

## “A Conceptual Study of Wound Bed Preparation by Leech Therapy (*Jalaukavacharana*) In Patients of *Dushta Vrana* w. s. r. Chronic Non-Healing Wound.”

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### Abstract:

Of all the surgical entities in this world of diseases, the treatment of *Vrana* is the hallmark of *Ayurveda Shalya Chikitsa*. Acharya Sushruta has explained varieties of *Vrana*, of them *Dushta Vrana* secures supreme importance as a disease and as a postsurgical complication. *Vrana* which has foul smell, flowing putrefied pus along with blood, with cavity, since long time and has bad odor, and which is almost opposite to *Shuddha Vrana* is *Dushta Vrana*. Moreover wound which refuses to heal or heals very slowly in spite of best efforts by *chikitsa chatuspada* can be considered as *Dushta Vrana* and needs extra therapeutic efforts for management. To achieve good approximation and early healing of wound Acharya Sushruta has explained *Shashti Upakramas* (sixty types of treatment procedures for comprehensive management of *Vrana* and have also mentioned *Shodhana* by *Raktamokshana* (Bloodletting) in acutely indurated and cyanosed, painful swellings and many inflammatory conditions like

*Vranashopha*, *Vidhradhi*, *Granthi*, *Arbuda* etc. and advised *Jalaukavacharana* (Leech therapy) in *Dushta Vrana* (contaminated wound).

According to modern medical science chronic wounds are those which do not follow the normal healing process and show no signs of healing in 4 weeks and remain in prolonged inflammatory stage.

Wound bed preparation is the management of a wound in order to accelerate endogenous healing or to facilitate the effectiveness of other therapeutic measures. The overall goal of wound bed preparation is to create an optimal wound healing by producing a well-vascularized, stable wound bed with little or no exudates.

*Jalaukavacharana* has a comprehensive therapeutic influence in reducing inflammation, pain, *Srava* (exudates) and vitiated *Doshas* and stimulates granulation tissue in the wound bed which has good healing properties or *vrana shodhana* properties thereby facilitating wound bed preparation..

Chronic non healing wound which can be correlated to *Dushtavrana* in *Ayurveda* texts is a debilitating illness especially in adult population irrespective of cause. In modern science whichever treatment is available is costly and affordability of these treatment options is questionable in developing countries like India. *Ayurveda* has got a remedy in the form of leech therapy as a para surgical tool which acts like boon as it stimulates granulation tissue formation by increasing pure blood flow, and it can be used as a primary approach for management of *Dushta Vrana* (chronic non healing wounds).

With all such basic concepts in mind a study has been planned for clinical research in which cnhu patients will be treated by jallaukavacharan in two groups so as to compare effect of leech therapy with control group treated by TIME principle of wound management.

**Keywords:** Wound bed preparation, *Shodhana*, *Sandhana* *Karma*, *Jalaukavacharana*, *Shashti Upakramas*, Leech Therapy

### Introduction:

There are lots of surgical entities in the world of diseases and the treatment of *Vrana* is the hallmark of *Ayurveda Shalya Chikitsa*. *Acharya Sushruta* has explained varieties of *Vrana* of them *Dushta vrana* secures supreme importance as a disease and as a postsurgical complication

*Acharya Sushruta* who is known of Father of Surgery, in *Sadhyovraniya* Adhyaya (*Chikitsasthana*) has elaboratively explained details of types of *Vrana*<sup>1</sup>.

*Vrana* which has foul smell, flowing putrefied pus along with blood, with cavity, since long time and has bad odor and symptoms (*Vranalakshanas*)<sup>2</sup> are high in intensity, and which is almost opposite to *Shuddha Vrana* is *Dushta Vrana*. Moreover, wound which refuse to heal or heals very slowly in spite of best efforts by *chikitsa chatuspada* can be considered as *Dushta Vrana* which needs extra therapeutic efforts or more conscious approach for their management. To achieve good approximation and early healing of wound *Acharya Sushruta* has explained *Shashti Upakramas*<sup>3</sup> (sixty types of treatment procedures) in *Dwivraniya* Adhyaya of *Chikitsasthana* for comprehensive management of *Vrana*.

