

# Study of the Efficacy of Ksharaplota in Dushtavrana w.s.r to Infected Wound

## Research Article

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### Abstract

*Vrana* (wound and ulcer) & process of healing is the soul of *Shalyatantra Chikitsa* (Surgical treatment). *Dushta Vrana* means getting vitiated by *Dosha* & hence *Dushta Vrana* or infected wound is characterized by bad smell, abnormal color with profuse discharge, severe pain and longer healing time. The severity of infected wounds and their vast range of etiologies, The treatment is cleaning & dressing the wound or it can be more extensive. It may require surgical intervention to close the wound and stabilize the patient. *Acharya Sushruta* defines *Kshara* as the substance possessing *Ksharana* and *Kshanan* properties. *Ksharaplota* formulation was selected and applied over the affected infected wound with the help of gauze piece. During the preparation of *Ksharaplota*, it is coated with *Snuhi kshira*, *Apamarga kshara* & *Haridra*. All these drugs are *Shodhana* & *Ropana*. It was observed that *Ksharaplota* has the properties as sustained release of drug, absorbs discharges, less painful & easily acceptable by the patient with excellent *Sodhana* & *Ropana Karma*. The clinical study has been done on 438 patients, selected randomly and divided in two groups. Group A 220 patients i.e. trial group, were treated with local application of *Ksharaplota*. The Group B 218 patients i.e. control group, were treated with Gold standard. The clinical assessment was done on the basis of clinical presentation of *Dushta Vrana*, (Infected wound) before and after the treatment. As grading used for assessment of parameters which were ordinal in nature, “Wilcoxon Signed Ranks test” was used for within the group assessment (i.e. before and after treatment of a group). For between the group assessment of parameters, Mann Whitney – U test was applied. We had tested hypothesis for each parameter and result was interpreted accordingly. The level of significance was kept at 5% (P=0.05). And the result of the present study found significant.

**Key Words:** *Dushtavrana, Ksharaplota, Vranakovida, Infected Wound, Alkaline Medicated Gauze.*

### Introduction

*Vrana* and *Shalyatantra* are two terms that are analogous to each other and therefore considered two sides of the same coin. *Vrana* & process of healing is the soul of *Shalyatantra*. Even in the definition of *Shalyatantra*, *Sushruta* emphasizes more on *Vrana vinishchiyartha* (1) which means *Vrana Nidana*, *Lakashana*, *Samprapti*, *Uapadrava* and *Chikitsa*. In the time of *Sushruta*, *Vranakovida* (2) was considered a type of super specialty for those who had expertise of diagnosis, prognosis & management of *Vrana* which therefore stimulated research scholars to gain expertise in management of *Vrana* with different skilful modalities (3).

*Dushta Vrana* means getting vitiated by *Dosha* & hence *Dushta Vrana* or infected wound is characterized by bad smell, abnormal colour with

profuse discharge, severe pain and longer healing time (4). *Dushta Vrana* or infected wounds are typically defined as cuts, lacerations, puncture, pathological in nature and cause damage to both skin & underlying tissues (5).

General treatment process for infected wound is cleaning, using sterile saline solution & extracting debris from the wound (6). An antibiotic gel is applied to prevent infection & then a sterile dressing is applied to keep the wound clean & protected. (7) Usually patient avoids surgical debridement due to pain, fear & psychological factors. Therefore there is scope for non surgical debridement modalities which are also known as parasurgical methods. *Acharya Sushruta* has mentioned *Kshara* (8) in *Anu-shastra*, *Upayantra*, *Agropaharaniya* and one of the *Upakram* of *Vrana*.

