

A COMPARATIVE CLINICAL STUDY OF VASA PRATISARANEYYA KSHARA AND JALOUKAVACHARANA IN THE MANAGEMENT OF DUSHTAVRANA (CHRONIC ULCER)

Sahl. M¹, Manjunatha Bhat²

¹PG Scholar, ²Professor and HOD;

Department of PG Studies in Shalya Tantra, Alva's Ayurveda Medical College, Moodbidri, Karnataka, India

Email: drsahlbams@gmail.com

ABSTRACT

Background: Wound and ulcer management is the basic fundamentals of the surgical practice. However, wound healing is a challenge faced in the medical field since the time of *Vedas*. Many procedures and formulations for the management of *Vrana* were practiced by our *Acharyas* from ancient period and also in modern era. In *Sushruta Samhita Acharya* detailed about *Vrana*, *Dushtavrana* in all its attributes and explained 60 treatment modalities by the name of *Shashtiupakrama*, covering all management aspect from its occurrence to its total healing are mentioned. **Objective:** To study the efficacy of *Vasa Pratisaraneeya Kshara* and *Jaloukavacharana* for managing *Dushtavrana* and compare their efficacy. **Methodology:** 40 patients suffering from *Dushtavrana* fulfilling the diagnostic and inclusion criteria were selected and randomly divided in two groups, Group A (*Vasa Pratisaraneeya Kshara*) and Group B (*Jaloukavacharana*), and patients were assessed before and after the treatments i.e. on 1st, 8th, 15th 22nd and 28th day. **Results:** Both the treatments were statistically significant in all attributes of the disease. **Conclusion:** *Vasa Pratisaraneeya Kshara* and *Jaloukavacharana* were effective in the management of *Dushtavrana*

Keywords: *Dushtavrana*, *Vrana*, *Jaloukavacharana*, *Vasa Pratisaraneeya Kshara*

INTRODUCTION

Ever since life originated, human beings are susceptible to injury which made them to think about fast healing. But till today wound healing is challenge among surgeons and medical practitioners. The incidence of non - healing ulcers is devastatingly high due to various traumas, pathological insults, infections, physical, chemical exposures and metabolic disorders.¹ It is estimated that in the course of life time, almost 10% of population will develop chronic ulcers

with mortality rate of 2.5%.² In current scenario of fast life everyone is expecting quick relief of the ailments with minimal adverse effects. Here comes the role of *Ayurvedic* science for managing non healing chronic ulcers and preventing persons from getting diseased in future.

Acharya Sushruta give superior position to the *Vrana* and its management, and elaborated the features of *Dushtavrana* like *Atisamvruta* (Slightly exposed) *Ati-*

vivruta (Greatly exposed), *Atikatina* (Very hard), *Atimrudu* (Very soft), *Utsannam* (Greatly elevated), *Avasannam* (Greatly depressed), *Putipuyasrava* (Putrefying pus discharge), *Atyartavedana* (Severe pain), *Daha* (Burning sensation), *Paka* (Suppuration), *Kandu* (Itching), *Deergakalanubhandhi* (Chronicity). These features exactly related with features of chronic non-healing ulcers.

Even though healing is a natural process, in *Dushtavrana* healing will be delayed. Debridement is one of the major procedures for cleansing the wounds and enhances healing. *Acharya Sushruta* elaborated *Shashtiupakrama*⁴ specially to manage different stages of *Vrana*. Which includes different kinds of *Upakrama* for *Vranashodhana*, *Vranaropana*, like medical, *Panchakarma*, surgical, para-surgical therapies, it helps to attain proper *Shuddhavastha* and *Roodavastha* of *Vrana* with restoration of normalcy.