*Acharya Sushruta* also mentioned *Shodhana* by *Raktamokshana* (Bloodletting) in acutely indurated and cyanosed, painful swellings and many inflammatory conditions like *Vranashopha*, *Vidhradhi*, *Granthi*, *Arbuda* etc. and advised *Jalaukavacharana* (Leech therapy) in *Dushta Vrana* (contaminated wound)<sup>4</sup>.

According to modern medical science wound is break in the integrity of the skin or tissues, often which may be associated with disruption of the structure and function. Chronic wounds are those which do not follow the normal healing process and show no signs of healing in 4 weeks and remain in prolonged inflammatory stage<sup>5</sup>.

**Wound bed preparation** is the management of a wound in order to accelerate endogenous healing or to facilitate the effectiveness of other therapeutic measures<sup>6</sup>. The overall goal of wound bed preparation is to create an

optimal wound healing by producing a well-vascularized, stable wound bed with little or no exudates.

In *Sushruta Samhita*, the procedure of *Raktamokshana* has been hailed as one of the most effective therapy of *Vranashopha*. Medicinal leeches are among various methods for bloodletting, *Jalaukavacharana* is described as the most important therapy because of its safety and high efficacy and has a comprehensive therapeutic influence in reducing inflammation, pain, *Srava* (exudates) and vitiated *Doshas*. *Jalaukavacharana* stimulates granulation tissue in the wound bed which has good healing properties or *vrana shodhana* properties.

Chronic non healing wound which can be correlated to *Dushtavrana* in *Ayurveda* texts is a debilitating illness especially in adult population irrespective of cause. In modern science whichever treatment is available is costly and affordability of these treatment options is questionable in developing countries like India. It is estimated that 1 to 2 % of the population will experience a chronic wound during their lifetime in developed countries<sup>7</sup>.

*Ayurveda* has got a remedy in the form of leech therapy as a para surgical tool which acts like boon in various inflammatory conditions of skin and soft tissues. As *Jalaukavacharana* (leech therapy) stimulates granulation tissue formation by increasing pure blood flow, it can be used as a primary approach for management of *Dushta Vrana* (chronic non healing wounds). Similarly, Leech therapy has less complication, painless procedure, cost effective, less time consuming, easy to apply so it is more convenient method

for treating non healing wounds. In the treatment of *Dushta vrana* bloodletting with Leech will be acting as the *shodhana* procedure which can be correlated to wound bed preparation and will be helping to facilitate the further therapies like *Sandhanakarma* (skin grafting) and *Ropana* with the help of various *tailas* and *lepas*.

Chronic non healing wound renders an adverse effect on the psychology of the patients and has got adverse stigma in the society and family both. So taking in consideration the social, physical and economical aspects of the disease and the easy availability of *Jalauka* as a para surgical tool, the study has been undertaken for research titled “Study of wound bed preparation by *Jalaukavacharana* in patients of *Dushta Vrana* w.s.r. chronic non-healing wound-a randomized control trial”. For the said study, following research protocol is planned and various assessment criteria planned according to a randomized control trial.

### Research Question

Is *Jalaukavacharana* effective in patients of *Dushta vrana* w.s.r. chronic non healing wound for wound bed preparation?

### Hypothesis:

- 1) **Null Hypothesis (H0):**  
*Jalaukavacharana* is not effective in patients of *Dushta vrana* w.s.r. chronic non healing wound for wound bed preparation.
- 2) **Alternative Hypothesis (H1):**  
*Jalaukavacharna* is effective in patients of *Dushta vrana* w.s.r.

chronic non healing wound for wound bed preparation.

### Review of Literature:

*Acharya Sushruta* considers *Rakthamokshana* as one among *Pancha karma* because of its importance in treatment methodologies. *Acharya Sushruta* considered *Raktamokshana* as *Chikitsaardha* which can cure many diseases by only leech applications.

*Jalaukavacharana* has a comprehensive therapeutic influence in

reducing inflammation, pain, *Srava* (exudates) and vitiated *Doshas*. *Jalaukavacharana* stimulates granulation tissue in the wound bed which has good healing properties or *vrana shodhana* properties<sup>8</sup>.

*Jalaukavacharan* significantly helped in reduction of the signs and symptoms of the *Dushta Vrana*, enhancing wound healing process and reducing the morbidity of the patients<sup>9</sup>.