Local application of *Ksharakarma* i.e. *Pratisarana*. studies proved *Shodhana* & *Ropana* properties of *Kshara* in the management of *Dushta Vrana* but during procedure of application (*Avachuranan*), there are some drawbacks while applying *Kshara* as it cannot be spread uniformly, very painful while spreading due to direct exposure, it can be used only for short duration, procedure of *Kshara karma* requires help of instruments and intervention by skill full medical person, absences of *Vrana Strava Shoshana* (absorption of discharge & necrotic tissues) & also the

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procedure is not easily tolerable and acceptable. *Sushruta* has given number of dressing materials (9) eg. *Pichu*, *Plota*, *Kawalika* & *Vikeshika*. Among these *Pichu* is used not only to clean the *Vrana* but also to absorb the *Vranastrava* while *Kawalika* is used as dressing pad or just as to cover the wound. *Plota* (10) can be used to clean the *Vrana* as well as to cover the *Vrana*. It can also be used as *Varti* in those wounds or ulcers which are very deep to clean easily. In such wounds or ulcers *Plotavarti* removes all the debris hide inside the wounds or ulcers (11).

*Snuhi kshira*, *Apamarga kshara* & *Haridra* powder are used for the preparation of *Ksharasutra* (12) which is very popular throughout the world for the management of *Fistula* in ano for debridement of unhealthy granulation tissues. On the basis of excellent result shown by *Ksharasutra*, this formulation is selected and applied over the affected infected wound with the help of Alkaline medicated gauze piece. During the preparation of *Ksharaplota*, it is coated with *Snuhi kshira*, *Apamarga kshara* & *Haridra*. All these drugs are *Shodhana* & *Ropana* (13) in *Karma* that's why *Ksharaplota* is used for debridement or to remove unhealthy tissue and enhances formation of healthy granulation tissue to enhance quick normal epithelialization (14). In this regard it is important to note that a similar principal of healing has already been mentioned by *Dalhana* in *Nimbhandhasangraha* where *Dalhana* states that "After the purification (*Shodhana*) of wound there is no further need of treatment since the wound heals (*Ropana*) itself". (15)

It was observed that *Ksharaplota* has the properties as sustained release of drug, absorbs discharges, less painful & easily acceptable by the patient with excellent *Sodhana* & *Ropana* (16). Hence present study "Study The Efficacy Of *Ksharaplota* In *Dushta Vrana* w.s.r. to Infected Wound." was being conducted.

Thus in present study, an effort was made to establish the scientific validity of *Ksharaplota* in the management of *Dushta Vrana* and investigate its *Shodhana* (debridement) and *Ropana* (wound healing) properties.

## Materials and Methods

### Materials for trial group (A)

- *Ksharaplota*
- Bandage

### Preparation of *Ksharaplota* (17)

*Ksharaplota* was prepared at the Institute's department of *Shalyatantra* Following were the materials used for *Ksharaplota* preparation.

- *Snuhikshira* (*Euphorbia nerifolia*)
- *Apamarg Kshara* (*Achyranthusaspera*)
- *Haridra churna* (*Curcuma longa*)
- Single layer Gauze piece
- Wooden Ring
- Cabinet

### *Snuhi kshira* (18)

It was collected by taking an incision over the stem of *Snuhi* plant. The secreted milk (*Kshir*) was collected and stored in a pot. As *Snuhi Kshira* has a tendency to coagulate early, hence every time fresh *Snuhi Kshira* was taken.

### *Apamarga Kshara* (19)

Whole *Apamarga* plant was to be taken and cut in pieces, after drying the plant in shade It was burned in light fire and ash was collected. The ash was dissolved in water, in the ratio 1:6. i.e.1 part ash and 6 parts water. The solution, so formed was filtered with the help of percolator. Residual ash was again dissolved in 4 parts of water and the same procedure was repeated at least twice in order to take away all the alkaline material from the ash. Ultimately, the ash remains as a neutral residue, which should be thrown, the fluid was filtered several times (filtering once in a day) and finally, the *Apamarga Kshara* was obtained by evaporating the filtered solution.

### *Haridra* (20)

Dry rhizomes of *Haridra* Plant were cut into pieces and powdered which was then sieved through a fine cloth. The fine powder thus obtained was stored in clean and sterile container.

### Gauze Piece

According to *Sushruta*, gauze piece is similar to *plota*. It is a piece of woven surgical wool. A single layer gauze piece was used over a circular wooden ring having diameter of 23 cm to obtain the required *Ksharaplota*.

### Wooden ring

A structure of double ring was used to hold the gauze piece. With the help of this ring, gauze piece was held tightly so that coating of *Snuhi kshira*, *Apamarga kshara* & *Haridra* was made very easy & effective.

