A Comparative Study to Compare the Efficacy of Honey Dressing With Normal Saline Dressings in Wound Healing

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Abstract
Wounds are one of the commonest cases managed by general surgeons, both in the community and in the hospital setting. The use of honey for medicinal purpose has been described since ancient times. Honey is derived from nectar which is altered by honeybees became topic of interest in late 19th century, when its antimicrobial properties were noted by Van Katel. This property of honey is mentioned in papyruses traced to 3500 years ago among ancient Egyptians and the Hebrews 3000 years ago. Honey naturally contains small amounts of enzymes. The predominant enzymes in honey are diastase (amylase), invertase (alpha-glucosidase) and glucose oxidase. The stimulation of cell growth seen with honey is probably also responsible for the healing process in wounds that have remained non-healing for longer periods. This study included 40 patients, 2 groups of 20 each (group A, Normal saline dressing; group B, Honey dressing), where we compared the efficacy of both group in terms of wound healing.

Keywords: wound, honey, saline, efficacy

Introduction
Wounds are one of the commonest cases encountered in general surgery practice both in the community and in the hospital setting. Honey since ancient times has been used as an antibacterial substance both for external and internal use. During recent years it has been widely used in modern medicine to treat infected and nonhealing wounds and ulcers, adult and neonatal postoperative infection, burns, necrotizing fascitis.

Honey provides protective barrier to prevent cross infections, creates anti bacterial moist healing environment, it has debriding effect and its osmotic action causes an outflow of lymph lifting debris from wound bed. (1)

Honey as it is hygroscopic in nature with a pH of 3.2-4.5 prevents colonization and bacterial growth in tissues due to its acidic nature. Because of its low water activity(aw) of 0.6, bacterial growth is inhibited. (2)

Honey rapidly removes malodor, hastens healing through stimulation of tissue regeneration prevents scarring and hypertrophication and its anti-inflammatory action reduces edema. (2)

The stimulation of cell growth seen with honey is probably also responsible for the healing process in wounds that have remained non-healing for longer periods. (3) Normal saline dressing is easily available and function as part of osmotic dressing. The hyperosmolarity of normal saline dressing provides an osmotic gradient for absorption of wound fluid and desloughing, contributing to its effectiveness as moist wound dressing promoting granulation and epithelialization. (4)
This study is undertaken to compare the efficacy of honey and normal saline dressing in wound healing.

**Aims And Objectives**

The aim and objective of this study is to compare the efficacy of honey dressing with saline dressing with respect to the duration of wound healing, need for repeated debridement and duration of hospital stay.

**Materials And Methods**

**Study Design- Retrospective Study**

Study setting - Study is conducted in MGM medical college, navi mumbai, which is a tertiary care center. Patients are selected from general surgical wards.

Study period - one year extending from January 1st 2020 to december 31st 2020

**Study population-** patients admitted in general surgery ward, mgm hospital, navi mumbai, with ulcers during this period. saline dressing is given for the patients admitted in the first 6 months of study. honey dressing is given for the next 6 months of study. dressing was done by single person in all 40 cases under aseptic condition

**Sample size-** patients who meet the inclusion criteria was selected during the study period. for the first 6 months of study, saline dressing was given. for the next 6 months of study, honey dressing was given. so 20 persons were included in first category that is group a and next 20 persons were included in second category that is group b. Inclusion criteria - all patients were included in this study which are classified according to the grade of ulcer by wagner classification

1. all grades included except those in which gangrene has already occurred
2. diabetic ulcer.
3. traumatic ulcer.
4. venous ulcer.
5. post operative wounds.