### TIME Principle of Wound Bed Preparation<sup>10</sup>

Tissue non viable or deficient	Infection or inflammation	Moisture imbalance	Edge of wound non advancing or undermined
Defective matrix and cell debris	High bacterial counts or prolonged inflammation	Desiccation or excess fluid	Non-migrating keratinocytes Non-responsive wound cells
⇓	⇓	⇓	⇓
<b>Debridement</b> ⇓	<b>Antimicrobials</b> ⇓	<b>Dressings</b> ⇓	<b>Biological Agents Adjunct Therapies Debridement</b> ⇓
Restore wound base and ECM proteins	Low bacterial counts and controlled inflammation	Restore cell migration	Stimulate <i>keratinocyte</i> migration

Table no 1

According to T.I.M.E. principle of wound management, the TIME table summarizes the four main components of wound bed preparation-1)Tissue management 2)Control of infection and inflammation 3)Moisture imbalance 4)Advancement of the epithelial edge of the wound. The TIME framework

is a useful practical tool based on identifying the barriers to healing and implementing a plan of care to remove these barriers and promote wound healing. In a chronic wound, debridement is often required more than once as the healing process can stop or slow down allowing further devitalized tissue to develop.

Wound Bed Preparation - It can be said that the term wound bed preparation is particularly applied to chronic wounds that fail to progress through the normal healing process. It is performed via removing abnormal cells, reducing the bacterial load, decreasing the level of wound exudates and increasing the formation of healthy granulation tissue<sup>11</sup>.

It can also be assumed as the leech sucks stagnant blood, *Shodhana* of the morbid *Dosha* via sucked blood occurs, which in turn results in the Srotoshuddhi and trapped Vata gets relieved which was responsible for pain<sup>12</sup>.

### Aim and Objectives:

**Aim:** To study the efficacy of *Jalaukavacharana* in wound bed preparation in patients of Dushta Vrana w.s.r. chronic non-healing wound.

### Primary objective:

To study the early healing of wound by *Jalaukavacharana* in patients of Dushta Vrana w.s.r. chronic non-healing wound.

### Secondary Objective:

To study the efficacy of *Jalaukavacharana* on pain in patients of *Dushta vrana* w.s.r. chronic non-healing wound.

### Methodology:

Study design: Randomized controlled open clinical trial.

Study setting: Registered patients in OPD and IPD of Shalyatantra department of *Shri Ayurved Mahavidyalaya*, Nagpur  
Study duration: Approx. - 18 Months

### Method of selection of study subject:

- 1) Total 60 patients will be selected from OPD and IPD OF *Shalyatantra* department of our institute.
- 2) They will be divided into 2 groups each consisting of 30 patients.  
Informed, written and valid consent of patient will be taken prior to commencement of clinical trials.
- 3) A standard case record form will be maintained.
- 4) Patient will be admitted in IPD.

### Selection Criteria:

#### Inclusion Criteria:

- 1) Patient fit for Raktamokshana.
- 2) Patient of age group in between 20 years to 70 years.
- 3) Patients having clinical signs and symptoms of Dushta Vrana i.e. vedana, pooti gandha, strava, shotha etc.
- 4) Patient who give written consent and regular follow up.

#### Exclusion criteria:

- 1) HIV, HBsAg positive patients.
- 2) Malignant ulcers,
- 3) Tubercular ulcers,
- 4) Syphilitic ulcers,
- 5) Lepromatus ulcers,
- 6) Patients having history of bleeding disorders,
- 7) Severe Anemia,
- 8) Burns

#### Withdrawal criteria:

- 1) Hypersensitivity to leech therapy.
- 2) If patients refuses to continue with the treatment.

**Matching criteria:** It will be same for both groups

- 1) Age
- 2) Assessment criteria

Specification of instruments and related measurements:

- 1) VAS (Visual Analogue Scale) Scale will be used for measurement of pain intensity,
- 2) Stainless steel scale will be used for measurement of wound size.

**Investigations:**

CBC, RBS, ESR, Sr. *creatinine*., Urine routine, BT, CT, HIV, HBsAg, CRP, ESR, Pus culture sensitivity if needed.

