

# Comparative Study between Glycerin Magnesium Sulfate and Honey Dressing for Cellulitis

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**Abstract:** Background: Cellulitis is essentially an acute inflammatory condition of the skin which is most commonly caused by indigenous flora colonies of the skin appendages. It is characterised by localised erythema, swelling, heat and localised pain. Methods: This is an observational study consisting of 20 patients (sample size) who presented at N and Hospital, Vasna - Bhayli, Vadodara between March 2022 and October 2022, with cellulitis. They underwent proper history taking, examination and investigations before being admitted and treated. Honey was used as a topical agent for the dressing on 10 patients while the other 10 were subjected to glycerin magnesium sulfate dressing. Results: Honey dressing proved itself to be superior to Glycerin Magnesium Sulfate dressing since there were no signs of skin irritation, inflammation, erythema, non - adherence during the removal of dressing. The duration of hospital stay and time of recovery was significantly lesser than the patients with glycerin magnesium sulfate dressing. Conclusions: Honey being a biological bactericidal agent which is cheap and readily available in India, stands to have lesser side effects and better efficacy than chemically produced glycerin magnesium sulfate.

**Keywords:** Honey, Glycerin magnesium sulfate, cellulitis, dressing

## 1. Introduction

Cellulitis is a bacterial infection of the deep dermis and subcutaneous tissue. It is most commonly caused by *S. pyogenes* and *S. aureus*. Bacteria may gain access to the dermis via a break in the skin barrier in healthy adults, whereas the hematogenous route is more common in immunocompromised patients.

The affected skin is usually erythematous, swollen, painful, and warm to the touch. Severe cellulitis can be complicated by bullae, pustules, or necrotic tissue. Damage to lymphatic vessels can lead to recurrent episodes of cellulitis. In areas of the world endemic for lymphatic filariasis, it is important to rule out this disease in cases of recurrent bouts of lower - extremity cellulitis and lymphangitis.

The differential diagnosis of lower extremity cellulitis includes deep vein thrombosis, superficial thrombophlebitis, and lipodermatosclerosis. It is also important to rule out necrotizing fasciitis, especially when the cellulitis is associated with the presence of anaesthesia and bullae.

Patients with a mild case of cellulitis can usually be treated with an oral antibiotic targeting gram - positive organisms.<sup>1</sup>

Lymphangitis is a part of similar process and presents as painful red streaks in affected area. If not treated leads to toxemia chills fever and rigors. Treatment includes antibiotic, anti - inflammatory best to the part along with the treatment of associated problems like diabetes. Dressing of cellulitis is important part of treatment. Dressing was usually done with Magnesium sulfate. It has been observed that many patients' inflammation and pain aggravated after Magnesium sulfate dressing<sup>2</sup>

The application of magnesium sulfate (Epsom salt) alone may cause skin irritation so any of the skin softeners,

preferably glycerin is used with it. Glycerin is a thick liquid that has variety of uses. It is capable of softening skin and it will help to nourish the skin tissues. The combination of magnesium sulfate and glycerin application on a limb oedema with help of roller bandage and followed by limb elevation may help in reduction of swelling and nourishment of skin as evidenced by studies.

Honey is an acidic hyperosmolar sugar solution produced from plant nectar by honey bees. It is composed of enzymes including water, sucrose, glucose, fructose, amino acid, beeswax, pollen, pigments, minerals and glucose oxidase which converts sucrose into simple glucose and fructose and produces gluconic acid.<sup>3</sup>

Each of the activities, which support healing, of the biological component of honey can be found separately in pharmacological products, but they are all together in honey.<sup>4</sup>

Natural raw and unfiltered honey has been used for thousands of years to treat a variety of wounds and despite its potential to treat a variety of conditions its inclusion in the mainstream clinical practice has not been well recognized. Studies revealed that the healing effect of honey could be classified by its antibacterial, antiviral, anti - inflammatory and antioxidant properties of its components. It being a cost effective, technically simple and patient efficient dressing with no observed side effects, deserves to be well known and integrated in the set of common antiseptics.

## 2. Methods

This was an observational study which comprised of 50 patients, who presented with cellulitis at Nand Hospital, Vasna - Bhayli, Vadodara between March 2022 and October 2022. After thorough history taking, examination and

investigations, they underwent admission and treatment for the same.

### Inclusion and Exclusion criteria

Patients who suffered cellulites due to injury or infection were included in the study. Whereas patients having chronic illness and co morbid condition were not included in the study.

A total of 20 patients were short listed and were randomly divided into 2 groups, A and B consisting of 10 patients each.