**Exclusion criteria –**

1. fistulas.
2. discharging sinus from bone.
3. tuberculous ulcer.
4. malignant ulcer

**Study procedure-** The study was conducted after obtaining clearance from the institutional ethical committee. The author has obtained informed written consent from the patients after explaining to them about the procedure and purpose of study. If abundant slough was present, debridement of wound was done in both groups. One group of patients were given conventional saline dressing, that is cleaning the ulcer with saline, debridement if abundant slough was present, covering the wound with sterile surgical pads after cleaning the surrounding skin with antiseptic agents. Alternate day cleaning and dressing was done by single person. Oral or parenteral antibiotics were also given according to culture and sensitivity report. Other group was given honey dressing. Wound was cleaned with saline. Debridement done if abundant slough was present. Honey poured over the ulcer to fill half of the depth. Gauze was placed over the ulcer, then dry sterile surgical pad was applied after cleaning the surrounding area with antiseptic agents. Antibiotics were also given orally or parenterally according to culture and sensitivity report and alternate day dressing was done by single person

**Materials used for study**

1. Patients were treated with commercially available sterilized honey. It was made fluid by stirring/light warming. it was spread on a dressing pad, and even coverage of the wound surface with honey was ensured.
2. Sterile surgical gauze.

**Methods And Assessment Of Outcome-**

Every alternate day for all patients, assessment done till the end of 2nd week. and till hospital stay for patient staying longer duration.

Every 5 days till patient hospital stay for appearance of granulation tissue. Patients factors assessed-the duration of wound healing, need for repeated debridement, wound area of patient and duration of hospital stay

The factors used in comparison of saline dressing and honey dressing include- i) Outcome plan- whether
patient was discharged or grafted. Grafting was done in patients with healthy granulation tissue and minimal serous discharge.

**Duration of hospital stay.**

iii) whether there is any difference of outcome in different distribution of grades of ulcer. iv) Whether there was need for repeated debridement. v) Whether wound healed with or without graft. vi) initial and final wound area in mm2 after 2 weeks.

**Results**

In our study, the age of male subjects was in the range of 20-76 years and female subjects were in the range of 33-82 years as per inclusion criteria. Honey dressing was done in 12 (30%) male patients and 8 (20%) female patients, whereas saline dressing was done in 15 (37.5%) male patients and 5 (12.5%) female patients.(table-1)

There was significant reduction in wound area at the end of 2 weeks of honey groups compared to saline groups [p value <0.05]. The percentage of reduction of wound achieved at end of 2 weeks was 19.8% for honey treated groups and 14.5% for saline treated groups.(table-2)

Appearance of granulation tissue was faster in group b compared to group a. (Fig -1)

Average duration of hospital stay in those dressed using normal saline was found to be 28.4 and mean duration in those dressed with honey was found to be 21.8.

Difference in average duration of hospital stay in both groups was proven significant among these groups, 18 of total 40 (42%) belonged to 22-28 days group. Another observation was that only 2 among the honey dressing group stayed for more than 35 days, whereas 6 among the normal saline group stayed in hospital for more than 35 days.

25% of patients treated with honey dressing could be grafted after 2 weeks of dressing and 10% of patients treated with saline dressing could be grafted.

**Discussion**

Honey is derived from nectar which is altered by honeybees became topic of interest in late 19th century, when its antimicrobial properties were noted by van katel.(5) Honey comprises 40% glucose, 40% fructose, 20% water, with organic acids, vitamins, enzymes, and minerals; it has specific weight of 1.4 and pH of 3.6 (6,7). the treatment with honey is simple and in expensive, and honey need not to be sterile as it already possesses a bactericidal property (6), because of its high viscosity it forms a physical barrier, creating a moist environment which appears to be helpful and accelerates wound healing1. In observational groups complete healing was present in this group of patients within two weeks, a good improvement was there in most of the cases, while in case of controlled clinical trials patients reported improvement but the time of improvement varies compare to control groups.(8)

This property of honey is mentioned in papyruses traced to 3500 years ago among ancient egyptians and the hebrews 3000 years ago. honey naturally contains small amounts of enzymes. The predominant enzymes in honey are diastase (amylase), invertase (alpha-glucosidase) and glucose oxidase. The stimulation of cell growth seen with honey is probably also responsible for the healing process in wounds that have remained non-healing for longer periods. (8)

