Original Research Article

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Role of topical use of natural honey in chronic non healing ulcer: a prospective non randomized comparative trial on 150 patients

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ABSTRACT

Background: Natural honey procured from any source on topical application on chronic non-healing ulcer has unique property to reduce pain, inflammation, oedema, deodorization, rapid disinfection, stimulate desloughing, promote neo vascularization, granulation, collagen synthesis, epithelialization and thus boost the process of ulcer healing.

Methods: In this study a prospective, non-randomized trial was done on 150 patients divided in two groups of 75 each (group-A with honey dressing and group-B without honey dressing), of different age and sex having chronic non healing ulcers situated on various parts of the body. Natural honey available from various sources was used.

Results: Most of the patients fall in their most productive and active 3rd and 4th decade of life. Pain and fever were the main reason of restricted mobility and absence from work reflecting productivity. Bacterial contamination, presence of necrotic tissue, bed ridden condition, old age, debility, DM, ulcer present in the vicinity of joint were found major cause of delay in the process of healing. The cost effectiveness, easy availability, ease of application makes natural honey a better alternative in the management of chronic non healing ulcer.

Conclusions: Cost effectiveness, easy availability, ease of application, increasing healing process makes natural honey a better alternative in the management of chronic non healing ulcer and safe to use in diabetic patients as well.

Keywords: Natural honey, Dressing, Chronic ulcer, Non-healing, Restricted mobility

INTRODUCTION

There is a great role of existence of chronic non healing ulcers on various parts of the body affecting public health and country economy. Role of topical use of honey to treat wounds was well known to ancient civilizations. Hundreds of studies have been done regarding use of honey in wound healing. Chemical composition of natural honey is very complex. Major component of honey comprises of carbohydrates (82%), glucose (31%), disaccharides (9%), maltose, isomaltose, sucrose, turanose and kojibiose etc. oligosaccharides are 4.2% including panose, erlose and theanderose. Honey contain variety of enzymes including invertase, which convert sucrose to glucose and fructose. Glucose oxidase convert

glucose to gluconolactone, which in turn into gluconic acid and H₂O₂. Catalase breakdown H₂O₂ into H₂O and oxygen, which keeps the wound moist, deodorize and help in auto desloughing. Honey also contain free amino acids of which most abundant is proline. Honey contain trace amount of vitamin B₂, B₅, B₆, B₉, pantothenic acid, vitamin C and minerals (calcium, iron, zinc, potassium, phosphorus, magnesium, selenium, chromium and manganese). Antioxidant property of honey is due to flavonoids, vitamin C, catalase and selenium. Generally old and darker the honey, greater is its antioxidizing properties. Honey also contain organic acids like citric, succinic, lactic, malic, acetic, formic, butanoic, pyroglutamic and aromatic acids. Hydroxymethyl furfural keeps its pH below 5 (3.2-4.5) which encourages blood to

release oxygen. Its high osmolarity prevents bacterial growth, reduces swelling and promote healing. Honey also had nitric oxide in traces that boost immunological response, bactericidal and inhibit viral multiplication. On topical application various evident effects of honey on ulcer are- provide moist environment and nutrition, reduces local pain, reduces edema and inflammation, deodorization of wound, stimulate necrotic tissue removal, rapid disinfection of wound, stimulate neovascularization, stimulate granulation, causes wound contraction, stimulate collagen synthesis and wound healing. 6-29

Objective of the study was to see the effect of natural honey application locally on healing process of chronic non healing ulcer among patients who are non-diabetic and diabetics as well.

METHODS

A prospective non randomized trial was done on 150 patients divided in two groups of 75 each (group- A with honey dressing and group-B without honey dressing) of different age and sex at JNUIMSRC, Jagatpura, Jaipur between November 2018 to May 2020 admitted in department of General Surgery. Informed consent was taken from all patients under study after getting formal ethical approval from the ethical committee.

Inclusion criteria

Chronic ulcer in male and female below 70 years of age, traumatic, diabetic, insect bite, venous ulcers and bed sores.

Exclusion criteria

Tuberculosis, leprosy, malignant ulcer, HBsAg and HIV positive patients and patients >70 years of age because high possibility of drop out and non-co-operation of patients and attendants as well.

