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## A clinical trial for evaluation of leech application in the management of *Vicarcikā* (Eczema)

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### Abstract

#### Background:

Skin diseases are among the most common health problems worldwide and are associated with a considerable burden. Eczema is such a skin ailment which cause psychological, social and financial burden on the patient and their families. Management of eczema with antibiotics, antihistamines, steroids etc., are available but even after their use relapses, recurrences and other complications are very common.

#### Aim:

The aim of this study was to assess the efficacy of leech application in the management of *vicarcikā* (Eczema) with standard clinical parameters viz. Eczema Area and Severity Index (EASI) score, SCORing of Atopic Dermatitis (SCORAD) Index and Dermatology Life Quality Index (DLQI).

#### Materials and Methods:

An open labeled clinical trial study without control group was conducted with 27 patients having the classical symptoms of *vicarcikā* (Eczema), selected as per the inclusion and exclusion criteria from outpatient department and inpatient department sections of Shalya Department, S.V. Ayurvedic Hospital, Tirupati. Minimum four sittings of leech application were carried out with 7 days interval. Pre- and post-treatment evaluation of the patient was done with Eczema Area and Severity Index (EASI) score, SCORing of Atopic Dermatitis (SCORAD) Index and Dermatology Life Quality Index (DLQI).

#### Statistical Analysis:

Analysis of the data was done with Student's paired *t*-test.

#### Results:

The total EASI score showed considerable reduction up to 54.45% ( $P < 0.01$ ) and the SCORAD Index significantly reduced by 55% ( $P < 0.01$ ). The life quality of the patient calculated by DLQI improved significantly by 62.36% ( $P < 0.01$ ).

#### Conclusion:

Leech application gives significant relief for the symptoms of eczema. The life quality of the patient also improved significantly after leech therapy. No adverse reactions were reported during the entire course of

study.

**KEY WORDS:** Dermatology Life Quality Index, eczema, Eczema Area and Severity Index score, leech application, Scoring of Atopic Dermatitis Index

## INTRODUCTION

Skin is an extraordinary structure. It is frequently damaged because it is directly in the “firing line” and for this reason, skin diseases are very common. There are more than 3000 known diseases of the skin.[1] Although most of the chronic skin conditions, such as eczema, psoriasis, vitiligo and leg ulcers, are not immediately life-threatening, they are recognized as a considerable burden on health status and quality of life, including physical, emotional and financial consequences. Eczema or dermatitis is a pattern of the inflammatory response of the skin, which is characterized by erythema, edema, vesiculation, exudation and crust formation.[2]

Management of eczema involves topical applications such as emollients, antipruritic lotions, steroids, coal tar and zinc paste etc., oral antibiotics, sedative antihistamines, corticosteroids and immunosuppressive agents.[3] Even after their use relapses, recurrences and other complications are very common. Indiscriminate use of these drugs can cause vomiting, diarrhea, stomach upset, allergic reaction, peptic ulcer, neuropsychiatric reactions, diabetes, diminution of libido, Cushing’s syndrome, etc.

In maximum cases, failure of contemporary medicine in the treatment of eczema push them to chronic state and hence report to Ayurvedic system in the later stage. The symptomatology of *vicarcikā* is similar with eczema[4] that is, *kaṇḍu* (excessive itching), *pīḍikā* (boil/pustule/vesicle), *śyāva* (discoloration/hyper pigmentation), *bahusrāva* (profuse oozing)[4] and later *rāji* (marked linings/lichenification/Criss-cross marking), *ruja* (pain) and *sarŪkṣa* (excessive dryness).[4]

*Vicarcikā* has been mentioned in Ayurvedic classics under *kṣudra kuṣṭha*[5] and also under *kṣudra roga*.[6] According to *Āyurveda*, *Rakta duṣṭi*[7] is one of the prime causes of skin diseases and among the *śodhana karma*; bloodletting is considered as the best treatment for skin diseases. According to *Suśruta*, if a person regularly undergoes bloodletting, he can develop resistance against all types of skin diseases.[8] In the present study, among the various methods of bloodletting, leech application was selected. Leech application is specifically indicated for *tvak doṣa*[9] and biochemicals released from leech saliva have anti-inflammatory, antibiotic, thrombolytic actions[10] etc., further leeches can be easily administered with less complication and are cost effective.