Ksharakarma is one of the best treatment modality for *Dushtavrana* because *Kshara* possess the special karma of *Ksharana* and *Kshanana*⁵ and is most important among *Shastra* and *Anushastra* due to its *Chedyā*, *Bedyā*, *Lekhya*, *Tridoshagnatwa* and *Visheshakriyā* properties⁶. *Acharya Sushruta* specifically mentioned that *Vrana* with *Utsanna Katinamamsa*, *Kandu*, *Chirothita*, and *Dushoddhya*⁷ should be cleansed by *Ksharakarma* due to debridement of slough tissue and promotes quick healing. Also *Acharya* mentioned different kinds of medicinal plants for the preparation of *Kshara* and *Vasa* is one among them, which is easily available. *Raktamokshana* is one among the *Shashtiupakrama* and *Jaloukavacharana* is one of the *Raktamokshana Upaya*^{8,9}, which is the most delicate among other bloodletting therapies. It is specially indicated in *Vrana* which are *Katina*, *Vivarna*, *Vedananuviddha* and *Vishayukta*.¹⁰

Healing of a non-healing ulcer is a process to regain the normalcy, for attaining this different management protocols are mentioned in contemporary medicine as well as *Ayurvedic* science. Even though there are various new inventions in the field of ulcer management in current era, *Ayurveda* concepts regarding *Vrana* and *Dushtavarana* management have its own prime importance. Hence in this study an effort is made to

evaluate and compare the efficacy of *Vasa Pratisaraneeya Kshara Patana* and *Jaloukavacharana* in the management of *Dushtavrana*.

MATERIALS AND METHODS

Sample source: 40 patients diagnosed as *Dushtavrana* were selected from the OPD and IPD of Alva's Ayurveda hospital Moodbidri, other camp referrals, were grouped into A and B irrespective of their age, sex, religion, socioeconomic status etc. Each patient was selected for their trial after voluntary consent

Sample size: 40 patients suffering from *Dushtavrana* fulfilling the diagnostic and inclusion criteria were selected and randomly divided in two groups, Group A (*Vasa Pratisaraneeya Kshara*) and group B (*Jaloukavacharana*)

Study design: A comparative clinical study

Diagnostic Criteria

Patients with classical signs and symptoms of *Dushtavrana* like *Atyarta Vedana*, *Daha*, *Paka*, *Kandu*, *Dheergakalnubandhi*, *Pootipooyasrava* were selected

Inclusion Criteria:

- Patient aged between 16- 70 years of either sex
- Patient indicated for *Ksharakarma* and *Jaloukavacharana*
- *Dushtavrana* with minimum duration of 30 days

Exclusion Criteria:

- Patients having pre- gangrenous or gangrenous ulcer
- Patients suffering from lesions like tuberculosis, syphilis, malignancy etc
- Vulnerable group of patients
- Uncontrolled systemic diseases

INTERVENTIONS

Study period: Including observation and follow up – total 60 days

GROUP A: 1st day - *Vasa Kshara Patana*

- Periodical observation was done on 1st, 8th, 15th, 22nd, and 28th days

GROUP B: 1st, 8th, 15th, 22nd, 28th day - *Jaloukavacharana* was done

- Periodical observation was done on 1st, 8th, 15th, 22nd, 28th days

Assessments was done before treatment and on 8th day, 15th day, 22nd day, and 28th day for both group

Follow up: The patients of both groups were advised to come for follow-up on 45th day and 60th day.

PROCEDURE

Informed written consent of the patients was taken for both groups.

Group A: *Vasa Pratisaraneeya Kshara Patana* was done on 20 patients of Group A.

Poorvakarma: *Vranasthana* cleaned with distilled water using sterile gauze.

Pradhanakarma: *Teekshna Vasa Kshara* applied with *Ksharakarma Shalaka* over the *Dushtavrana*. Wait till 100 *Matrakala* (around 1 min)¹¹ After that *Kshara* wiped off with sterile cotton gauze. Then washed with *Nimbuswarasa* and observe for *Krishnavarnata* of *Vrana*. If it will not attain properly then the procedure repeats again till the *Samyaklakshana* of *Kshara Karma* will appear.

Paschatkarma: After washing with distilled water, *Shathadhoutha Ghrita* applied on the area where *Ksharakarma* done. After that dressing was done with loose bandage.

Group B: *Jaloukavacharana* was done on 20 patients of Group B.

Poorvakarma:

- 1) Preparation of patient for *Jaloukavacharana*.
- 2) Preparation of *Jalouka*.

Preparation of patient: Patient was made to lie down. The local area will be cleaned with distilled water using sterile gauze.

Preparation of *Jalouka*: The *Jaloukas* were anointed with the paste of *Sarshapachoorna*, *Haridrachoorna* and placed in a vessel containing water for a while, for refreshment and making it active.