### Cabinet (21)

It was used for drying the *Ksharaplota*. The prepared *Ksharaplota* on wooden rings was kept in a air tight cabinet for drying, sterilization & storage purpose.

### *Ksharaplota* preparation

A Round gauze piece, 23 cm in diameter was fixed over the doubled layered circular wooden ring. This gauze piece was made so tight that the coating can be done uniformly. Initially on 1<sup>st</sup> day 50 ml *Snuhikshira* was applied with the help of small cotton swab over the gauze on its entire circumference. The wet coated gauze with rings was placed inside the cabinet for drying for 1 day. On 2<sup>nd</sup> day dried gauze was again smeared with 50ml *Snuhikshira* followed by 20 gms of *Apamargakshara* This was again dried in the cabinet for a day. On 3<sup>rd</sup> day dried gauze was again smeared with 50 ml *Snuhikshira* followed by 20 gms *Haridra churna*. The prepared gauze was kept in the cabinet for drying (22).

In this way the Ksharaplota was prepared having coating each of *Snuhikshira* (150 ml) *Apamargakshara* (20 gms.) & *Haridra churna* (20 gms.). The prepared *Ksharaplota* is then cut into 6 x 6 cm. pieces and sealed in sterile polythene packs. *Ksharaplota* should be preferably kept in the cabinet for safety storage as well as sterilization.

### Materials for Control Group (B)

- Normal Saline (N.S)
- Hydrogen Peroxide Solution(H<sub>2</sub>O<sub>2</sub>)
- Chlorinated Lime Water Boric Acid Solution (Eusol)
- Povidine - Iodine 0.5%w /v available Povidine (Betadine)
- Sterile Pad
- Bandage

### Inclusion Criteria

- Patients having sign & symptoms of *DushtaVrana* w.s.r.to traumatic lacerated infected wound over extremities.
- Within size upto length 6 cm.and breadth 6 cm.
- Patients of either sex will selected.
- The patients between the age group of 16-70 years.

### Exclusion Criteria

- Anaemic patient Hb<10 gm %.
- Malnourish patient( As per age, height & weight proportion.)
- Bleeding disorders( Increased B.T & C.T)
- Patient in septicemia
- The patients suffering from systemic disease such as AIDS, Tuberculosis, Diabetes mellitus, Hepatitis-B, Malignancy, Vericose ulcer, Deep vein thrombosis, Arterial ulcer, Neurogenic ulcer, Leprosy, Pregnancy, Acute & Chronic renal failure, Jaundice & cirrhosis of liver.

### Laboratory investigations

- Hemoglobin percentage
- Total WBC count.
- Differential count.
- Erythrocyte sedimentation rate
- Platelet count
- B.T & C.T
- Blood sugar level.
- Tridot test.
- Hepatitis –B (HbsAg)
- Sr. Creatinine.
- Urine sugar.
- Urine albumin.
- Urine microscopic examination.

### Criteria of Assessment

#### Pain

Assessment will be done by Visual Analog Scale.

#### Daha(Burning Sensation)

Assessment will be done by Visual Analog Scale.

#### Kandu (Itching)

Assessment will be done by Visual Analog Scale.

Grade	Description
<b>Amount of Srava (Discharge)</b>	
0	No <i>Strava</i> / Dry Dressing
1	Gauze is slight moist
2	After opening the bandage gauze is completely wet
3	Bandage is completely moist within 24 hours but no need to change the dressing
4	Bandage is completely moist within 24 hours and bandage is to be changed
<b>Consistency of Srava (Discharge)</b>	
0	Absent
1	Prulent
2	Mucopurulent
3	Scanty
4	Copious
<b>Gandha (Malodor)</b>	
0	Non Existence
1	Minimum Bad Smell
2	Mild Bad Smell
3	Unpleasant Smell but tolerable
4	Foul smell which is intolerable
<b>Wound Floor (Bed)</b>	
0	Smooth Regular Floor and healthy granulation tissue
1	Smooth regular floor with slight discharge with absence of slough
2	Smooth irregular, slight discharge, less granulation tissue and presence of slough
3	Rough floor and presence of slough with moderate discharge
4	Rough irregular floor with more slough and profuse discharge
<b>Tenderness</b>	
0	No tenderness
1	Tenderness on palpation
2	Tenderness on touch
3	Unable to touch