Thus in this study an attempt is made to assess the efficacy of leech application in the management of *vicarcikā* (Eczema) with standard clinical parameters viz. Eczema Area and Severity Index (EASI) score, SCORing of Atopic Dermatitis (SCORAD) Index and Dermatology Life Quality Index (DLQI).

## MATERIALS AND METHODS

### Selection of patients

An open labeled clinical trial was conducted on 27 patients having the classical symptoms of “*vicarcikā*” (Eczema). The patients were selected from outpatient department and inpatient department sections of Department of *Śalya*, S.V. Ayurvedic Hospital, Tirupati as per inclusion and exclusion criteria. The criteria for diagnosis were based up on the classical signs, and symptoms of *vicarcikā* described in *mādhava nidāna*. The inclusion criteria included patients of age group 16–70 years (as bloodletting is indicated for this age group[11]). The exclusion criteria included, patients having secondary infections, bleeding disorders, diabetes mellitus, heart diseases, tuberculosis, leprosy and generalized eczema. A specific case sheet was prepared, and the patients of the present study were examined in detail as per case sheet. Routine hematological investigations and urine examinations were carried out before and after treatment to rule out the other associated pathology. The patients were included for study after taking written consent for ethical clearance. Written consent was taken from the parents of the patients below 18 years of age (the trial study was not registered in clinical trial registry, but the study has been registered as M.S (Ayu) thesis in Dr. NTRUHS, Vijayawada).

## Treatment

Minimum four sittings of leech application therapy were carried out with 7 days interval. Number of leeches applied was decided on the basis of the size of the lesion. The patients were not given any other concomitant medications for eczema. Procedure of leech application was undertaken in the following stage:

**Preoperative procedure** Nonpoisonous leeches were identified[12] and collected from fresh water sources; they were stored in mud pots. On the day of application, the patient was placed on proper position according to the site of lesion. Leeches (no. as required) were kept in turmeric water to make them active, increase appetite and free from natural urges, after keeping the leeches for 45 min they were put in fresh water.

**Operative procedure** Lesion is cleaned by water and dried with cotton. After this, rubbing of the skin was done as per need. For this purpose, either sterilized cotton bandage pad or thick thread of jute was used. The activated leeches were applied over the lesion site. Leech become elevated like a horse shoe or raised in an arched position from its neck that indicates that they are sucking the blood vigorously or strength fully. After catching the site, leeches were covered with wet cotton pad and regularly sprinkled with cold water. The leeches usually detach from the site after sucking the vitiated blood or have to be removed by sprinkling salt over it when the patient complains pain or itching.

**Postoperative procedure** After detachment of leech, wound was cleaned with anti-septic solution and after that tight bandage was applied for prevention of secondary hemorrhage. After falling off, the leech was dusted with rice powder and turmeric powder was applied on the mouth to make it vomit the sucked blood. Leeches after vomiting were put in fresh water, when they move freely without sinking down, were considered as properly vomited. Used leeches were kept in a separate pot containing pure water and used for the same patient after a gap of 7 days. The frequency of leech application varied according to the disease and severity. Generally every leech was applied once in a week up to 4–6 sittings. For every patient separate leeches were assigned to avoid cross infection.[13]

**Contraindication of leech therapy** Leech therapy is contraindicated in the following conditions: They are blood clotting disorders; severe anemia; allergic reaction to active substances of the leech such as hirudin, hyaluronidase, egline, apyrase, destabilase, etc.; weak constitution (identified depending upon the Satva bala of the patients viz., pravara, madhyama and avara) and pregnancy

**Precautions during leech application** The following precautions should be taken during leech application: The bleeding and clotting time of the patient should be normal; care should be taken in handling leeches, that is, they should be handled gently and the leeches have to be covered with wet cloth.

## Assessment criteria

All the patients were examined weekly during the treatment. Assessment was done on the basis of relief in the sign and symptoms of the disease *Vicarcikā*. For this purpose, the following scoring methods were adopted: (a) EASI,[14] (b) SCORAD Index[15] and (c) DLQI.[16]

Eczema Area and Severity Index score is a tool used to measure the severity and extent of atopic eczema. The intensity of redness (erythema), thickness (induration, papulation, edema), scratching (excoriation) and lichenification (lined skin) of the eczema is assessed as none (0), mild (1), moderate (2) and severe (3). The four intensity scores are added up for each of the four body regions (head and neck, trunk, upper limb and lower limb). The percentage area affected by eczema is evaluated in the four regions of the body. In each region, the area is expressed as nil (0), 1–9% (1), 10–29% (2), 30–49% (3), 50–69% (4), 70–89% (5) or 90–100% (6).[17]

