



ISSN 2456-3110

Vol 2 · Issue 6

Nov-Dec 2017

Journal of **Ayurveda and Integrated Medical Sciences**

www.jaims.in

JAIMS



Charaka
Publications

Indexed

A Clinical Study on *Vrana Shodhana* Action of *Gomutra Arka* in *Dushtavrana* w.s.r. to Diabetic Foot Ulcer

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ABSTRACT

Context: The diabetic foot ulcer, being chronic in nature involves various tissues, it can be considered as *Dushtavrana* in Ayurveda. Proper Care for diabetic foot with medication and procedures that has hastened the healing process with less complication is the need of the hour. **Aim:** To evaluate the *Vrana Shodhana* action of *Gomutra Arka* in *Dushtavrana* w.s.r. to diabetic foot ulcers. **Settings and Design:** It is a clinical study with pre-test and post-test design. Total number of patient's taken for the study was 40 excluding dropouts. The patients selected for the study were divided in to 2 groups, Group-A and Group-B, consisting of 20 patients each. **Materials and Methods:** The wound is examined, exudates, debris, slough were removed, the surrounding area was cleaned and pad soaked in *Gomutra Arka* was placed and wound dressing was done once in a day. Duration of study was 45 days or till the formation of granulation tissue whichever is earlier, assessment was done every 7 days. For healing *Jatyadi Taila* was applied after the *Shodhana Kriya* with *Gomutra Arka*. **Conclusion:** *Gomutra Arka* was having good results in reducing burning sensation, itching, smell, size, depth, discharge, edge, floor and presence of granulation tissues compared to Betadine. Both drugs have equal effect in reducing pain. Both drugs have *Shodhana*, *Lekhana* properties, hastens the wound healing process which helps in reduction of wound size. It can be concluded that *Gomutra Arka* application is effective in all types of Diabetic foot ulcer by their faster, effective *Shodhana*, *Lekhana*, *Vedana Shamaka*, *Kandu Shamaka*, *Daha Shamaka* properties compared to Betadine.

Key words: *Dushta Vrana*, *Diabetic foot ulcer*, *Gomutra Arka*, *Betadine*, *Jatyadi Taila*.

INTRODUCTION

The diabetic foot may be defined as a group of syndromes in which neuropathy, ischaemia, infection lead to tissue breakdown resulting in morbidity and possible amputation.^[1]

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Submission Date : 27/09/2017 Accepted Date: 24/10/2017

Access this article online

Quick Response Code



Website: www.jaims.in

DOI: 10.21760/jaims.v2i06.10920

The diabetic foot ulcer, being chronic in nature and with involvement of various tissues, can be considered as *Dushtavrana*.^[2] Proper Care for diabetic foot with medication and procedures that have hastened the healing process with fewer complications is the need of the hour.

The use of *Arka* in *Vrana* is mentioned in Ayurveda.^[3] *Krimihara* property of *Gomutra* is also mentioned by Charaka.^[4] Thus to evaluate the *Vrana Shodhana* action of *Gomutra Arka*^[5] in *Dushtavrana*, this study was being carried out.

MATERIALS AND METHODS

Twenty patients diagnosed as suffering from Diabetic foot ulcer fulfilling inclusion criteria were randomly selected from O.P.D.

Study Design

A clinical study in comparison with a control group, with pre-test and post-test design was done on 40 patients suffering from diabetic foot ulcer selected as per the criteria mentioned in assessment criteria. The patients enrolled in the study were divided into 2 groups - a) Study Group; b) Control Group, each comprising of 20 patients each. The signs and symptoms and other parameters, as per the assessment criteria were observed before and after the treatment and the results of the two groups were compared, analyzed statistically and discussed.

Inclusion criteria

- Patients with clinical features of diabetic foot ulcer having diagnosed diabetes mellitus type two.
- Age below 60yrs
- Sex- both male and female.
- Diabetic foot ulcer with minimum H/O 7 days.