After cleaning the area of cellulitis with betadine solution, open wounds were covered by anti - septic dressing, while rest of inflamed area, was covered by gauze pads soaked in raw unfiltered natural honey in group A while the group B patients' inflamed area was covered by warm glycerin magnesium sulfate dressing.

First dressing was changed after 48 hours and subsequent dressings on alternate days. In case of un - healthy ulcer, dressing was done daily. Patients were given antibiotic anti - inflammatory along with treatment for associated problems.

### 3. Results

There following conclusions and results were obtained from this study.

- The incidence of Cellulitis was found to be maximum in age group 30 - 50 years in both groups.
- There was majority of male population in both groups A and B.
- Most of the cases of Cellulitis were common on lower limbs than other parts of body.
- Duration of healing in patients treated with honey in group A was significantly less than group B.
- The total number of dressings required till completion of healing was significantly less in group A than in group B.
- The need for debridement despite of increase area of involvement was significantly less in group A.
- Duration of hospital stay was decreased in patients treated with honey dressing.
- There was no pain during the removal of honey dressing while group B underwent hardening and signs of skin irritation while removal of the dressing.
- Additionally, there was significant decrease in odour / foul smell from the dressing of the group A comparatively.
- Apart from the benefits observed above, the ancient association of honey with healing, acceptance, availability and it being cheap for the patients, awarded supremacy to honey dressing over magnesium sulfate with glycerin dressing for patients with cellulitis.

### 4. Discussion

Comparison of the groups carried out using comparable features and calculation of the P - value was then computed to test the significance of the hypothesis. Honey as a topical agent was compared with standard practice of using Glycerin Magnesium sulfate dressing in management of

cellulitis in patients of Groups A and B which were distributed randomly.

### Need of debridement:

Honey dressing definitely reduces need of debridement by virtue of its hygroscopic and bactericidal action.

### Cost effectiveness:

Natural Honey available free of cost in rural areas of India.

While 1 Kg. Magnesium Sulfate powder costs Rs.220 furthermore, 1 Kg. of Glycerincosts Rs.400. The dissolution of magnesium sulfate in glycerin requires a heating source as well.

Hence, there is marked difference in the cost of dressing and its prompt availability.

Other evident factors like,

Hospital stay and Total number of dressings needed are both evidently in favour of honey dressing as mentioned in the Table 1.

It has been suggested that the healing effect of Natural Honey is related to chemical and physical properties <sup>5, 6</sup>, including acidity, high osmolarity, volatiles organic acids, pollen, flavonoids, propolis and hydrogen peroxide <sup>7</sup>.

Although honey has all the above characteristics, one of the most important properties seems to be its antimicrobial action. Antibacterial properties of Natural Honey is related to many factors including its low pH value of 3.4 - 6.1 <sup>8</sup>, super - saturated content of sugars with a low water content which draws fluid out of lymphatic's and capillaries thereby enhancing wound growth through fibroblast migration and epithelization, yet at the same time depriving microorganisms of water molecules thereby compromising their metabolism <sup>9</sup>.

Natural Honey also contains inhibin which is a thermo - labile substance acting as an antibacterial factor <sup>10</sup>, along with hydrogen peroxide, a well - known antimicrobial agent, which is diluted to 1: 1000 times, enough to kill most susceptible bacteria, Candida albicans, and Methicillin resistant Staph aureus.

Furthermore, Natural Honey possesses many properties which makes it the ideal dressing for a variety of wounds including its ability to absorb oedema from ulcer margins, derides wounds rapidly by the autolysis action of tissue proteases and an, create a physical barrier specially ones which contain a higher bee wax content which adds to its viscosity thereby preventing external pathogens from invading the wound.

It also provides nutrients to the wound bed including laevulose and fructose, manages pain and minimize scarring has anti - inflammatory properties<sup>11</sup> and deodorizes wounds by providing glucose to bacteria to metabolize instead of amino acids, resulting in the production of a non - malodorous metabolite, lactic acid. Furthermore, Natural Honey has an added advantage as it is easily removed from the wound bed provided you apply water or normal saline to

the honey impregnated dressing prior to removal or to change the dressing daily.

### Declarations

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Study approved by Institutional Ethics Committee.*

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**Table 1:** Comparable baseline features of group A and B

Comparable features	'Group A' mean	'Group B'
Total number of dressings needed per patient	10	18
Duration of hospital stay (days)	6	14
Difficulty in removal of dressing	Dressings were easily peeled off in one go.	Dressings removed with difficulty and pain.