes completely blocked. Symptoms may be less severe because gradual narrowing allows time for nearby blood vessels to expand or new blood vessels (called

collateral vessels) to grow. Thus, the affected tissue can still be supplied with blood. If an artery is suddenly blocked, there is no time for collateral vessels to develop, so symptoms are usually severe.

In this case report, on the first day of consultation, patient presented with tingling, numbness, paleness, night pain in left hand and ulcer on left thumb. Radial pulse was not palpable ulnar pulsation was very weak. PAOD mostly affects lower limb and present with intermittent claudication, critical limb ischemia consisting of: Rest pain, a pain in the soles of the feet, particularly when the feet are elevated, such as when in bed, tissue loss, consisting of arterial insufficiency ulcers, which are sores or wounds that heal slowly or not at all, and gangrene. We diagnosed this case as a PAOD Grade III, Category 5 (Rutherford classification) and Stage IV (Fontaine classification).<sup>8</sup>

We diagnosed this case as a PAOD and confirmed it by Angiography because it is a gold standard method for diagnosis. PAOD is rarely found in upper limb it is common in lower limb. So, this is a rare case of PAOD in upper extremity.

Treatment of the PAOD depends on the severity of the disease. Lifestyle changes, Smoking cessation. Management of comorbidities antiplatelet therapy and various other conservative modes of treatment are advised. Angioplasty (PTA, or percutaneous transluminal angioplasty) can be done on solitary lesions in large arteries, such as the femoral artery, but angioplasty may not have sustained benefits.<sup>9</sup> Other criteria that affect outcome following revascularization are length of lesion, and number of lesions.<sup>10 11</sup> Atherectomy,<sup>12</sup> Vascular bypass are various surgical interventions indicated in PAOD but all these are costly and do not have sustained benefits. So, we prescribed Leech application to this patient.

This case study aims at focusing the efficacy of leech application in the management of a rare case of PAOD in upper extremity.

### CASE REPORT:

A 60 years old male patient came at *shalya tantra* outpatient department with complains of blackish discoloration (scab like) of left thumb since last three months, tingling sensation, pallor and coldness at left hand since last 2 months. Tingling, numbness in both sole since last 2 months. Disturb sleep due to tingling sensation and burning pain at the left hand. He had a history of smoking about 30 bidis daily since last 15 years. His peripheral angiography report showed normal right axillary artery, plaque in right brachial artery, abnormal medial course with distal total occlusion in right and left radial artery and palmar arch filled by ulnar artery, normal course and calibre with distal disease in the right and left ulnar artery, there was a plaque in the left subclavian and left axillary artery, bilateral common iliac artery and bilateral external iliac artery were normal, plaque in the bilateral superficial femoral artery and bilateral popliteal artery, multiple 50% lesion with distal diffuse disease in the left posterior tibial artery and diffuse disease in the right posterior tibial artery, bilateral anterior tibial artery, bilateral dorsalis pedis artery.”(date:8/1/2017)

On examination his left hand was colder as compared to right hand. Radial pulsations could not be felt in left hand while ulnar pulsation was very feeble. In right hand both radial and ulnar pulsation was feeble. In this patient, Allen’s test was positive and showed total occlusion of right and left radial artery while both ulnar arteries were patent. As per *Ashthavidha Rugna pariksha*: Patient had *kapha* predominant *nadi*, *samyaka mala* and *mutra pravrutti* (normal defecation and micturition), *nirama jivha* (no coating on tongue), *prakruta shabda* (normal voice), left hand was colder than right, eye sight was weak, *madhyama akruti*.

So, case was diagnosed as PAOD Stage IV (Fontaine classification).

### Material and Method:

**Place of study:** IPD, Department of Shalyatantra, IPGT & RA, Gujrat Ayurved University, Jamnagar

**Preparation of patient:** Before leech application, Coagulatory disorder like haemophilia was ruled out. Similarly, precautionary measures were taken while handling Anaemia, Diabetes, Hepatitis, HIV. Light semi-solid diet was given. Patient’s hand was properly washed with cold water. Patient was layed in supine position or slight propped-up position.

**Preparation of Leech:** Fresh Leech from the tank or jar is chosen and dropped in a tray or bowl filled with clean water. Fine turmeric was mixed in it. It was observed that an inactive Leech becomes highly active and runs all around the tray After that, the active Leeches were transferred in another tray having clean water.

### Leech application:

The desired site (hand- dorsal or ventral aspect) was cleaned with wet gauze. The Leech is held at its neck with fingers and applied directly to the skin, 5- 6 Leeches were applied at a time [Fig-2]. Once Leeches start sucking the blood, they are covered with wet gauze and cold water is poured on them time to time. If Leech did not catch the site by its own, in such condition a prick was made to induce bleeding, to facilitate the sucking. The Leech when once starts sucking the blood, elevates its neck, and fixes its head to skin. A wave like movement was observed indicating sucking of blood. Leech leaves off the skin spontaneously, if not in such a case, a little turmeric powder is placed on the sucking point of the Leech it immediately leaves the skin.

### Post procedure patient’s care:

The site was cleaned with normal saline, followed by dressing with turmeric powder. Patient was allowed to sit for some time before leaving the place to check bleeding.

**Post procedure leech care:** After application used Leeches were kept in an empty tray. Turmeric powder was placed on its mouth which induces vomiting of black colored blood. After this the Leech was

again washed in clean water. In the end Leeches were transferred in the jar.

**Duration of treatment and Follow up:** Total duration of treatment was 2 months, first 15 days leech was applied on alternate days, after 15 days it was twice a week. Later on, leech was applied once a week for further month.