SCORing of Atopic Dermatitis is a clinical tool used to assess the extent and severity of eczema. The rule of 9 is used to calculate the affected area, as a percentage of the whole body. The intensity of redness, swelling, oozing, scratching, and lichenification is assessed as none (0), mild (1), moderate (2) or severe (3). Subjective symptoms that is, itch and sleeplessness, are each scored by the patient or relative using a visual analog scale where 0 is no itch (or no sleeplessness) and 10 is the worst imaginable itch (or sleeplessness).[18]

## Follow-up

The follow-up was carried out up to 6 months from the end of the treatment with interval of 15 days to rule out progression of the disease and adverse reactions.

## Statistical analysis

Statistical analysis of the collected data was done with Student's paired *t*-test. GraphPad InStat software (GraphPad Software. Inc, San Diego, USA) used for statistical analysis.

## RESULTS

The assessment of results was made by adopting the standard international scoring methods – EASI Score, SCORAD Index and DLQI.

The average age of patients was 50.12 years and 70% were male. Itching and oozing were among the main complaints of the patients, and 62.96% of patients had chronicity of 1–5 years.

### Overall effect of leech application in *Vicarcikā* with reference to Eczema Area and Severity Index score

[Table 1](#) shows the overall effect of leech application in *Vicarcikā* with reference to EASI Score. Highly significant results were noted in parameters like redness, thickness, scratching and lichenification. However, insignificant result was seen in the percentage of area. The total score of EASI was highly significant with 54.45% of reduction [[Figure 1](#)].

### Overall effect of leech application in *vicarcikā* with reference to SCORing of Atopic Dermatitis Index

[Table 2](#) shows the overall effect of leech application in *vicarcikā* with reference to SCORAD Index. In the parameters of SCORAD Index, intensity criteria and subjective symptoms showed highly significant results, but, on the other hand, insignificant result was seen in extent criteria. The total score of SCORAD Index was highly significant with 55% reduction [[Figure 2](#)].

### Overall effect of leech application in *vicarcikā* with reference to Dermatology Life Quality Index

[Table 3](#) shows the overall effect of leech application in *vicarcikā* with reference to DLQI. The effect of leech application with reference to DLQI was highly significant. Leech application provided an improvement of 62.36% in the quality of life of the patient [[Figure 3](#)].

## Follow-up

During the follow-up period of 6 months, the progression of disease was static in all cases. There were no adverse reactions noted during the therapy and also in follow-up.

## DISCUSSION

*Vicarcikā*, a type of *kśudra kuṣṭha* is found to be mainly caused by *viruddhāhara*[[19](#)] and *rakta duṣṭi*. Frequently *śodhana* is indicated in *Kuṣṭha* due to involvement of *bahu Doṣa*,[[20](#)] which even holds good for *vicarcikā*. *raktamokṣaṇa* is one among the *pañca śodhana*[[21](#)] which is highly useful in *kuṣṭha*, as *kuṣṭha* is a *rakta pradoṣaja vyādhi*.

Among different methods of bloodletting, leech application is considered to be more scientific and safe. The medicinal leech is a beautiful symbol of “give and take” and is sustainable resource management. *Hirudo medicinalis* is one of the oldest surviving animals on earth. The first documented accounts of the use of leeches for medicinal purpose is from the time of extreme antiquity, more than 2500 years before in *Ayurvedic* texts, then long later during the period of Hippocrates. *Dhanvantari*, the physician of gods and the god of *Ayurveda* hold a leech in one of his hand. This simply suggests the importance of leeches in the medicinal field by ancient Indian science. Leeches have and will always be thought of as the “wonder doctors” of science.

The probable mode of action of leech application in *vicarcikā* can be explained in the following way. The anti-inflammatory substances present in leech saliva like Eglins and Bdelins[[22](#)] are responsible for

reduction of erythema (redness) and oozing. Leech application induces granulation tissue formation[23] which in turn results in collagen formation causing keratolysis resulting in reduction of thickness in eczema. Leech application induces microcirculation[24] and reduces inflammatory components like lymphocytes; these factors play an important role in reducing itch impulse (in turn scratching). Leech application reduces acanthosis (thickened epidermis) and scratching which are the causative factors for lichenification. Leech saliva contains hylaurinadase which has antibiotic properties[22] and that may be responsible for the reduction of oozing in *vicarcikā*.