Exclusion criteria

- Patients with diabetic foot ulcer with HbA_{1c} level above 7.5.
- Malignant ulcers.
- Ulcer with signs of gangrene.
- HIV & HBsAg +ve.
- Patient with any signs and symptoms of Osteomyelitis.
- Ulcer in which bone is visible to the naked eye.

Diagnostic criteria**Subjective Parameters**

- Pain.
- Burning sensation.
- Itching.
- Smell.

Objective parameters

- Size.

- Depth.
- Discharge.
- Edge.
- Floor and granulation tissue.

Procedure of administration of drug**Treatment Regimen**

Dressing with the application of *Gomutra Arka* pad under aseptic precautions in study group and Betadine pad in control group. Application of *Jatyadi Taila* in both groups for healing.

Procedure

- A. *Poorvakarma*
- B. *Pradhana Karma*
- C. *Paschat Karma*.

Poorvakarma

The procedure adopted was (for both the Groups)

1. *Vrana* was exposed properly
2. Examination and assessment of features of wound during each visit.
3. Debridement of wound was done with swab.
4. The wound was cleaned in each case prior to application of the said medicaments in both the groups.
5. *Prakshalana* was done with Normal saline water (*Lavanodaka*).
6. Wound was kept dry.

Pradhana Karma

For group A - *Gomutra* pad alone applied over wound area (sufficient quantity)

For group B - Betadine pad alone applied over wound area (sufficient quantity)

Paschat Karma

Vrana Bandha (bandaging) is done with sterile gauze piece.

Though bandaging is contraindicated in some of the *Vranas*, it was done to prevent contamination from the surroundings and to protect the part from external trauma and to keep the medicament on the lesion for longer duration. Depending upon the quantity of oozing, pain and smell, dressing was done daily.

All the patients in both the Groups were requested to take light prescribed diabetic diet and to keep the wound in resting position and to keep it dry as far as possible. Treatment was given for 45 days, once in 7 days follow-up for 3 months was done.

During this period keen observations were made for *Vrana Vedana, Kandu, Daha, Vrana Varna, Vrana Srava*, Granulation tissue, Area of wound etc. and were immediately noted down on their respective research proforma papers.

Assessment criteria

Subjective Parameters

- Pain.
- Burning sensation.
- Itching.
- Smell.

Objective parameters

- Size.
- Depth.
- Discharge.
- Edge.
- Floor and granulation tissue.

STATISTICAL ANALYSIS

For assessing the improvement of symptomatic relief and to analyze statistically the observations were recorded before starting the treatment, during the course of treatment i.e. every 7th day, after the treatment (i.e. 45 day) and after follow-up period (i.e. on the 90th day of treatment). The mean, percentage, S.D, S.E, and t-value (unpaired t-test), p-value were calculated from the observation recorded. The total result including the overall effect of therapy is given in tabular form for the present study.

RESULTS

Statistical results were analyzed within Group A and Group B, patients with Diabetic Foot Ulcer before, after treatment and after follow-up was done.

Total 40 patients were registered for this study. Out of that all 40 patients were studied in this project. 20 patients were in group A while 20 were in B group. Each patient was observed thoroughly and noted neatly. The observations are recorded and necessary table and charts were made. Photograph of the Diabetic Foot Ulcer before and after the treatment was taken and observed thoroughly.

Table 1: Effect of Group - A on Signs and Symptoms.

Signs and Symptoms	Mean Score				SEM (+-)	t	p
	BT			Mean Difference			
Pain	2.45	AT1	0.55	1.9	0.1141	11.77	<0.0001
		AT2	0.35	2.1	0.1094	13.28	<0.0001
		AT3	0.2	2.25	0.09177	15.36	<0.0001
		AF1	0.1	2.35	0.06882	17.63	<0.0001
		AF2	0.1	2.35	0.0688	17.63	<0.0001
Burning Sensation	0.9	AT1	0.55	0.35	0.1141	2.626	0.0124
		AT2	0.2	0.7	0.09177	6.102	<0.0001
		AT3	0.05	0.85	0.05000	9.992	<0.0001
		AF1	0.05	0.85	0.05000	9.992	<0.0001
		AF2	0.05	0.85	0.05000	9.992	<0.0001
Itching	0.8	AT1	0.4	0.4	0.1124	2.757	0.0089
		AT2	0.2	0.6	0.09177	4.623	<0.0001
		AT3	0.0	0.75	0.050	7.17	<0.0001