A complete history was taken regarding sex, age, occupation, cause of ulcer, associated medical problem like malnutrition, anaemia, HT, DM, cardiovascular diseases etc. A routine blood profile, X-ray chest, BS charting in diabetic patients, ECG and any special investigation done as per fixed protocol for all patients under study. Before starting treatment and on 15th day, culture and sensitivity of ulcer discharge was done and findings noted. Observations on subjective complaints like duration of ulcer, etiology, pain in ulcer, discomfort, discharge, fever, absence from work, medicines record, hospital stay were made. All ulcers thoroughly washed with H₂O₂, NS and painted with betadine lotion. Natural honey from various sources which is easily available in this region provided by patients, poured and spread over ulcer in patients of group-A, immediately covered with sterile gauze pieces to avoid spillage then cotton pads put over it and closed dressing was done with bandage

whereas in group-B patients honey was not used. Dressing were changed on alternate day basis in the same way. All patients received the same supportive treatment in the form of antibiotics, analgesics, B-complex along with a good healthy diet. Diabetic patients received either oral hypoglycaemic or insulin injections as per their blood sugar level. Patients' age, sex, etiology of ulcer, symptomatology, certain blood investigations (blood sugar, TLC, Hb, ESR), culture of discharge, debridements required and hospital stay were used as tool and statistical method of study. On every fifth day during change of dressing following points were noted.

Ulcer size in two dimensions i.e. transverse and longitudinal; presence of slough; appearance of granulation tissue; change in ulcer size; soakage from ulcer; neo-epithelium at margins.

Appearance of red granulation tissue, clearance of slough, reduction in size and discharge, presence of purple color neo-epithelium at margins of ulcer were taken as signs of healing.

RESULTS

Out of 150 patients under study most of the patients suffered in their most productive period of life means in 3rd and 4th decade (39.33%) and male female ratio was 1.8:1.0 (Table 1).

Table 1: Age and sex distribution.

Age (years)	Male	Female	Total (%)
0-20	10	6	10.66
21-40	38	21	39.33
41-60	34	16	33.33
>60	14	11	16.66
Total	96	54	100

Table 2: Ulcer variety as per etiology.

Etiology	No. of patients		
Etiology	Group A	Group B	
Traumatic ulcer	41	41	
Insect bite ulcer	4	4	
Diabetic ulcer	23	23	
Bed sores	2	2	
Venous ulcer	5	5	
Total	75	75	

Table 3: Symptoms as per patient.

Symptoms	No. of patients
Pain	97
Discharge	113
Fever	47
Bleeding	21
Maggots	13

Trauma was the most common cause of chronic ulcer (54.66%), which precede the diabetic ulcer (30.66%) (Table 2).

Most common cause of restricted mobility was pain and fever (Table 3). Average duration of chronicity of ulcer was 127 days and absence from work was 63 days.

Table 4: Investigations.

Name with normal value	No. of patients	Abnormal value	No of patients
TLC (4000- 10000/mm ³)	108	>10000/mm ³	42
BS-R (80-120 mg%)	113	>120 mg%	37
Hb (>10 gm%)	97	<10 gm%	53
ESR (2-20 mm 1 st hour)	114	>20 mm 1 st hour	36

Table 5: Culture of discharge.

Dothogona	Before tr	On 15 th day	
Pathogens	patients	Group A	Group B
Staphylococcus	43	Nil	Nil
Streptococcus	13	6	11
Klebsiella	28	7	8
Proteus	17	9	9
E. Coli	13	Nil	11
Pseudomonas	11	Nil	Nil
Sterile	19	47	33
Mixed type	6	6	3
Total	150	75	75

Diabetic patients having blood sugar >120 mg% were 24.66%, TLC>10000/mm³ (28%), Hb<10 gm% (35.33%) and ESR>20 mm 1st hour 24% cases (Table 4). On culture of discharge before starting treatment *staphylococcus aurous* was the major pathogen (28.66%) followed by *Klebsiella* (18.66%) but 15 days after treatment discharge culture was found sterile 62.66% in group-A while it was only 44% in group-B (Table 5). It was also observed that there was no evident rise in blood sugar level on local application of honey in diabetics.

Table 6: Debridements required.

No. of John Jones and	No. of patients		
No. of debridements	Group A	Group B	
1	31	37	
2	17	19	
>2	6	9	
0	21	10	
Total	75	75	

72% patients require one, two or more times debridement in group-A while 86.66% in group-B. 28% patients of group-A and 13.33% of group-B didn't required

debridement (Table 6). A few patients complaint of local discomfort for a few minutes after application of honey and was disappeared spontaneously without any treatment. Average hospital stay was significantly higher in group-B than in group-A (Table 7).