Pradhanakarma: *Jaloukas* were applied to the site of *Dushtavrana* after rubbing the area with sterile cotton swab for making the area rough. If the *Jalouka* does not bite, then a sterile needle prick was made on the area. When *Jalouka* starts sucking blood it covered with a wet cotton pad. Number of *Jaloukas* used according to the size of the *Vrana* (2-4 *Jalouka*).

Paschatkarma of the patient: After the detachment of *Jalouka*, the bitten area was applied with *Shathadhoutha Ghrita* and loose bandage applied with sterilized cotton pad.

Paschatkarma of *Jalouka*: When *Jaloukas* leaves the area, its body was anointed with *Tandulachoorna* and mouth was smeared with *Tilataila* and *Saindhavachoorna*. The *Jalouka* was held by tail with left thumb and index finger, with the right thumb and index finger *Jalouka* was massaged from tail to mouth and vomiting was done. After vomiting it transferred to fresh water.

Assessment Criteria

Assessment of the condition was done based on a detailed proforma adopting different methods of scoring of subjective and objective parameters and was analysed statistically

Table 1: Subjective and Objective Parameters

| Subjective parameters | Objective parameters |
|---|--|
| <ul style="list-style-type: none"> • Pain • Odour • Itching • Burning sensation | <ul style="list-style-type: none"> • Size of ulcer (length, width, depth) • Discharge • Tenderness • Floor of ulcer • Surrounding area of ulcer |

Results

Table 2: Effect of treatment in Group A

| Signs & symptoms | Mean | | MD | % relief | SD | SE | t value | P value | Remarks |
|-------------------|------|------|------|----------|-------|-------|---------|---------|---------|
| | BT | AT | | | | | | | |
| Pain | 2.70 | 0.65 | 2.05 | 75.9 | 0.999 | 0.223 | 9.180 | <0.001 | HS |
| Burning sensation | 2.15 | 0.50 | 1.65 | 76.7 | 0.671 | 0.150 | 11.00 | <0.001 | HS |
| Itching | 1.95 | 0.40 | 1.55 | 79.4 | 0.826 | 0.185 | 8.396 | <0.001 | HS |
| Discharge | 2.25 | 0.35 | 1.90 | 84.4 | 0.641 | 0.143 | 13.262 | <0.001 | HS |
| Odour | 2.40 | 0.30 | 2.10 | 87.5 | 0.641 | 0.143 | 14.658 | <0.001 | HS |
| Tenderness | 2.80 | 0.60 | 2.20 | 78.5 | 0.768 | 0.172 | 12.815 | <0.001 | HS |
| Floor | 2.50 | 0.45 | 2.05 | 82.0 | 0.605 | 0.135 | 15.158 | <0.001 | HS |
| Length | 2.70 | 0.95 | 1.75 | 64.8 | 0.639 | 0.143 | 12.225 | <0.001 | HS |
| Width | 2.85 | 0.95 | 1.90 | 66.6 | 0.641 | 0.141 | 13.262 | <0.001 | HS |
| Depth | 2.55 | 0.80 | 1.75 | 68.6 | 0.716 | 0.160 | 10.925 | <0.001 | HS |
| Surrounding area | 2.80 | 0.70 | 2.10 | 75.0 | 0.553 | 0.124 | 16.998 | <0.001 | HS |

Table 3: Effect of treatment in Group B

| Signs & symptoms | Mean | | MD | % relief | SD | SE | t value | P value | Remarks |
|-------------------|------|------|------|----------|-------|-------|---------|---------|---------|
| | BT | AT | | | | | | | |
| Pain | 2.75 | 0.90 | 1.85 | 67.2 | 0.745 | 0.167 | 7.906 | <0.001 | HS |
| Burning sensation | 2.30 | 0.50 | 1.80 | 78.2 | 0.834 | 0.167 | 9.658 | <0.001 | HS |
| Itching | 2.35 | 0.45 | 1.90 | 80.8 | 0.788 | 0.176 | 10.782 | <0.001 | HS |
| Discharge | 2.40 | 0.65 | 1.75 | 73.0 | 0.639 | 0.143 | 12.254 | <0.001 | HS |
| Odour | 2.35 | 0.45 | 1.90 | 80.8 | 0.718 | 0.161 | 11.831 | <0.001 | HS |
| Tenderness | 2.85 | 0.80 | 2.05 | 71.9 | 0.826 | 0.185 | 11.105 | <0.001 | HS |
| Floor | 2.55 | 0.75 | 1.80 | 72.0 | 0.616 | 0.138 | 13.077 | <0.001 | HS |
| Length | 2.80 | 0.80 | 2.00 | 71.4 | 0.459 | 0.103 | 19.494 | <0.001 | HS |
| Width | 2.55 | 0.70 | 1.85 | 72.5 | 0.587 | 0.131 | 14.091 | <0.001 | HS |
| Depth | 2.50 | 0.70 | 1.80 | 72.0 | 0.523 | 0.117 | 15.387 | <0.001 | HS |
| Surrounding area | 2.45 | 0.55 | 1.90 | 77.5 | 0.410 | 0.098 | 19.615 | <0.001 | HS |