			5		0	7	01
		AF1	0.05	0.75	0.0500	7.177	<0.0001
		AF2	0.05	0.75	0.0500	7.177	<0.0001
Smell	1.3	AT1	0.4	0.9	0.1124	5.290	<0.0001
		AT2	0.15	1.15	0.08192	7.579	<0.0001
		AT3	0.15	1.15	0.08192	7.579	<0.0001
		AF1	0.15	1.15	0.08192	7.579	<0.0001
		AF2	0.15	1.15	0.08192	7.579	<0.0001
		AT1	0.7	0.85	0.1469	4.569	<0.0001
		AT2	0.2	1.35	0.9177	9.218	<0.0001
Size	1.55	AT3	0.1	1.45	0.06882	10.88	<0.0001
		AF1	0.05	1.5	0.0500	12.04	<0.0001
		AF2	0.05	1.5	0.0500	12.04	<0.0001
		AT1	0.5	0.8	0.1357	4.660	<0.0001
		AT2	0.3	1	0.1051	6.726	<0.0001
Depth	1.3	AT3	0.2	1.1	0.09177	7.883	<0.0001
		AF1	0.15	1.15	0.08192	8.629	<0.0001
		AF2	0.1	1.2	0.06882	9.550	<0.0001
		AT1	0.5	1.05	0.1357	5.921	<0.0001
		AT2	0.4	1.15	0.1124	7.179	<0.0001
Discharge	1.55	AT3	0.4	1.15	0.1124	7.179	<0.0001
		AF1	0.4	1.15	0.1124	7.179	<0.0001

		AF2	0.4	1.15	0.1124	7.179	<0.0001
Edge	0.9	AT1	0.15	0.75	0.08192	4.160	<0.0001
		AT2	0.1	0.8	0.06882	4.579	<0.0001
		AT3	0.05	0.85	0.0500	5.054	<0.0001
		AF1	0.05	0.85	0.0500	5.054	<0.0001
		AF2	0.05	0.85	0.0500	5.054	<0.0001
		AT1	0.4	1.35	0.1124	6.899	<0.0001
		AT2	0.1	1.65	0.0688	9.464	<0.0001
Floor	1.75	AT3	0.1	1.65	0.0688	9.464	<0.0001
		AF1	0.05	1.7	0.0500	10.13	<0.0001
		AF2	0.05	1.7	0.0500	10.13	<0.0001
		AT1	0.2	1.7	0.09177	9.191	<0.0001
Granulation Tissue	1.9	AT2	0.1	1.8	0.06882	10.30	<0.0001
		AT3	0.05	1.85	0.0500	10.99	<0.0001
		AF1	0.05	1.85	0.0500	10.99	<0.0001
		AF2	0.05	1.85	0.0500	10.99	<0.0001
Podiatric Study	1.5	AT1	1.35	0.15	0.3424	0.309	0.7590
		AT2	0.35	1.15	0.1094	3.185	0.0029
		AT3	0.35	1.15	0.1094	3.185	0.0029
		AF1	0.3	1.2	0.1051	3.335	0.0019
		AF2	0.35	1.15	0.1094	3.185	0.0029

Effect on Pain

By the Group - A, significant reduction in pain was observed with a mean reduction of score from 2.45 to 0.2 after treatment and after follow up it again reduced to 0.1 with 95.92 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$)

Effect on Burning

In Group - A significant reduction in burning sensation was observed with a mean reduction of score from 0.9 to 0.05 after treatment and after follow up it again reduced to 0.05 with 94.44 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$)

Effect on Itching

In Group - A significant reduction of itching was observed with a mean reduction of score from 0.8 to 0.05 after treatment and after follow up it again reduced to 0.05 with 93.75 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$)