Table 7: Hospital stay.

Davis wangs	No of patients	3
Days range	Group A	Group B
0-10	6	2
11-20	19	9
21-30	29	24
>30	21	40
Total	75	75

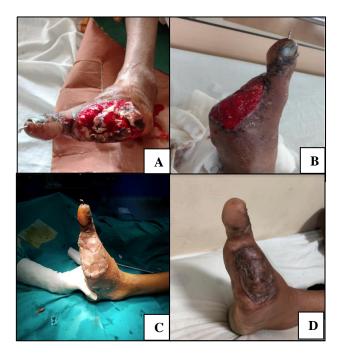


Figure 1: (A)) In group A, ulcer on admission (etiology-RTA); (B) ulcer on 12th day; (C) ulcer after SSG graft on 12th day; (D) follow up (25 days after SSG).



Figure 2: (A) In group B, ulcer on admission (etiology-snake bite); (B) ulcer on 23^{rd} day; (C) ulcer after SSG graft on 30^{th} day.

DISCUSSION

In this prospective randomized study 150 patients were included divided equally in two groups having chronic ulcer situated on various parts of the body. In 63% of patients' ulcer was situated on lower limbs mainly on foot region. Trauma was main etiological factor due to RTA, domestic violence or accidents (54.66%), followed by diabetic ulcer in 30.66%, which was also found a major cause of delayed healing. Venous ulcer, insect bite ulcer and bed sores contributed a minor percentage. Most of the patients suffered in their 3rd and 4th decade of life. found to be the most productive age group. It was also observed that male suffered almost double than female (1.8:1.0), probably due to their work profile and thus are more vulnerable. Pain and fever were found most common cause of restricted mobility, aggravated by secondary infection, maggots and reduced movement of adjacent joints. In India male is the main earning member among most of the families which in turn affect financial status and productivity. Discharge from ulcer shows that Staphylococcus aureus and Klebsiella are the major pathogens but after 15 days of taking treatment 36% patients of group-A became sterile on culture.11 About 72% patients required debridement due to grossly unhealthy ulcers, 28% of patients saved from surgical trauma in group-A as compared to group-B which was 13.33%. 1,8,10 57.33% patients needed SSG grafting and total hospital stay was significantly higher in group-B in comparison to group-A. Honey dressing can be used without fear of evident increase in blood sugar level in diabetic patients probably due to the fact that honey is minimally absorbed on local application. Only 13% of patients complaint off local discomfort for a few minutes of honey application that was spontaneously subsided without taking any treatment, otherwise no other local or systemic side effects were observed.

It was evident that bacterial contamination, presence of necrotic tissue, bed ridden situations, old age, debility, diabetes mellitus, ulcer in vicinity of joint were found major cause of delay in the process of healing.²⁵ Ulcer healing found triggered after debridement.^{1,8,10} Ulcer healing was assessed by measuring its size, appearance of red granulation tissue and neo-epithelialization at margins.^{2,3,7,12-23}

The limitation of this study was that it was non randomized, so uniformity among etiology, type, site and size of ulcer was not possible to maintain. Secondly sample size was average i.e. 150 patients.

CONCLUSION

In this study a total of 150 patients of different age, sex and etiology of chronic ulcer situated on various parts of the body were included. Chronic ulcers of tuberculosis, leprosy, malignancy, patients >70 years of age and HBsAg and HIV positive were excluded from this study. Trauma due to RTA/domestic accidents or violence was

the main etiological factor. Male ratio was found almost double of female due to their work profile thus more vulnerable. Most of the patients suffer in their most productive 3rd and 4th decade of life. Pain and fever was the mainstay of restricted mobility, absence from work and thus increasing financial burden as in most of the Indian families male person is the only earning member. Every patient under study followed a set investigations protocol was of great help in antibiotic selection and diabetics. Most common pathogen grown on culture was Staphylococcus aureus followed by Klebsiella. On 15th day of treatment 36% of patients' ulcer found sterile on culture and in rest colony count of pathogens reduced drastically in group-A as compared to group-B which was 24%. 28% patients of group-A saved from surgical trauma of debridement. It was concluded that honey procured from any source on local application reduces pain, inflammation, oedema, deodorization, rapid disinfection, stimulate slough removal, promote neovascularization, distinctly speed up granulation, collagen synthesis, epithelialization and thus promote ulcer healing. The cost effectiveness, easy availability, ease of application makes natural honey a better alternative in the management of chronic ulcer.

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