#### Wound Area

- Surface area of wound measured by graph paper
- Healed Surface Area = x
- Actual Surface Area of wound on day 0 = A<sub>0</sub>
- Unhealed surface area remained on last day = A<sub>L</sub>
- X = A<sub>0</sub> - A<sub>L</sub>
- Percentage of Healed Wound Area = ( X / A<sub>0</sub> ) x 100

#### Unit Healing Time

(Total number of days during Treatment) / (A<sub>0</sub> - A<sub>L</sub>)



## Overall result

Class	Percentage of improvement (Total relief in symptoms)
Cured	75-100 %
Markedly improved	50-74 %
Moderately Improved	25-49 %
Not Improved (Unchanged)	00-24 %

### Trial group (A) - Ksharaplota

- In this group the infected wound was washed with normal saline.
- Then the *Ksharaplota* was kept and bandaged with sterile dressing once in a day.
- On next day the *Ksharaplota* was changed.
- This procedure was done till the appearance of *Shuddha Vrana Lakshanas* or upto 14 days whichever was early.

### Control group (B) - Application of H<sub>2</sub>O, Eusol, Povidine

- In this group the infected wound was washed with Normal Saline.
- A local application of H<sub>2</sub>O<sub>2</sub>, Eusol, Povidine sequentially was then applied once in a day & properly bandaged with sterile dressing.
- On the next day same procedure was repeated till the appearance of *Shuddha Vrana Lakshanas* or upto 14 days whichever was early.
- After 14 days or on attaining *Shudhda Vrana Lakshanas* (Sign of healing wound ) further management for both groups (Trial & Control) will be only Normal Saline dressing followed by sterile bandaging which should done on alternate day till complete epithelialization was seen or for 1 month whichever was early.

Table No. 1

Sr. No.	Particulars	Trial Group (A)	Control Group (B)
1	Drug	<i>Ksharaplota</i>	H <sub>2</sub> O, Eusol, Povidine
2	Route	Local	Local
3	Frequency	Once Daily	Once Daily
4	Duration	14 Days or till appearance of <i>Shuddha Vrana Lakshanas</i>	14 Days or till appearance of <i>Shuddha Vrana Lakshanas</i>
5	Sample size	220	218

## Observation of the Study

### Gender

Out of 218 patients in control group, 118 (54.13%) were male and 100 (45.87 %) patients were female. In trial group, out of 220 patients 116 (52.73%) patients were male while 104 (47.27%) were female.

The Age group of the selected cases for the study was 16-70 years divided into 4 age groups viz. 16-30 years, 30-45 years, 45-60 years and Above 60 years. Majority of the 241 cases i.e. 55% were between the age group of 30-45 years. In control group, out of 218 patients, 116 (53.21%) were from 30 to 45 years, 60 (27.52%) patients were from age group 16 to 30 years, 40 (18.35 %) patients from 45 to 60 years while 02 (00.92 %) belongs to age group 60 years & above. In trial group, out of 220 patients, 125 (56.82%) were from 30 to 45 years, 53 (24.09%) patients were from age group 16 to 30 years, 40 (18.18 %) patients from 45 to 60 years while 02 (00.91 %) belongs to age group 60 years & above.

### Marital status

Regarding marital status, from control group, out of 218 patients, 159 (72.94%) were married while 59 (27.06 %) were unmarried. Similarly from trial group, out of 220 patients 161(73.18%) were married while 59 (26.82%) were unmarried.

### Religion

Regarding religion wise distribution of cases from control group, out of 218 patients, 187 (85.78%) were Hindu, 14(06.42%) were Muslim, 11 (05.05 %) patients from Christian religion while 06 (02.75 %) belongs to Buddha. Similarly from trial group, out of 220 patients, 189 (85.91%) were Hindu, 13( 5.91%) were Muslim, 11 (05.00 %) patients from Christian religion while 07 (03.18 %) belongs to Buddhist community. Thus maximum patients belonged to Hindu religion which might be due to the dominance of Hindu religion in the society.