Effect on Smell

In Group - A significant reduction of smell was observed with a mean reduction of score from 1.3 to 0.15 after treatment and after follow up it again reduced to 0.15 with 88.46 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$)

Effect on Size

In Group - A significant reduction of Size of the ulcer was observed with a mean reduction of score from 1.55 to 0.1 after treatment and after follow up it again reduced to 0.05 with 96.77 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$) (Table 1)

Effect on Depth

In Group - A significant reduction of Depth was observed with a mean reduction of score from 1.3 to 0.2 after treatment and after follow up it again reduced to 0.1 with 92.31 % improvement. Analysis of

this data shows statistically significant improvement ($P<0.0001$)

Effect on Discharge

In Group - A significant reduction of Discharge was observed with a mean reduction of score from 1.55 to 0.4 after treatment and after follow up it again reduced to 0.4 with 74.19 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$)

Effect on Edge of the ulcer

In Group - A significant changes in the Edge of the ulcer was observed with a mean reduction of score from 0.9 to 0.05 after treatment and after follow up it again reduced to 0.05 with 94.44 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$)

Effect on Floor of the ulcer

In Group - A significant changes in the Floor of the ulcer was observed with a mean reduction of score from 1.75 to 0.1 after treatment and after follow up it again reduced to 0.05 with 97.14 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$)

Effect on presence of Granulation Tissue

In Group - A significant changes in the Granulation tissue of the ulcer was observed with a mean reduction of score from 1.9 to 0.05 after treatment and after follow up it again reduced to 0.05 with 97.37 % improvement. Analysis of this data shows statistically significant improvement ($P<0.0001$)

Effect on Podiatric Study

In Group - A significant changes in the podiatric study was observed with a mean reduction of score from 1.5 to 0.35 after treatment and after follow up it again reduced to 0.35 with 76.7 % improvement. Analysis of this data shows statistically moderately significant improvement ($P<0.0029$)

Figure 1: Assessment of total effect of therapy of Group - A.

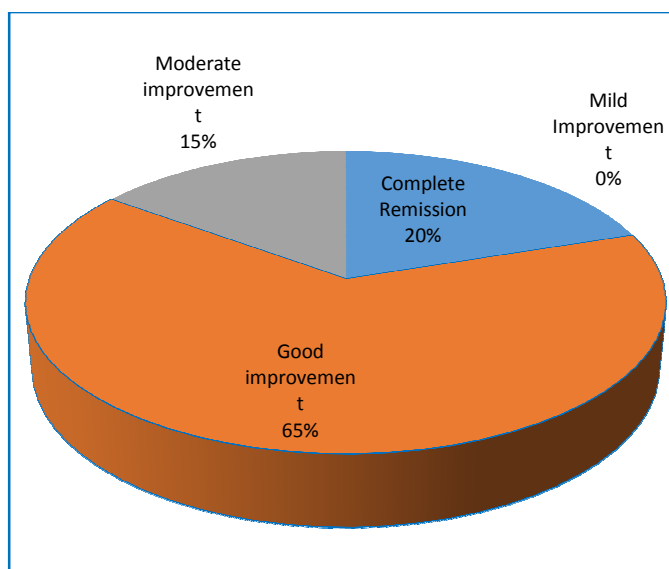


Table 2: Effect of Group - B on Signs and Symptoms.

Signs and Symptoms	Mean Score				SEM (+-)	t	p
	BT	AT1	AT2	Mean Difference			
Pain	2.55	0.9	1.65	0.1000	10.87	<0.0001	
		0.80	1.75	0.09177	11.95	<0.0001	
		0.65	1.9	0.1094	12.01	<0.0001	
		0.25	2.3	0.09934	15.20	<0.0001	
		0.2	2.35	0.09177	16.05	<0.0001	
Burning Sensation	1	0.55	0.45	0.1141	2.93	0.0057	
		0.4	0.6	0.1124	3.94	0.0003	
		0.3	0.7	0.1051	4.765	<0.0001	
		0.3	0.7	0.1051	4.765	<0.0001	
		0.25	0.75	0.09934	5.25	<0.0001	
Itching	0.85	0.4	0.45	0.1124	2.87	0.0067	