Jull et al showed modest efficacy 56.6% with honey treatment and most of the patients reported healing in 12 weeks time.(9)

Ingle et al reported a prospective, randomized, double-blind study comparing the effect of honey and intrasite gel. the mean healing times of shallow wounds treated with honey or with intrasite gel did not differ significantly. When adjusted for wound size, the 2.8-day difference in favour of honey was not significant. In the case of abrasions there was also no significant difference. in conclusion of the study, there was no evidence of a real difference between honey and intrasite gel as healing agents.(10)

Another double blind controlled study with 100 patients was carried out by mcintosh, revealed that conventional treatment was superior to topical honey.(11)

In a meta-analysis of five observational and ten randomized controlled trials using honey, complete healing was reported with 2–9 weeks’ time and indicated that 99 % patients showed improvement in terms of wound healing.(12)
In a study by Vijaya Kumari and Nishteswar, pain relief was observed after the 15th day in 80% of cases and healthy granulation developed after the 7th day in 50% of patients. (13)

Honey dressing has been reported to promote formation of clean healthy granulation tissue (Subrahmanyam, 1991), accelerates wound healing and enhances graft taking (Bergman, 1983). (14, 15)

In the study conducted by Dubhashi S P et al on 150 patients, with 3 groups of 50 each (group A, honey dressing; group B, phenytoin dressing; group C, saline dressing) it was noted that appearance of granulation tissue was faster with significant wound area reduction after 3 weeks in groups A and B compared to group C. Eradication of infection was evident earlier in the honey- and phenytoin-treated groups along with significant pain relief as compared to that of group C. (16)

**Conclusion**

Chronic wounds management is the new challenge in today’s era with various options for treatment. It also causes financial and psychological burden to the patient. Honey is cheap, easily available and has good efficacy in managing wounds and provides alternative to costly wound dressing. Honey dressing was found to be highly effective in achieving wound healing compared to normal saline in terms of patient duration of wound healing and hospital stay. Honey dressing will be welcomed by patients who increasingly seek a natural approach to wound care which found to be very effective.

<table>
<thead>
<tr>
<th>SLN NO</th>
<th>CLINICAL DIAGNOSIS</th>
<th>TOTAL</th>
<th>SALINE DRESSING</th>
<th>HONEY DRESSING</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
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<td>MALE</td>
<td>FEMALE</td>
</tr>
<tr>
<td>1</td>
<td>DIABETIC ULCER</td>
<td>17</td>
<td>7</td>
<td>3</td>
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<tr>
<td>2</td>
<td>VENOUS ULCER</td>
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<td>2</td>
<td>0</td>
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<tr>
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<td>PRESSURE ULCER</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>TRAUMATIC ULCER</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>POST OP WOUND</td>
<td>8</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>total</strong></td>
<td></td>
<td><strong>40</strong></td>
<td><strong>15</strong></td>
<td><strong>5</strong></td>
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**Table 2: Wound area reduction in study group**

<table>
<thead>
<tr>
<th></th>
<th>INITIAL WOUND AREA (mm²)</th>
<th>FINAL WOUND AREA (mm²) AFTER 2 weeks</th>
<th>WOUND AREA REDUCTION (mm²)</th>
<th>% OF REDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP A</td>
<td>702.4 (0.00)</td>
<td>600.8 (0.64)</td>
<td>101.6 (3.06)</td>
<td>14.5</td>
</tr>
<tr>
<td>GROUP B</td>
<td>728.2 (0.00)</td>
<td>583.7 (0.62)</td>
<td>144.5 (2.95)</td>
<td>19.8</td>
</tr>
</tbody>
</table>
The chi-square statistic is $7.259$. The p-value is $0.0265$ hence significant ($< 0.05$)

**Fig 1**: Appearance of granulation tissue in saline vs honey dressing

Appearance of granulation tissue in series 1 (saline) and series 2 (honey)

**Fig 2**: Wound healing with honey dressing
Fig 3: Wound healing with saline dressing

DAY 5  
DAY 15  
DAY 25

References