### Socio-economic status

In control group, out of 218 patients, 139 (63.76%) patients were from middle class, 35(16.06%) were from rich class, while 44 (20.18 %) belonged to poor class. Similarly in trial group, out of 220 patients, 143 (65%) patients were from middle class, 34(15.45%) were from rich class, while 43 (19.55 %) belongs to poor class Thus, maximum patients belonged to middle class.

### Educational status

In control group, out of 218 patients, 45 (20.64%) patients were illiterate, 63(28.90%) had primary education, 93 (42.66 %) patients completed their graduation while 17 (07.80 %) had done their post graduation. From trial group, out of 220 patients, 44 (20.00%) patients were illiterate, 62(28.18%) had primary education, 97 (44.09 %) patients completed their graduation while 17 (07.73 %) completed their post graduation.

### Occupation

In control group, out of 218 patients, 41 (18.80%) patients were students, 28 (12.84%) were labour, 27(12.39 %) patients were government employee, 38 (17.43 %) were from agricultural field, 46 (21.10%) were house wives, 19 (08.72 %) patients were

farmers while 19 (08.72 %) belonged to other occupations. From trial group, out of 220 patients, 44 (20%) patients were students, 27 (12.27%) were labour, 28(12.73 %) patients were government employee, 38 (17.27 %) were from agricultural field, 41 (18.64%) were house wives, 24 (19.91 %) patients were farmer while 18 (08.18 %) belonged to other occupations.

**Sleep**

In control group, out of 218 patients, 138 (63.30%) patients had good sleep, 51(23.39%) were had sound sleep, while 29 (13.30 %) were had disturbed sleep. In trial group, out of 220 patients, 139(68.18%) patients had good sleep, 53(24.09%) had sound sleep, while 28 (12.73 %) were having disturbed sleep.

**Deha prakruti**

In control group, out of 218 patients, 83 (38.07%) patients were of *Vata-pittaj prakruti*, 91(41.74%) were of *Kapha-pittaj prakruti*, while 44(20.18 %) were having *Vata-kaphaj prakruti*. In trial group, out of 220 patients, 88 (40%) patients were of *Vata-pittaj prakruti*, 88(40%) were having *Kapha-pittaj prakruti*, while 44(20 %) had *Vata-kaphaj prakruti*.

**Manas Prakruti**

In control group, out of 218 patients, 104 (47.71%) patients were having *Rajasik prakruti*,

114(52.29%) were having *Tamasik prakruti*, while no patient belonged to *Satvik prakruti*. In trial group, out of 220 patients, 106 (48.18%) patients were having *Rajasik prakruti*, 114(51.82%) were having *Tamasik prakruti*, while no patient belonged to *Satvik prakruti*.

**Sarata**

In control group, out of 218 patients, 25(14.47%) patients were having *Pravara sarata*, 121(55.50%) had *Madhya sarata*, while 72 (33.03%) patients had *Avar sarata*.

In trial group, out of 220 patients, 26(11.82%) patients had *Pravara sarata*, 123 (55.91%) had *Madhya sarata*, while 71 (32.27%) patients had *Avar sarata*.

**Result of the Study**

As grading used for assessment of parameters which were ordinal in nature, “Wilcoxon Signed Ranks test” was used for within the group assessment (i.e. before and after treatment of a group). For between the group assessment of parameters, Mann Whitney – U test was applied.

We had tested hypothesis for each parameter and result was interpreted accordingly. The level of significance was kept at 5% (P=0.05). Proper summary statistics like mean, mean difference, median difference were provided along with graphs and diagrams.