Although leeches may not be safe for people with diseases that impair blood clotting or for those with compromised immune function, it is believed to be safe for most other people. The saliva of leeches contain a variety of substances such as hirudin, hylaurinadase, histamine like vasodilators, collagenase, destabilize,[25] inhibitors of kallikerin, super oxide production and poorly characterized anesthetic and analgesic compounds.[26]

These substances reach epidermis and dermis by the action of enzyme hylaurinadase. It has been proved through laser Doppler flowmetry that there is a significant increase in superficial skin perfusion following leech application, especially 16 mm around the biting zone.[27] Therefore, a regional antiphlogistic, thrombolytic and antibiotic effect by these substances enforced by hylaurinadase might be the possible reason of improvement by treatment with leeches. The jaws of the leech pierce the skin so that potent biologically active substances can penetrate into the deeper tissues. Hylaurinadase (spreading factor), an enzyme in leech saliva, further facilitates the penetration and diffusion of these pharmacologically active substances into the tissues.

Venous congestion is an important complication that threatens the viability of the affected areas. It can be best treated with the application of the leech. Leech therapy has two phases, active bloodletting and passive bleeding from the leech wound after detachment, which can last for several hours. The small blood volume removed by medicinal leeches and the augmented blood removed during the passive bleeding phase of leech therapy results in a remarkable decrease in venous congestion. In addition to this, a broad number of anticoagulant agents decrease venous congestion such as the thrombin inhibitor hirudin, apyrase, as well as collagenase, hylaurinadase, factor Xa inhibitor and fibrinase I and II.[28]

## CONCLUSION

In the present study it was found that, leech application gives significant relief to the symptoms of eczema such as erythema, edema, oozing, excoriation and lichenification, etc., The life quality of the patient also improved significantly after leech therapy. In the study, during the follow-up period of 6 months the disease progression was static in most of the patients. No adverse reactions were reported during the entire course of study.

Hence the application of leeches in the cases of *vicarcikā* can be an effective treatment for chronic eczema. The study suggests the utility of leech application in other inflammatory disorders.

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## Footnotes

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**Conflict of Interest:** None declared.

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## Figures and Tables

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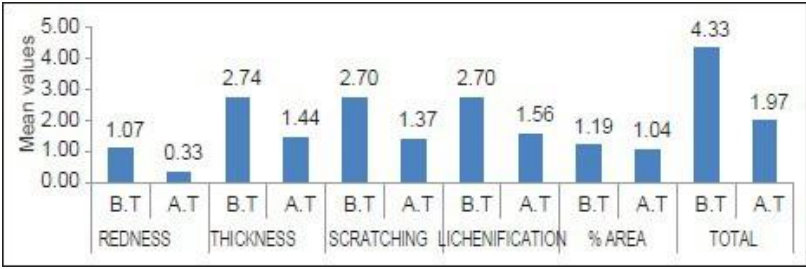
Table 1

| Easi score (Eczema area and severity index) | Mean | SD   | % of reduction | Paired t-test        |
|---------------------------------------------|------|------|----------------|----------------------|
| Redness                                     |      |      |                |                      |
| B.T                                         | 1.07 | 1.04 | 69.15%         | 4.2640**             |
| A.T                                         | 0.33 | 0.68 |                |                      |
| v                                           |      |      |                |                      |
| B.T                                         | 2.74 | 0.53 | 47.29%         | 7.6172**             |
| A.T                                         | 1.44 | 0.70 |                |                      |
| Scratching                                  |      |      |                |                      |
| B.T                                         | 2.70 | 0.61 | 49.31%         | 11.1713**            |
| A.T                                         | 1.37 | 0.74 |                |                      |
| Lichenification                             |      |      |                |                      |
| B.T                                         | 2.70 | 0.47 | 42.46%         | 11.1772**            |
| A.T                                         | 1.56 | 0.58 |                |                      |
| % Area                                      |      |      |                |                      |
| B.T                                         | 1.19 | 0.62 | 12.49%         | 1.6879 <sup>NS</sup> |
| A.T                                         | 1.04 | 0.44 |                |                      |
| Total                                       |      |      |                |                      |
| B.T                                         | 4.33 | 2.78 | 54.45%         | 5.8202**             |
| A.T                                         | 1.97 | 1.12 |                |                      |

NS: Not significant at 5% level, \*\*: Significant at 1% level, BT: Before Treatment, AT: After Treatment