**Sample size:** 60 patients

**Sample technique:**

$$n = \frac{z^2 \times p \times (2-p)}{d^2}$$

z : 1.96 (Standard normal variable)

p: 0.02 (Prevalence)

d: 0.05 (error)

$$\frac{3.84 \times 0.02 \times (2-0.02)}{(0.05)^2} = 30$$

Sample size = 30

Grouping: 2 groups -

Group A (Control) = 30 Patients

Group B (Trial) = 30 Patients

A) Control group= Patients treated with Antibiotics used as per Hospital Infection Control Policy. (NABH

protocol) and TIME principle of wound management

- 1) Inj. Co- *Amoxiclav* 1.2 gm IV BD/ Tab. Co-*Amoxiclav* 625mg TDS For 7 days
- 2) Wound Debridement
- 3) Dry dressing once a day
- 4) Tab. *Triphala guggulu* 250mg 2 BD for 7 days
- 5) *Triphala kwatha dhavana* once a day.

B) Trial group = Patients treated with Leech Therapy (*Jalaukavacharana*) and TIME principle of wound management

- 1) *Jalaukavacharana* for 7 days
- 2) Inj . Co-*Amoxiclav* 1.2 gm IV BD / Tab.Co- *Amoxiclav* 625mg for 7 days
- 3) Wound Debridement
- 4) Dry dressing once a day
- 5) Tab. *Triphala guggulu* 250mg 2 BD for 7 days
- 6) *Triphala kwatha dhavana* once a day

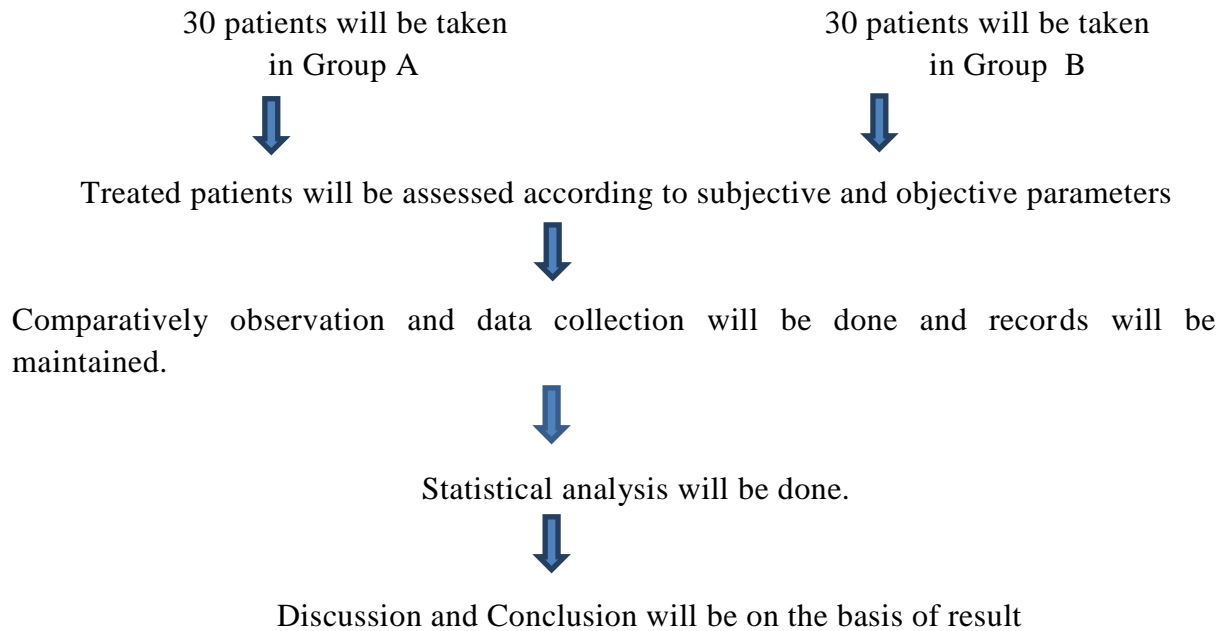
**Study period:**

Daily *Leechtherapy* for 7 days

Observation up to 15 days

**Plan of work:**

- Screening of patients from OPD and in *Shalyatantra* department in Shri *Ayurved Mahavidyalaya, Nagpur*
- Random selection of patients having sign and symptoms of *Dushta vrana*.
- Informed and written consent will be taken



Patients will be assessed on subjective & objective parameter & relevant data will be collected for analysis.