Table 4: Comparative effect of treatments between Group A & Group B

| Symptoms | BT- AT Mean | | Mean differ- ence | Standard deviation | | t Value | P value |
|-------------------|-------------|---------|----------------------|--------------------|---------|---------|---------|
| | Group A | Group B | | Group A | Group B | | |
| Pain | 2.050 | 1.850 | 0.200 | 0.999 | 0.745 | 0.718 | 0.477 |
| Burning sensation | 1.650 | 1.800 | 0.150 | 0.671 | 0.834 | 0.627 | 0.534 |
| Itching | 1.550 | 1.900 | 0.350 | 0.826 | 0.788 | 1.371 | 0.178 |
| Discharge | 1.900 | 1.750 | 0.150 | 0.641 | 0.639 | 0.742 | 0.463 |
| odour | 2.100 | 1.900 | 0.200 | 0.641 | 0.718 | 0.929 | 0.359 |
| Tenderness | 2.200 | 2.050 | 0.150 | 0.768 | 0.826 | 0.595 | 0.552 |
| Floor | 2.050 | 1.800 | 0.250 | 0.605 | 0.616 | 1.296 | 0.203 |
| Length | 1.750 | 2.000 | 0.250 | 0.639 | 0.459 | 1.422 | 0.163 |
| Width | 1.900 | 1.850 | 0.050 | 0.641 | 0.587 | 0.257 | 0.798 |
| Depth | 1.750 | 1.800 | 0.050 | 0.716 | 0.523 | 0.252 | 0.802 |
| Surrounding area | 2.100 | 1.900 | 0.200 | 0.553 | 0.553 | 1.145 | 0.259 |

By comparing the effects of both treatments, there is no statistical significant difference between the group A and group B.

Table 5: Comparative percentage relief between Group A & Group B

| Signs and symptoms | Percentage of relief | |
|--------------------|----------------------|---------|
| | Group A | Group B |
| Pain | 75.9% | 67.2% |
| Burning sensation | 76.7% | 78.2% |
| Itching | 79.4% | 80.8% |
| Discharge | 84.4% | 73% |
| Odour | 87.5% | 80.8% |
| Tenderness | 78.5% | 71.9% |
| Floor | 82% | 72% |
| Length | 64.8% | 71.4% |
| Width | 66.6% | 72.5% |
| Depth | 68.6% | 72% |
| Surrounding area | 75% | 77.5% |

DISCUSSION ON RESULTS

Effect of treatment on pain: -

Pain mainly due to infection destruction of the tissue, tension of tissue due to collection of pus and tough slough.

Vitiation of *Vatadi Doshas* elicit *Vedana* to the patient

Group A: The mean score reduced from 2.7 to 0.65 after treatment and the results were statistically significant. Here infections were reduced and pus collections were drained due to the *Chedana*, *Bhedana*, *Lekhana*, *Darana* properties of *Kshara* helps to reduce the pain by relieving the tissue tension **Group B:** The mean score reduced from 2.75 to 0.900 after treatment and the results were significant statistically. This may be probably due to *Jalaukavacharana* which removes the vitiated blood and locally increased *Doshas*, by that it reduced *Vrana Vedana*. And also leech saliva has an anesthetic agent that will also help in reducing the pain.¹²

Effect of treatment on burning sensation: -

In non- healing ulcers due to poor circulations there will be hypoxia to nerve endings that cause burning sensation.