Overall effect of Leech application in *Vicarcikā* with reference to EASI SCORE

**Figure 1**



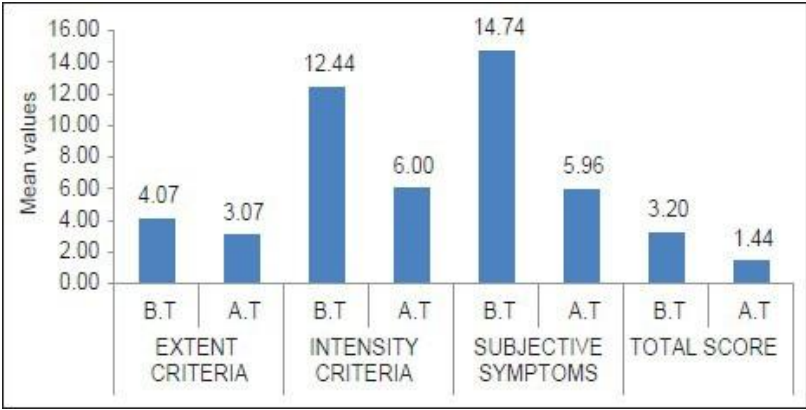
Eczema Area and Severity Index score. BT: Before Treatment, AT: After Treatment

Table 2

| Scorad index (Scoring of atopic dermatitis)                                                             | Mean  | SD   | % of reduction | Paired t-test |
|---------------------------------------------------------------------------------------------------------|-------|------|----------------|---------------|
| Extent criteria                                                                                         |       |      |                |               |
| B.T                                                                                                     | 4.07  | 1.96 | 24.54%         | 2.7041NS      |
| A.T                                                                                                     | 3.07  | 1.41 |                |               |
| Intensity criteria                                                                                      |       |      |                |               |
| B.T                                                                                                     | 12.44 | 1.83 | 51.78%         | 14.2952**     |
| A.T                                                                                                     | 6.00  | 2.43 |                |               |
| Subjective symptoms                                                                                     |       |      |                |               |
| B.T                                                                                                     | 14.74 | 2.25 | 59.54%         | 14.5167**     |
| A.T                                                                                                     | 5.96  | 2.58 |                |               |
| Total score                                                                                             |       |      |                |               |
| B.T                                                                                                     | 3.20  | 0.46 | 55%            | 16.0649**     |
| A.T                                                                                                     | 1.44  | 0.62 |                |               |
| NS: Not significant at 5% level, **: Significant at 1% level, BT: Before Treatment, AT: After Treatment |       |      |                |               |

Overall effect of Leech application in *vicarcikā* with reference to SCORAD INDEX

**Figure 2**



SCORing of Atopic Dermatitis index. BT: Before Treatment, AT: After Treatment

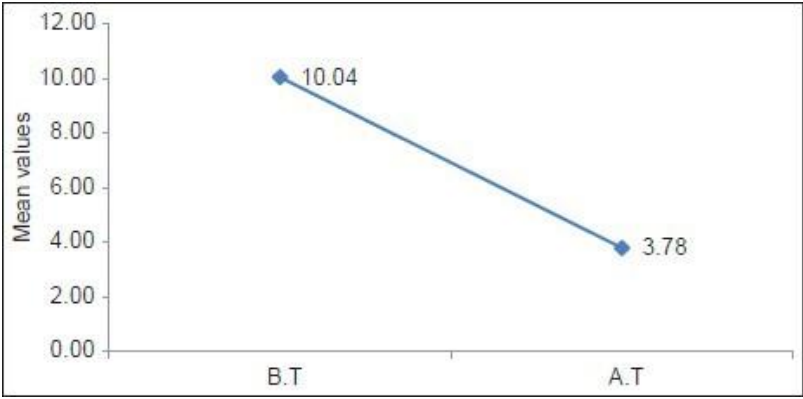
Table 3

| Dermatology life quality index (dlqi) | Mean  | SD      | % of improvement | Paired t-test |
|---------------------------------------|-------|---------|------------------|---------------|
| B.T                                   | 10.04 | 4.407   | 62.36%           | 8.0005**      |
| A.T                                   | 3.78  | 1.76141 |                  |               |

\*\* : Significant at 1% level, BT: Before Treatment, AT: After Treatment

Overall effect of Leech application in *Vicarcikā* with reference to DLQI

**Figure 3**



Dermatology Life Quality Index. BT: Before Treatment, AT: After Treatment

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