Assessment criteria<sup>13</sup>:

Subjective: 1) *Vedana* / Pain

Signs	Grade
No itching	0
Itching some times in a day	1
Itching whole day but not disturbing sleep	2
Severe itching disturbing sleep	3

2) *Kandu* / Itching

Objective: 1) *Akruti* / Size & Shape

2) *Vranatala* / wound bed

3) *Gandha* / smell

4) *Srava* / Discharge

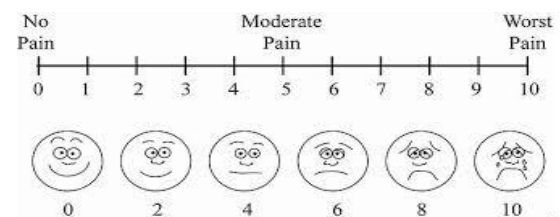
5) *Varna* / Granulation tissue

formation

**Subjective Criterion –**

1) *Vedana* / Pain:

Pain will be calculated on Visual analogue scale (Bond and *Pilpowsky* 1971-73) and scored as 1 to 10.



2) *Kandu* / Itching: Itching will be assessed in four grades

Table no 2= Assessment criteria for *Kandu* / Itching

**Objective Criterion –**

1) *Akruti* / Size and Shape:

Size of wound will be taken by length and width of Wound<sup>14</sup>.

Signs	Grade
The gauze is slightly moist	0
Bloody / sanguineous discharge	1
Sero-sanguineous discharge	2
Serous discharge	3
Seropurulent	4

This equation is used to

Signs	Grade
Smooth, irregular & with healthy granulation tissue	0
Smooth, irregular, slight discharge & less granulation tissue	1
Rough, regular wet with more discharge & having slough	2
Rough, irregular with profuse discharge & much slough	3

calculate the area of irregular surface.

*Kundin's formula* -  
 $Akun = L \times W \times 0.785 \text{ mm}^2$

2) Vranatala / wound bed: : wound bed will be assessed in four grades

Table no 3 - Assessment criteria for Vranatala / wound bed

4) Gandha / Odor: Odor will be assessed in four grades

Signs	Grade
No smell	0
Bad smell	1
Tolerable unpleasant smell	2
Foul smell which is intolerable	3

Table no 4 Assessment criteria for Gandha / odor:

5) *Srava* / Discharge: Discharge will be assessed in five grades

Table no 5 -- Assessment criteria for *Srava* / Discharge

5) Varna / Granulation tissue formation: will be assessed in four grades

Signs	Grade
Pinkish red	0
Slight pinkish red	1
Slight Yellowish	2
Yellowish	3

Table no 6 - Assessment criteria for Varna / Granulation tissue formation:

#### Study instrument:

- 1) *Jalauka* (Leech and Leech lab).
- 2) *Haridra* powder, Mustard powder.
- 3) Sterilized Gauze pieces, dressing pads, cotton, gloves.
- 4) Disposable syringes, kidney trays, distilled water, needles.
- 5) Container of sterile water, for placing leeches after they have been fed.

(This container will be labeled with patient's name)

#### Data collection tools:

- 1) Assessment parameters
- 2) Case report form

#### Data management and analysis procedure:

Data analysis will be done by standard computer program and with the help of statistician if required. Data will be coded and entered in MS-Excel worksheet and other statistical software will be used.

**Plan for statistical analysis:**

Collected data of Group A and Group B will be analyzed statistically by

- 1) Paired t- test,
- 2) " Chi "square test,

**References of disease:**

*Nidan, samprapti & lakshana of Dushta Vrana –*

- 1) *Sushrut samhita , sutrasthana, adhyaya 22nd/ sloka-6,7*
- 2) *Sushrut samhita ,sutrasthana, adhyaya 27th/ sloka-7*

*Chikitsa of Dushta vrana is explained in –*

- 1) *Sushrut samhita Chikitsasthana , adhyaya 1st*
- 2) *Charak samhita, chikitsasthana, adhyaya 23rd*

**Drug/ Formulation details:**

- 1) Inj. Co-amoxiclav 1.2gm (Amoxicillin sodium 1000mg + clavulanate potassium 200mg)

- 2) Tab. Co-amoxiclav 625 mg (Amoxicillin sodium 500mg+ clavulanate potassium 125mg) is an antibiotic drug used to treat various infections.