*Pitta Dosh*a vitiation in *Dushtavrana* causes the burning sensation

Group A: The mean score reduced from 2.150 to 0.50 after treatment and the results were statistically significant. The removal of slough by *Lekhana*, *Shodhana*, *Pachana*, *Vilayana*, and *Theekshna* properties of *Kshara* improves the circulation to the area of ulcer reduce hypoxia, and reduces the burning sensation.

Group B: The mean score reduced from 2.30 to 0.500 after treatment and statistically significant. This may be probably due to the *Sheeta* and *Pittahara* properties of *Jalouka* which reduce the burning sensation.

Effect of treatment on itching: -

Due to infective organisms, dead tissues and presence of pus which vitiate *Kapha Dosh*a can cause severe itching

Group A: The mean score reduced from 1.95 to 0.40 after treatment and the results were statistically significant. This may be probably due to the *Lekhana*, *Shodhana* and *Shoshana* property of *Kshara* breaks up the concealed pus pockets present in the base or surrounding area of the ulcer, *Kshara* kills the infective organisms by its *Krimihara* property and there be reduces the itching. **Group B:** The mean score reduced from 2.35 to 0.450 after treatment and the results were statistically significant. This may be probably due to *Jalaukavacharana* which remove the vitiated blood and locally increased *Doshas*, by that it reduced *Vrana Kandu* and leech produce and antihistaminic protease

and bacteria-inhibiting substances which will also help in reducing itching¹².

Effect of treatment on Discharge: -

Group A: The mean score reduced from 2.250 to 0.350 after treatment and the results were statistically significant. This may be probably due to the *Shodhana, Lekhana, Shoshana Tridoshaghna* properties of *Kshara* improves the blood circulation and reduce inflammation and exudates. **Group B:** The mean score reduced from 2.40 to 0.650 after treatment and the results were statistically significant. The *Jalauka* is having *Pittahara* property that will reduce the *Srava* of the *Vrana*.

Effect of treatment on odour: -

Odour is mainly due to infected organisms, increased pus and slough tissues

Group A: The mean score reduced from 2.400 to 0.300 after treatment and the results were statistically significant. This may be probably due to the *Shodhana, Lekhana, Krimighna, Pachana* and *Tridoshaghna* properties of *Kshara* reduce the infections and by reduce the odour. **Group B:** The mean score reduced from 2.35 to 0.450 after treatment and the results were statistically significant. This may be probably due to *Jaloukavacharana* improves the microcirculation adjacent to *Vrana* that promote faster healing of ulcers. Leech saliva components like acetyl choline, carboxy peptidase A¹², all these acts on the vessels and increase the flow of blood to the site of *Vrana* which helps to produce new healthy granulation tissues and diminishes the pus and slough leads to the reduction of bad odour from ulcer.

Effect of treatment on tenderness

Tenderness is mainly due to infections and tissue tension by ulcer

Group A: The mean score reduced from 2.800 to 0.60 after treatment and the results were statistically significant. This may be probably due to *Chedana, Lekhana, Bhedana, Shodhana, and Tridoshagna* properties of *Kshara*, that reduce infections and then reduce tissue tension and tenderness. **Group B:** The mean score reduced from 2.85 to 0.80 after treatment and the results were statistically significant. This may

be due to the leech's saliva contains anti- inflammatory and anaesthetic agents that reduces the tenderness¹².

Effect of treatment on floor of ulcer:

Floor of the non - healing ulcers contains pale granulation tissue with profuse slough

Group A: The mean score reduced from 2.50 to 0.50 after treatment and the results were statistically significant. This may probably due to *Chedana, Kledahara, Vishada, Thridoshagna, Shodhana, and Ropana* properties of *Kshara* played a major role in scrapping out the debris and slough from the *Vrana*. **Group B:** The mean score reduced from 2.55 to 0.75 after treatment and the results were statistically significant. This may be probably due to *Jaloukavacharana* which drained out the vitiated blood and promote good circulation. Leech saliva components like acetyl choline, carboxy peptidase A¹², all these acts on the vessels and increase the flow of blood to the site of *Vrana* and promote granulation tissue formation.