**Table 2: Effect on Vedana**

Vedana	Mean Score			Median Difference	Sample size	Wilcoxon signed rank test (T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	7.546	3.959	3.587	4	218	(T+)=23871 (T-)=0	P<0.0001	Extremely significant
Trial Group	7.568	3.955	3.614	4	220	(T+)=24310 (T-)=0	P<0.0001	Extremely significant

**Table 3: Effect on Daha**

Daha	Mean Score			Median Difference	Sample size	Wilcoxon signed rank test	P value	Inference
	BT	AT	Diff.					
Control Group	6.977	3.867	3.110	3	218	(T+)=23871 (T-)=0	P<0.0001	Extremely significant
Trial Group	6.982	3.877	3.105	3	220	(T+)=24310 (T-)=0	P<0.0001	Extremely significant

**Table 4: Effect on Tenderness**

Tenderness	Mean Score			Median Difference	Sample size	Wilcoxon signed rank test (T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	2.564	0.9725	1.592	2	218	(T+)=23871 (T-)=0	P<0.0001	Extremely significant
Trial Group	2.564	1.014	1.550	2	220	(T+)=24090 (T-)=0	P<0.0001	Extremely significant

**Table 5: Effect on Kandu**

Kandu	Mean Score			Median Difference	Sample size	Wilcoxon signed rank test (T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	1.99	0.9725	1.018	1	218	(T+)=23871 (T-)=0	P<0.0001	Extremely significant
Trial Group	1.986	0.9682	1.018	1	220	(T+)=23871 (T-)=0	P<0.0001	Extremely significant

**Table 6: Effect on Discharge**

Discharge	Mean Score			Median Difference	Sample size	Wilcoxon signed rank test (T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	2.408	0.6697	1.739	2	218	(T+)=23871 (T-)=0	P<0.0001	Extremely significant
Trial Group	2.41	0.6727	1.736	2	220	(T+)=24310 (T-)=0	P<0.0001	Extremely significant

**Table 7. Effect on Gandha**

Gandha	Mean Score			Median Difference	Sample size	Wilcoxon signed rank test (T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	2.092	0.01376	2.078	2	218	(T+)=23871 (T-)=0	P<0.0001	Extremely significant
Trial Group	2.091	0.01364	2.077	2	220	(T+)=24310 (T-)=0	P<0.0001	Extremely significant

**Table 8: Effect on Wound floor bed**

Wound floor	Mean Score			Median Difference	Sample size	Wilcoxon signed rank test (T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	2.986	0.0092	2.98	3	218	(T+)=23871 (T-)=0	P<0.0001	Extremely significant
Trial Group	2.991	0.0091	2.982	3	220	(T+)=24310 (T-)=0	P<0.0001	Extremely significant

**Table 9: Effect on Consistency of discharge**

Consistency of Discharge	Mean Score			Median difference	Sample size	Wilcoxon signed rank test(T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	2.99	0.0092	2.965	3	218	(T+)=10296 (T-)=0	P<0.0001	Extremely significant
Trial Group	2.991	0.0091	2.98	3	220	(T+)=24310 (T-)=0	P<0.0001	Extremely significant

**Table 10: Effect on Wound Area**

Wound Area	Mean Score			Median Difference	Sample size	Wilcoxon signed rank test (T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	2.266	0.9862	1.28	1	218	(T+)=23871 (T-)=0	P<0.0001	Extremely significant
Trial Group	2.268	0.9909	1.277	1	220	(T+)=24310 (T-)=0	P<0.0001	Extremely significant

**Table 11. Unit Healing Time**

Unit Healing Time	Mean Score			Median Difference	Sample size	W i l c o x o n signed rank test (T Value)	P value	Inference
	BT	AT	Diff.					
Control Group	1.995	0.9862	1.009	1	218	(T+)=23653 (T-)=0	P<0.0001	Extremely significant
Trial Group	1.99	1.005	0.99	1	220	(T+)=23871 (T-)=0	P<0.0001	Extremely significant

**Overall Result**

**Table No. 12: Showing the overall result**

Overall Effect	Control Group	Trial Group	Number Of Patients	%
	Number Of Patients	%		
Cured	1	0.46	0	0
Markedly improved	217	99.54	220	100
Moderately improved	0	0	0	0
Not improved (Unchanged)	0	0	0	0
<b>TOTAL</b>	<b>218</b>	<b>100</b>	<b>220</b>	<b>100</b>

From control group out of 218 patients in the study 1 patient i.e.(0.46%) was totally cured while 217 i.e.(99.54%) patients were had marked improvement in their complaints. Similarly from trial group out of 220 i.e.(100%) patients, had marked improvement in their complaints.