The products contain two active ingredients, amoxicillin sodium and clavulanate potassium. Amoxicillin is an antibiotic agent with a notably broad spectrum of activity against the commonly occurring bacterial pathogens in general practice and hospital. The  $\beta$ -lactamase inhibitory action of clavulanate extends the spectrum of amoxicillin to embrace a wider range of organisms including many resistant to other  $\beta$ -lactam antibiotics. Co-amoxiclave is used to treat respiratory infections, infections of the GI tract and wound infections<sup>15</sup>.

Thus, the combination of amoxicillin with clavulanic acid maintains the activity of the aminopenicillin against organisms that produce sufficient quantities of these enzymes that would otherwise render it inactive. Side effects are uncommon and mainly of a mild and transitory nature.

- 3) Tab. Triphala Guggulu <sup>16</sup>

	<b>Latin name</b>	<b>Active ingredients</b>	<b>Rasa</b>	<b>Guna</b>	<b>Virya</b>	<b>Vipaka</b>	<b>Dosh gnata</b>	<b>Gana</b>
<b>Aamalaki</b>	<i>Phyllanthus emblica</i>	Ascorbic acid, emblicanin A etc	Panch ras lawan warjit	Guru, ruksha, shita	Shita	Madhura	Tridosha	Rasayan

<b>Bibhitaki</b>	<i>Terminalia bellirica</i>	Tannins, b-sitosterol, gallic acid etc	Kashay	Ruksha, laghu	Ushna	Madhur	Pittakaphaghna	Rasayan, Shothahara, vedanasthapak
<b>Haritaki</b>	<i>Terminalia chebula</i>	chebulinic acid	Panchras lawan warjit	Laghu, ruksha	Shita	Madhur	Tridoshahar	Rasayan'vranashodhan, vranaropana
<b>Krishna/pipli</b>	<i>Piper longum</i>	Volatile oil, alkaloids, isobutylamides	Katu	Laghu, tikshna	Ushna	Katu	Vata kaphaghna	Dipaniya, pachaniya
<b>Guggulu</b>	<i>Commiphora wightii</i>	Quinic acid myoinositol,	Tikta, Katu	Laghu, ruksha, tikshna, vishad	Ushna	Katu	Tridoshahar	Vedanasthapa k, vranaropak, shothahar

Table no 7-contents of trifala guggulu (Sharangdhara samhita madhyamkhanda 7/82-83)

Triphala Guggulu reduces Kleda, Paaka, Putigandha, Shotha along with remarkable reduction of pain in wound.

#### Description of Jalauka (Leech):

The history of therapeutic uses of leech dates back to the 8th century, when the Ayurveda vaidyas (Physicians) used them to suck blood from various diseases like Vranashopha, Vidradhi etc.

The first description of Leech therapy, classified as Blood Letting was found in the text of Sushruta Samhita (dating 800 B.C.) Written by Acharaya Sushruta, who was also considered the Father of Surgery. Medicinal Leeches 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 in the affected

area. Medicinal leeches are any of several species of leeches, but most commonly *Hirudo medicinalis* is the European medicinal leech<sup>17</sup>.

#### Types of Jalaukas (Leeches)<sup>18</sup>:

- 1) *Savisha* (Poisonous) 6 in numbers
- 2) *Nirvisha* (nonpoisonous) 6 in numbers– Indicated to treat the patients.

#### Indications for Raktamokshana<sup>19</sup>:

- 1) *Vranashopha* (Cellulitis)
- 2) *Vidradhi* (Abscess)
- 3) *Vatarakta* (Gout)
- 4) *Kushta* (Skin diseases)
- 5) *Arbooda* (Tumor)
- 6) *Vicharchika* (Eczema)
- 7) *Vrana* (Wound)
- 8) *Mukhadushika* (Acne vulgaris)

Contra indications for Raktamokshana<sup>20</sup>:

Leech therapy is contra indicated in patients suffering from

- 1) *Sarwanga Shopha (Anasarca),*
- 2) *kshina (emaciated person),*
- 3) *Shosha (debilitated person),*
- 4) *Pandu (Anaemia),*
- 5) *Jalodara (Ascites),*
- 6) *garbhini (pregnant women)*

Side effects- The local pain and short term itching are side effects<sup>21</sup>.