		AT2	0.4	0.45	0.1124	2.87	0.0067
		AT3	0.4	0.45	0.1124	2.87	0.0067
		AF1	0.4	0.45	0.1124	2.87	0.0067
		AF2	0.4	0.45	0.1124	2.87	0.0067
Smell	1.4	AT1	0.7	0.7	0.1051	4.55	<0.0001
		AT2	0.55	0.85	0.1141	5.31	<0.0001
		AT3	0.55	0.85	0.1141	5.31	<0.0001
		AF1	0.55	0.85	0.1141	5.31	<0.0001
		AF2	0.55	0.85	0.1141	5.31	<0.0001
Size	1.65	AT1	0.9	0.7	0.1606	3.86	0.0004
		AT2	0.55	1.1	0.1141	6.96	<0.0001
		AT3	0.5	1.15	0.1147	7.25	<0.0001
		AF1	0.5	1.15	0.1147	7.25	<0.0001
Depth	1.4	AT1	0.65	0.75	0.1313	4.34	0.0001
		AT2	0.5	0.9	0.1147	5.60	<0.0001
		AT3	0.5	0.9	0.1147	5.60	<0.0001
		AF1	0.5	0.9	0.1147	5.60	<0.0001
Discharge	1.6	AT1	0.75	0.9	0.1230	4.68	<0.0001
		AT2	0.65	0.95	0.1094	5.497	<0.0001

		AT3	0.65	0.95	0.1094	5.497	<0.0001
		AF1	0.65	0.95	0.1094	5.497	<0.0001
		AF2	0.65	0.95	0.1094	5.497	<0.0001
Edge	1	AT1	0.4	0.60	0.1124	2.85	0.0070
		AT2	0.4	0.60	0.1124	2.85	0.0070
		AT3	0.4	0.60	0.1124	2.85	0.0070
		AF1	0.35	0.65	0.1094	3.12	0.0035
		AF2	0.35	0.65	0.1094	3.12	0.0035
Floor	1.8	AT1	0.75	1.05	0.1230	4.97	<0.0001
		AT2	0.65	1.15	0.1094	5.65	<0.0001
		AT3	0.65	1.15	0.1094	5.65	<0.0001
		AF1	0.6	1.2	0.1124	5.85	<0.0001
		AF2	0.55	1.25	0.1141	6.06	<0.0001
Granulation Tissue	1.95	AT1	0.9	1.05	0.1606	4.49	<0.0001
		AT2	0.7	1.2	0.1051	6.26	<0.0001
		AT3	0.65	1.3	0.1094	6.44	<0.0001
		AF1	0.65	1.3	0.1094	6.44	<0.0001
		AF2	0.65	1.3	0.1094	6.44	<0.0001
Podiatric Study	1.35	AT1	1.35	0	0.3424	0.000	>0.9999
		AT2	1.05	0.3	0.3283	0.633	0.5309
		AT3	0.6	0.75	0.2753	1.707	0.0960

		AF1	0.45	0.9	0.2458	2.135	0.0392
		AF2	0.45	0.9	0.2458	2.135	0.0392

Figure 2: Assessment of total effect of therapy on Group - B.