SIZE OF THE ULCER:

Length of the Ulcer

Group A: The mean score reduced from 2.750 to 0.950 after treatment and the results were statistically significant. This may be probably due to the *Shodhana, Ropana, Shoshana* property of *Kshara* which provide an ideal environment for the healing by scrapping out the necrosed tissues and slough. **Group B:** The mean score reduced from 2.80 to 0.80 after treatment and the results were statistically significant. This may be probably due to the *Jaloukavacharana* which drained out the vitiated blood along with the locally increased *Doshas* and also the saliva of the leech contains chemical constituents like acetyl choline and carboxy peptidase A¹², which acts on vessels and improves microcirculation that promotes the healing.

Width of the Ulcer

Group A: The mean score reduced from 2.850 to 0.950 after treatment and the results were statistically significant. This may be probably due to the *Shodhana, Ropana, Shoshana* property of *Kshara* that provides an ideal environment for the healing. **Group B:** The mean score reduced from 2.550 to 0.700 after treatment. In this group the results were significant

statistically. This may be probably due to *Jaloukavacharana* which remove the vitiated blood then clear the locally increased *Doshas* also the saliva of leech contains chemical constituents like Carboxy peptidase A, that also help to increase the inflow of blood at the site of ulcer and helps in healing¹²

Depth of the Ulcer

Group A: The mean score reduced from 2.550 to 0.850 after treatment and the results were statistically significant. This may be probably due to the *Shodhana*, *Ropana*, *Vilayana* and *Medhaghna* properties of *Kshara* liquefies *Kapha* and *Meda* and thus doing *Srotoshodhana*, thus improvement in circulation to the affected part, which helps in healing. **Group B:** The mean score reduced from 2.500 to 0.700 after treatment and the results were statistically significant. This may be probably due to *Jaloukavacharana* which drained out the vitiated blood that will remove the locally increased *Doshas*, hence by promoting the fast healing

Surrounding Area of Ulcer

Group A: The mean score reduced from 2.800 to 0.70 after treatment and the results were statistically significant. This may be probably due to the *Darana* and *Shodhana* property of *Kshara* it breaks up the concealed pus pockets present in the base or surrounding area of the ulcer, by this it clears the infection and swelling. **Group B:** The mean score reduced from 2.450 to 0.550 after treatment and the results were statistically significant. This may be probably due to the *Pittahara* property of the leech that helps in reducing the *Vrana Shophya* and *Shodhana* of the *Vrana*. *Bdellins* and *eglin*s is a compound in leech's saliva that acts as an anti-inflammatory agent¹².

Discussion on comparative effect of both the group

Comparing both the groups there is no statistical significant difference between the groups in all criteria.

Discussion on comparative percentage relief of Group A and Group B

comparing percentage of relief between the group, criteria's like pain, discharge, odour, tenderness and floor of the ulcer, *Kshara* have better result than *Jaloukavacharana*, due to *ksharana*, *kshanana*,

Lekhana, *Darana*, *Tridoshagna*, *Shoshana* properties of *Kshara* scrapes out the all vitiated *Doshas* and puscells. It will give proper healing; reduce discharge, odour, and tenderness. And in criteria like burning sensation, itching, length, width, depth and surrounding area of ulcer *Jaloukavacharana* have better result than *Kshara*, it is due to *Pitta hara* qualities of *Jalouka* reduce burning sensation, *Jaloukavacharana* letting out the vitiated blood and improves the micro circulations it gives an over all effects in size of ulcer and betterments in surrounding area of ulcer.

CONCLUSION

Since old time to this 21st century humans are suffering from wounds in different ways from birth to death. Incidence of non-healing ulcers devastatingly high due to various traumas, pathological insult, infection, physical and chemical exposures and metabolic disorders. *Kshara* gives a fast debrding of the non-healing ulcers by its qualities like *Pachana*, *Deepana*, *Vilayana*, *Darana*, *Shoshana* and *Tridoshagnatwa* etc. which helps to attain immediate *Shodhana* and later promotes the *Ropana* of the *Dushtavrana*. *Jaloukavacharana* is a simple cost effective procedure gives good results by draining the *Dushta Rakta* and supporting the wound care by different kinds of salivary secretions like vaso dilators, histamines, anti-inflammatory chemicals. In this clinical study, both Group A and Group B showed highly significant result in all attributes of *Dushtavrana*. While comparing both the groups there is no statistical significance difference between the groups in all criteria, hence both the group have a significant effect on management of *Dushtavrana*