**Discussion**

*Ksharaplota* composed of *Snuhi* & *Apamaraga* has *Ksharan* and *Kshanan* properties, *Apamargakshara* also cauterize tissue by its *Ksharana Guna* while *Haridra* offers *Krimighana* & *Ropana* properties thus provides *VranaShodhana* & *VranaRopana* effect. Chemical properties of *Ksharaplota* remove unhealthy tissue and alkaline nature of *Kshar* offers aseptic and antimicrobial effect thus reduces chance of secondary infection. *Snuhi* component of *Ksharaplota* provides moisturizing effect due to its sticky property which ultimately promotes epidermal migration resulting enhanced synthesis of connective tissue. The *Snuhi* latex having binding property therefore retains surgical benefits (debridement, scrapping, hemostatic, aseptic, antiseptic and healing effect) of *Apamargakshara* for longer time. *Snuhikshira*, *Apamargakshara* and *Haridra* support biological action of each other and not contraindicated when applied together. Sustained release action of *Ksharaplota* medication releases ingredient slowly and make available medicine for longer duration to achieve complete healing of chronic wound.

*Ksharaplota* overall possess penetrating, scrapping, draining, debridement, sclerosing, healing, antibacterial and anti inflammatory effect in the management of wound and cuts. All three ingredients contribute significantly towards mode of action as follows ( 23 ).

*Snuhi* (Latex of *Euphorbia nerifolia*) *Kshira* possess properties such as; *Lekhana*, *Vedanasthapana*, *Rakthashodhak* and *Vishaghana* due to *Katu* & *Tikshana Rasa* and *Ushna Virya*. The latex of plant also found to have rubifacient, irritant and powerful caustic

action when applied to a raw surface; it also offers analgesic, anti-inflammatory, wound healing and antibacterial activity. It is believe that *Euphorbia nerifolia* enhances wound healing process by promoting tensile strength, epithelization and angiogenesis.

*Apamarga* (*Achyranthus aspera*) *Kshara* offers *Lekhana*, *Chedana*, *Bhedana*, *Ropana*, *Kushtaghna*, *Shodhana* and *Krumighana* properties due to *Katu* & *lavana Rasa* and *Ushna Virya*. *Katu Rasa* contributes towards *Shonit*

*Sanghat Bhinnati* action of *Apamarg Kshara* which breakdown pus pockets and blood clots at the site of *Vrana*. *Apamarg Kshara* also possesses analgesic, antiinflammatory, hemostasis and antibacterial activity which offers symptomatic relief in *Vrana*.

*Tikta* & *Laghu Guna* and *Ushanya Virya* of *Haridra* (*Curcuma longa*) provides *Varnya*, *Sandhana*, *Vedanashamaka*, *Raktastambak*, *Raktashuddhikar* and *Lekhana* properties. It enhances capillaries vasodilation when applied locally thus facilitates wound debridement (*Shodhana*) and wound healing (*Ropana*) process. It also possesses anti-inflammatory, analgesic and antibacterial activity.

**Conclusion**

- *Ksharaplota* proved significantly effective in reducing *Vrana Vedena*, *Vrana Daha*, *Vrana Kandu*, *Vrana Srava* and *Vrana Shotha*.
- *Ksharaplota* showed satisfactory outcome in healing of wound as compared to H<sub>2</sub>O<sub>2</sub> + Eusol + Povidone application.
- The aim of the study was to assess the efficacy of *Ksharaplota* in the management of *Dushta Vrana* with the objective to give relief to patients of *Dushta Vrana* having sysmptoms like *Vrana Vedena*, *Srava*, *Kandu*, *Daha Shotha*. This objective was achieved both clinically and statistically.
- On the other hand *Ksharaplota* achieved statistically significant efficacy over modern Gold



standard drugs used for dressing like H<sub>2</sub>O<sub>2</sub> + Eusol + Povidone.

- Therefore it can be concluded that (Ksharaplota) is the effective with benefit of cost, free from hazard, easy procedure and tolerable to the patient
- Ksharaplota can be useful as first choice among Para surgical procedure in the management of *Dushta Vrana* (infected wound).

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