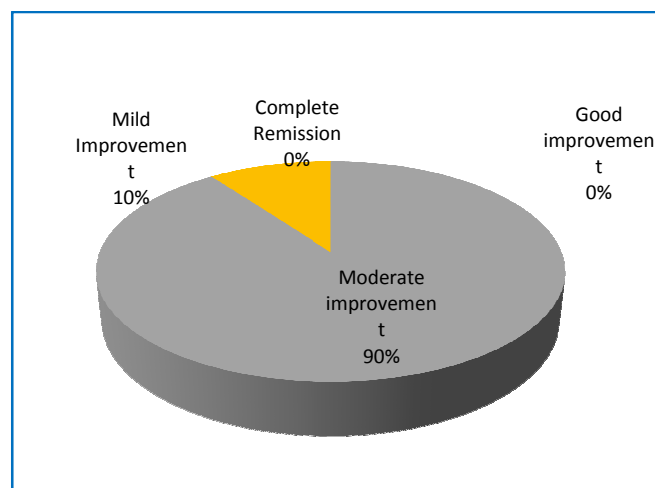
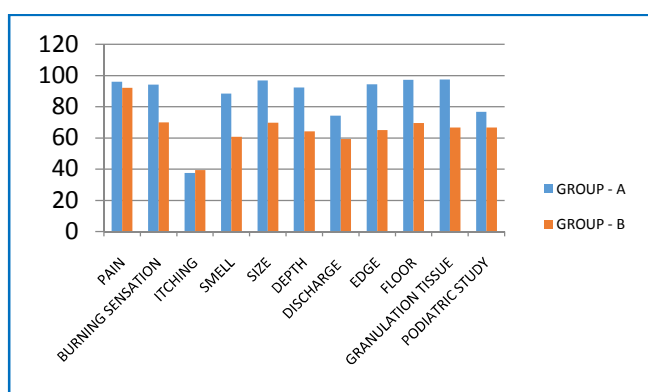


Table 3: Comparative result of Group-A and Group-B

Signs and Symptoms	Mean A		% of Relief	Mean B		% of Relief	Unpaired t	p
	BT	A F U		BT	A F U			
Pain	2.45	0.1	95.92	2.55	0.2	92.16	0.872	0.388
Burning Sensation	0.86	0.5	94.23	0.83	0.5	69.99	1.798	0.801
Itching	0.8	0.5	37.5	0.66	0.4	39.39	2.845	0.071
Smell	1.33	0.1	88.46	1.4	0.5	60.71	3.376	0.017
Size	1.55	0.5	96.77	1.65	0.5	69.69	3.596	0.009
Depth	1.3	0.1	92.31	1.4	0.5	64.29	2.990	0.049
Discharge	1.55	0.4	74.19	1.6	0.5	59.38	1.594	0.1193

Edge	0. 9	0. 0 5	94.44	1	0. 3 5	65	2.49 4	0.0 171
Floor	1. 75	0. 0 5	97.14	1. 8	0. 5 5	69.44	4.01 3	0.0 003
Granulation Tissue	1. 9	0. 0 5	97.37	1. 95	0. 6 5	66.67	4.99	<0. 000 1
Podiatric Study	1. 5	0. 3 5	76.7	1. 35	0. 4 5	66.67	0.37 17	0.7 122

Figure 3: Comparative result of Group-A and Group-B



The comparison between two groups was done by considering BT value and After Last Follow Up value.

In case of Diabetic foot ulcer, *Gomutra Arka* Group (group-A) showed good results in reducing the burning sensation, itching, smell, size, depth, discharge, edge, floor and showed presence of granulation tissues compared to Betadine Group (group-B). Both treatments have equal effect in reducing the pain. Both have less effect on podiatric study.

DISCUSSION

Shodhana action of *Gomutra Arka* can be understood as follows,

Rasa - Katu, Tikta, Kashaya, Lavana

- *Kashaya Rasa* is *Vrana Ropana, Lekhana*. It is *Svarnatwakrit* (As. Su 18/17-18) therefore it may help in normalizing skin colour.
- *Tikta Rasa* does *Lekhana Karma* and *Shodhana*. It scrapes the slough from the wound.

- *Katu Rasa - Shodhana* and *Vranaavasaadana* property. It might help in cleansing the wound.

Guna - Tikshna. Penetrating property of *Gomutra* might help in reaching deeper.

Karma - Malashodhaka. This property shows the cleansing nature of *Gomutra Arka*.

Betadine

Therapeutic Uses

Disinfectant of skin, is an excellent agent in treatment of wounds and abrasions. Aqueous solution of 0.5% to 2% iodine with sodium iodide is applied. 0.1% solution may be used for irrigation.