REFERENCES

1. S. Das, A Concise Text Book of Surgery, 7th edition, Kolkata, 2012, Page no: 157,158
2. Shubhangi Vinayak Agale, Review article on chronic leg ulcers: epidemiology, aetiopathogenesis, and management- <http://www.hindawi.com>- hindawi publishing corporation, ulcers, volume 2013, article ID 413604,

3. Yadavji Trikamji, sushruta Samhita with Nibandhasangraha Commentary of Dalhanacharya and Nyayachandrika Panchika of Gayadasa, Published by Chaukamba Krishnadas Academy, Varanasi, Reprint-2014, Sutra Sthana ,22nd chapter, Sloka no 07, Page no :108
4. Yadavji Trikamji, Sushruta Samhita with Nibandhasangraha Commentary of Dalhanacharya and Nyayachandrika Panchika of Gayadasa, Published by Chaukamba Krishnadas Academy, Varanasi, Reprint-2014, Chikitsa Sthana, 1st chapter,Sloka no: 08, Page no :397
5. Yadavji Trikamji, Sushruta Samhita with Nibandhasangraha Commentary of Dalhanacharya and Nyayachandrika Panchika of Gayadasa, Published by Chaukamba Krishnadas Academy, Varanasi, Reprint-2014, Sutra Sthana, 11th chapter, sloka no: 3, page no: 45
6. Yadavji Trikamji, Sushruta Samhita with Nibandhasangraha Commentary of Dalhanacharya and Nyayachandrika Panchika of Gayadasa, Published by Chaukamba Krishnadas Academy, Varanasi, Reprint-2014, Sutra Sthana, 11th chapter, sloka no: 4, page no: 45
7. Yadavji Trikamji, Sushruta Samhita with Nibandhasangraha Commentary of Dalhanacharya and Nyayachandrika Panchika of Gayadasa, Published by Chaukamba Krishnadas Academy, Varanasi, Reprint-2014, Chikitsa Sthana, 1stchapter, sloka no: 88, page no: 404
8. Hari Sadashiva Shastri, Ashtanga Hridaya Sanskrit text with commentaries Sarvanga Sundara Arunadatta and Ayurveda Rasayana tika of Hemadri annotated by Anna Moreshwar Kunte and Krishna Ramachandra Shastri. published by Varanasi, Chaukambha Sanskrit series office, Edition 2009, Sutra Sthana, chapter: 26, sloka 35 page no: 322
9. Yadavji Trikamji, Sushruta Samhita with Nibandhasangraha Commentary of Dalhanacharya and Nyayachandrika Panchika of Gayadasa, Published by Chaukamba Krishnadas Academy, Varanasi, Reprint-2014, Sutra Sthana, 13th chapter, sloka no: 4, page no: 55
10. Hari Sadashiva Shastri, Ashtanga Hridaya Sanskrit text with commentaries Sarvanga Sundara Arunadatta and Ayurveda Rasayana tika of Hemadri annotated by Anna Moreshwar Kunte and Krishna Ramachandra Shastri. published by Varanasi, Chaukambha Sanskrit series office, Edition 2009, Uttara Sthana, chapter: 25, sloka 25 page no: 866
11. Shankar. S, S.V Shailaja, Baidyanath Mishra, Shyamsundar Upadhyay.B.R “Clinical efficacy of Pratisaraneeya Kshara Karma on Dushtavrana(chronic ulcer)”- IJBIO- International Journal Of Bioassays, ISSN 3532-3535, Volume 3, Issue- 11, July- 2014
12. Abdulkader A.M, Ghavi A.M, Alaama.M, Awang.M, Merzouk A. Leech therapeutic applications. Indian J Pharma Sci, 2013, Mar, 75(2): 127- 137

Source of Support: Nil

Conflict Of Interest: None Declared

How to cite this URL: Sahl. M & Manjunatha Bhat: A Comparative Clinical Study Of Vasa Pratisaraneeya Kshara And Jaloukavacharana In The Management Of Dushtavrana (Chronic Ulcer). International Ayurvedic Medical Journal {online} 2019 {cited September, 2019} Available from: http://www.iamj.in/posts/images/upload/1470_1477.pdf