Procedure:

*Jalaukavacharana Vidhi*<sup>22</sup> -

Procedure of *jalaukavacharana* will done in three steps-

- A) *Purva karma*
- B) *Pradhan karma*
- C) *Pashat karma*

A) *Purva Karma*:

- a) Preparation of the leeches: - *Jalaukas* will be first prepared for *Raktamokshana* by keeping it in *lavana Jala*, or prepared by adding a few pinches of or in a kidney tray half filled with fresh water.
- b) Preparation of patient: - The ulcerated site will be cleaned with sterile water to remove the discharge after which wound will be cleaned by dry gauze.

B) *Pradhana Karma*:

After wearing the latex gloves, leeches will be caught with the gauze or cotton pad. Then prepared active leeches will be kept over the wound and its periphery. If needed, wound and non-ulcerated site will be punctured with sterilized needle and when blood oozes the leeches will be kept on it. When a leech attached itself to the site, then wet cotton pad will be placed over it.

C) *Paschat karma*:

- a) Leech Care: Then *Haridra Churna* will be sprinkled over the leech's anterior sucker (mouth) for inducing vomiting. After expelling all the blood from its gut, the leech became active again and will be stored in fresh water container.
- b) Patient Management: - *Haridra Churna* will be applied over the bite lesions. After few minutes, cotton gauze pieces will kept over the bleeding sites with firm pressure to absorb the secondary bleeding.

Effect of *Jalaukavacharan* (Leech Therapy):<sup>23</sup>

In wound healthy cell gets sick when it is deprived of needed oxygen and nutrition, and is unable to remove toxins accumulated during metabolism. *Jalaukavacharana* increases blood flow by their anti-coagulant properties which enhance the local circulation and also provide the nutrient.

- 1) *Jalauka* sucks blood by self-regulatory mechanism i.e. they get detached from the wound on its own after sucking properly.
- 2) *Jalauka* exerts Local effect in the wound due to several active substances, emitted into it during sucking.
- 3) *Jalauka* ( Leech) is anti-phlogistic i.e. used for relief of local inflammation in tissue.
- 4) *Jalauka* has Capability of improving microcirculation.
- 5) *Jalauka* has anesthetic, anticoagulant & antibacterial effect.
- 6) *Jalauka* is currently used during post-operative care of re-

implanted fingers, skin graft and venous congestion.

- 7) Blood purification effect by the virtue of which vitiated *Doshas* expelled out of the body.

### RCT- Randomized Control Trial

A) Randomization proposed: Simple random method with help of computer generated randomization plan.

B) Allocation concealment proposed: Patient selected from simple random will be allotted to group A and group B, using computer plan.

C) Blinding proposed: open trial method.

D) Experimental studies: Interventional

### Reference style Vancouver

**Discussion and Conclusion** – Such a unique study on wound bed preparation by leech therapy which can be correlated to *vrana nirma* by *shodhana upakrama* (by *jallaukavacharana*) and other standardized treatment options is proposed in a scientific way in the form of a randomized control study titled “Study of wound bed preparation by *Jalaukavacharana* in patients of *Dushta Vrana* w.s.r. chronic non-healing wound- a randomized control trial”. 60 patients will be treated by the given protocol and standard assessment criteria’s will be applied to both groups. Observations and conclusions will be drawn according to the subjective and objective parameters and results will be compared in both groups. With the concept of acceleration of wound healing in mind, published earlier as a case study<sup>24</sup>, the present study was planned and proposed and got approval for clinical research by Research Cell of MUHS, Nashik

(Maharashtra University of Health Sciences, Nashik). Hence, with the concepts of all the ethical practices and with the motto of rendering a novel approach of wound bed preparation by leech therapy to facilitate the easy use of other treatment practices in *ayurvediya vrana chikitsa* (treatment of wound by Ayurveda methods) like *Vranaropana tailas*, *lepas*, *Sandhana Karma* (Skin grafting) in chronic non healing wound ie, *Dushtavrana*, and to generate a new treatment modality in the arena of the treatment of *Dushtavrana (cnhu)* the said study is proposed. Good results are anticipated in the group of treatment by *jallaukavacharana*, (as per the case study published earlier) and every clinical detail will be maintained as a record and adverse reactions if any will be taken care of. The patients will be given utmost liberty to leave the clinical trial at any point of time during treatment. And we do agree that this is a study on a very small size of population but whatever results we get will be definitely helpful to the mankind in a positive way so as to formulate newer ethical studies.

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