Jatyadi Taila

Most of the ingredients of *Jatyadi taila* possess *Tikta, Kashaya Rasas* and *Laghu, Ruksha Gunas*.

Kashaya Rasa : It does *Shoshana* there by it may help in *Vrana Ropana*.

Tikta Rasa : It does *Twak-Mamsa Sthireekarana* and *Lekhana*. It might help in increasing tensile strength of wound and removal of slough.

Katu Rasa : It has *Vrana Shodhana* and *Avasadana* properties.

Tutha : It is one among the ingredients of *Jatyadi Taila*, having *Lekhana Karma*. So it may help in removal of slough. Even in current surgical practice copper sulphate is used in the removal of slough from the ulcers. Drug with similar action *Tutha* is one.

Tila Taila : It is used in the preparation of *Jatyadi Taila*. It has *Ushna, Teekshna, Madhura, Vataghna, Vyavayi, Vikasi & Sukshma Gunas*. When it is treated with drugs it takes the properties of those drugs. So it might help in entering the minute channels by means of its *Sukshma, Vyavayi, Vikasi Gunas* and in reducing *Vedana*. As *Jatyadi Taila* includes the drugs which possess both *Shodhana* and *Ropana* qualities it helps in proper healing of Diabetic foot ulcer.

Discussion on the effect of treatment

The patients selected for the study were divided into two groups of 20 each.

Group A was subjected to dressing with *Gomutra Arka* and Group B was subjected to dressing with Betadine

solution. However both the groups were administered their regular medication of diabetes mellitus during the course of treatment. The course of treatment was 45 days and follow up was done for up to 90 days after treatment. The treatment had shown significant changes in all clinical features of ulcers, because drugs selected promoted natural healing process.

A total of 40 patients were registered for this study. Out of this all 40 patients were studied in this project. 20 patients were in group A while 20 were in B group. Each patient was observed thoroughly and noted neatly. The observations were recorded and necessary charts and graphs were made. Photographs of the Diabetic foot ulcer before and after the treatment were taken and observed thoroughly.

Effect on pain

Reduction in pain was observed in both the groups of patients of Diabetic foot ulcer. The amount was reduced after treatment in Group-A and Group-B with statistical significance. As observed, there was a reduction in the percentage by 95.92% in Group-A and 92.16% in Group - B. When the effects of both the treatments were compared the patients in Group - A showed better response in combating pain.

Effect on burning sensation

Reduction in burning sensation was observed in both the groups. The amount was reduced after the treatment in Group - A and Group - B with statistical significance. As observed, a reduction in the percentage by 94.23% in Group - A and 69.99% in Group-B. When the effect of both the treatments were compared the patients in Group - A showed better response in reduction of burning sensation.

Effect on itching

Reduction in itching was observed in both the groups. The amount was reduced after the treatment in Group - A and Group - B with statistical significance. As observed, there was a reduction in the percentage by 37.5% in Group - A and 39.39% in Group - B. When the effect of both the treatments were compared the patients in Group - A showed less response in reduction of itching.

Effect on smell

Reduction in smell was observed in both the groups of patients of Diabetic foot ulcer. The amount was reduced after the treatment in Group - A and Group - B with statistical significance. As observed, a reduction in the percentage by 88.46% in Group - A and 60.71% in Group-B. When the effect of both the treatments were compared, the patients in Group - A showed better response in reduction of smell.

Effect on size

Reduction in size was observed in both the groups. The amount was reduced after the treatment in Group - A and Group - B with statistical significance. As observed, there was a reduction in the percentage by 96.77% in Group - A and 69.69% in Group - B. When the effect of both the treatments were compared the patients in Group - A showed better response in reduction of size.

Effect on depth

Reduction in depth of the tissue was observed in both the groups.. The amount was reduced after the treatment in Group-A and Group-B with statistical significance. As observed, there was a reduction in the percentage by 92.31% in Group - A and 64.29% in Group - B. When the effect of both the treatments were compared the patients in Group - A showed better response in reduction of depth.