**Observation & result:**

Patient was observed after every sitting of leech application on the basis of discoloration of hand, tingling, numbness, pain during night and coldness of hand.

After 1<sup>st</sup> sitting of leech application patient got 40% relief in pain specially at night, no change was observed in discoloration, tingling, numbness and coldness of hand. After 2<sup>nd</sup> sitting, 60% relief in pain specially at night, 10% relief in tingling and numbness, no change in discoloration and coldness of hand. After 3<sup>rd</sup> sitting, patient got 90% relief in pain,

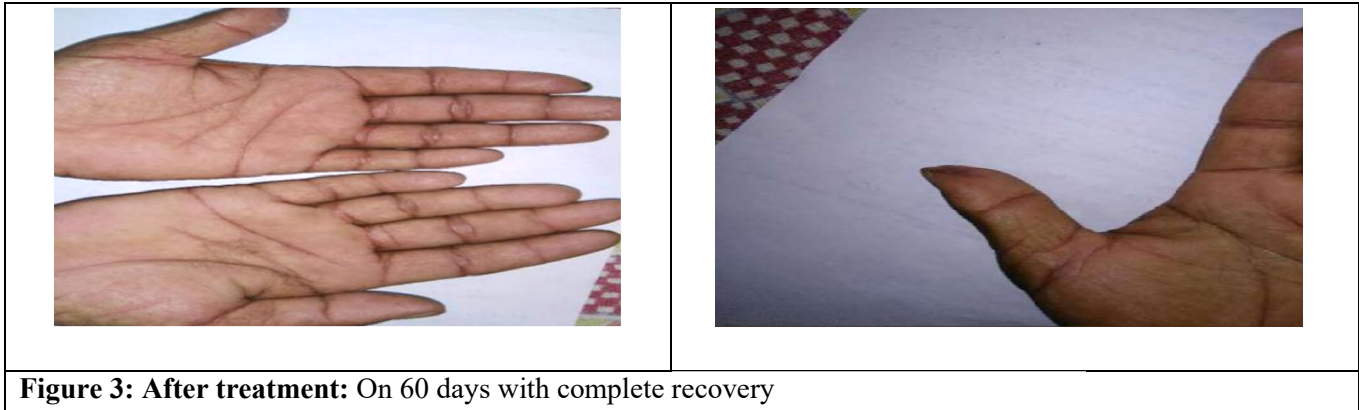
30% relief in tingling and numbness, no improvement in discoloration and coldness of hand. After 4<sup>th</sup> sitting, patient got complete relief in pain, 45% relief in tingling and numbness, discoloration improved by 10% and 5% improvement in coldness of hand. After 7<sup>th</sup> sitting, patient had no pain, 65% relief in tingling and numbness, 30% improvement in discoloration and coldness of hand. After 9<sup>th</sup> sitting, 50% improvement in discoloration in hand and coldness of hand, 70% relief in tingling and numbness. After 11<sup>th</sup> sitting, 75% improvement in discoloration in hand and coldness of hand, 90% relief in tingling and numbness. After 13<sup>rd</sup> sitting, patient got complete relief in pain, discoloration in hand, coldness of hand, tingling and numbness. During leech application, blackish discoloration (scab) slough out itself after 11<sup>th</sup> sitting of leech application and by 13<sup>th</sup> setting the wound was healed completely.



**Figure 1: Before treatment:** At the time of first consultation during local examination



**Figure 2: During treatment:** Application of leeches in dorsal and ventral part of palm



**Figure 3: After treatment:** On 60 days with complete recovery

## DISCUSSION

*Acharya Vagbhata* indicate leech application in the *grathit ratkaja vikara* (blood clot /thrombosis).<sup>13</sup> We can compare arterial occlusion due to plaque with *grathit raktaja vikara*. Saliva secretion of leech having hirudin may dissolve the plaque at arterial wall and improve blood circulation to the tissue. Leech saliva can temporarily improve blood flow and ameliorate connective tissue hyperalgesia. Histamine-like substances have dilating effect on the blood vessels and thereby cause the blood to stream to the bite site. In the meantime, the spreading factor, hyaluronidase acts to clear the path for the active and healing substances to penetrate. These substances allow continued bleeding for up to 24 hrs after the leech has been detached.<sup>14</sup> Acetylcholine is also a component in leech secretions, causing endothelial muscle relaxation and vasodilatation.<sup>15 16 17</sup> It may help in vasodilatation, Increased blood flow to the tissue so ischemic area get blood flow and ulcers heals. Ultimately patient get relief from numbness and tingling sensation, pallor area converts into normal pinkish colour. Antistatin, Hirustatin, Ghilantens, Elgin, complement C1 inhibitor, Guamerin and Pigumerin, Carboxypeptidase inhibitor, Bdellins and Bdellastasin are Analgesic and anti-inflammatory substance found in secretion of leech that helps to reduce pain sensation of hand.<sup>18</sup> Besides that, because of specific thrombin inhibitors, hirudin which has a potent inhibitory effect on both free and clot-bound thrombin.<sup>19</sup> Anticoagulants are

therapeutic; they cause blood to circulate from the affected area, even after leech detachment.<sup>20</sup> Calin is found in salivary secretion of leech and it acts by inhibiting collagen and von Willebrand factor.<sup>21</sup> Saratin from the leech has been described as a platelet aggregation inhibitor via blocking the binding of collagen to integrin  $\alpha_2\beta_1$  and von Willebrand factor.<sup>22</sup> So, these prevent further plaque formation.

## CONCLUSION

This case report bespeaks our experience about a rare presentation of PAOD (Peripheral arterial occlusion disease) in upper limb and management of arterial ulcer due to PAOD by leech application with symptomatic relief. Further study in more such case is needed for scientific validation.

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