Effect on discharge from ulcer

Reduction in discharge from ulcer was observed in both the groups. The amount was reduced after the treatment in Group - A and Group - B with statistical significance. As observed, there was a reduction in the percentage by 74.19% in Group - A and 59.38% in Group - B. When the effect of both the treatments were compared the patients in Group - A showed better response in reduction of discharge from ulcer.

Effect on edge

Reduction in edge was observed in both the groups. The amount was reduced after treatment in Group - A and Group - B with statistical significance. As observed, there was a reduction in the percentage by 94.44% in Group - A and 65% in Group - B. When the effect of both the treatments were compared the

patients in Group - A showed better response in reduction of edge.

Effect on floor

Reduction in floor was observed in both the groups. The amount was reduced after the treatment in Group - A and Group - B with statistical significance. As observed, there was a reduction in the percentage by 97.14% in Group - A and 69.44% in Group - B. When the effect of both the treatments were compared the patients in Group - A showed better response in changes in the floor.

Effect on granulation tissue

Reduction in granulation tissue was observed in both the groups. The amount was reduced after treatment in Group - A and Group - B with statistical significance. As observed, there was a reduction in the percentage by 97.37% in Group - A and 66.67% in Group - B. When the effect of both the treatments were compared the patients in Group - A showed better response in changes in granulation tissue.

Effect on podiatric study

Reduction in podiatric study was observed in both the groups. The amount was reduced after treatment in Group - A and Group - B with statistical significance. As observed, a reduction in the percentage by 76.7% in Group - A and 66.67% in Group - B. When the effect of both the treatments were compared the patients in both Group showed average response in reduction of podiatric study.

Comparative results of Group - A and Group - B

In case of Diabetic foot ulcer, *Gomutra Arka* Group (Group - A) is having good result in reduction in burning sensation, itching, smell, size, depth, discharge, edge, floor, presence of granulation tissues compared to Betadine Group (Group - B). Both treatments have equal effect in reduction of pain. Both have less effect on podiatric study.

Assessment of total effect of therapy

Out of 20 patients, In Group - A 4 patients were cured, 13 patients showed good improvement and 3 patients showed moderate improvement.

Out of 20 patients, In Group - B total 18 patient showed moderate improvement and 2 patients showed mild improvement. Compared in both Groups Group - A showed better response than Group - B perhaps because the medications had more ingredients, it showed good results.

CONCLUSION

Gomutra Arka has good results in reducing burning sensation, itching, smell, size, depth, discharge, edge, floor and presence of granulation tissues compared to Betadine. Both drugs have equal effect in reduction of pain. Both drugs have *Shodhana*, *Lekhana* property, hasten the wound healing process and helps in reduction of wound size.

REFERENCES

1. Sivakumar.G, Diabetic foot ulcer surgical principles & practices, Jaypee brothers medical publishers, 2009 edition, Pp-156, page no.2.
2. Syed Muhammed Jalaludheen, Outline of Salyatantra, vol -1, Centre Ayurvedic Research & Studies, Jalaliya manzil, Kunnatheril, 2010 edition, Pp-484, page no-84.
3. Indradeva Tripathi, Arkaprakasa of Langapati Ravan, Chowkamba Krishnadas Academy, 2006 edition, Pp-172, page no-81.
4. Agnivesa, Charaka Samhita, Acharya Jadavji Trikamji, 2008 edition. Choukambha publication, Varanasi; pp 738, page no-21.
5. Krihnananda maharaja, Rasatanrasaar & siddaprayog sangraha, 2010 edition, Krishnagopal ayurveda bhavan, Ajmeer, pp 422,pg no 388.

How to cite this article: Mrudul Mohan, Sanjay Sharma, Shyam Prasad M, Rajneesh V. Giri, Gururaja D. A Clinical Study on *Vrana Shodhana* Action of *Gomutra Arka* in *Dushtavrana* w.s.r. to Diabetic Foot Ulcer. *J Ayurveda Integr Med Sci* 2017;6:1-10.
<http://dx.doi.org/10.21760/jaims.v2i06.10920>

Source of Support: Nil, **Conflict of Interest:** None declared.