

## Original Research Article

# A comparative study of honey-betadine dressing and paraffin gauze dressing on skin graft donor site

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### ABSTRACT

**Background:** Honey has long been used in Indian medicine for its anti-inflammatory, antibacterial and wound-healing properties. Split-thickness skin grafting is a common reconstructive method in surgery, yet there is no universally accepted, standardized dressing for donor sites that is simple, affordable and effective. This study evaluates honey as a donor site dressing to establish scientific evidence for its benefits.

**Methods:** A prospective randomized controlled trial was conducted at MGM Hospital, Navi Mumbai, from April 2025 to September 2025. Postoperative patients undergoing split-thickness skin grafting for healed ulcers were allocated into two groups: honey–betadine dressing or paraffin gauze dressing at the donor site.

**Results:** In the honey–betadine group, complete epithelialization occurred in 60% by day 7, 26.6% by day 10 and 6.6% by day 14. In contrast, only 33.3% of the paraffin gauze group healed by day 10, with 73.3% achieving complete healing by day 14 or later. Pain assessment revealed that in the honey–betadine group, 73.3% reported only mild or moderate pain, compared with 26.6% in the paraffin gauze group, where higher proportions experienced severe or very severe pain.

**Conclusions:** An ideal donor site dressing should be readily available, cost-effective, hydrating, antibacterial, infection-preventive, and promote rapid healing with minimal discomfort. Honey fulfils these criteria, demonstrating faster epithelialization, better pain outcomes and improved patient comfort compared with paraffin gauze.

**Keywords:** Cosmetic surgery, Dressings, Honey-betadine, Plastic surgery, Reconstructive surgery, Skin grafting, Wound healing

### INTRODUCTION

Honey has been traditionally used in Indian medicine since time immemorial for its anti-inflammatory, anti-bacterial and healing properties. It is produced by bees by extracting nectar from flowers.

There has been a long history of usage of honey for its wound healing properties in ancient medicine. The Russians used honey in World War I to prevent wound infection and to accelerate wound healing. The Germans combined cod liver oil and honey to treat ulcers, burns, fistulas and boils.<sup>1</sup> However, its use has dwindled through

the ages due to lack of scientific evidence to prove its efficacy.

Honey has been reported to have an inhibitory effect on around 60 species of bacteria, some species of fungi and viruses. Antioxidant capacity of honey is important in many disease conditions and is due to a wide range of compounds including phenolics, peptides, organic acids, enzymes, and Maillard reaction products.<sup>2</sup> It has hygroscopicity and exerts osmotic effect as it is a supersaturated sugar solution which absorbs moisture from the cells of microorganisms and leads to their desiccation.

Split thickness skin grafting is a common reconstructive method used in general surgery, orthopaedics and plastic surgery for the closure of healthy, healing ulcers caused due to variety of reasons such as trauma, burns, diabetes, peripheral vascular disease. It has been noted that patients experience more pain and discomfort of skin graft donor site as compared to recipient site.

There is no widely-accepted standardised method for the dressing of skin graft donor wounds that are easy to apply, accessible, cost-effective and most importantly effective. This study seeks to fill that gap by creating scientific evidence for honey's benefits in a clinical setting. The primary aim of this research is to compare the effects of a honey-betadine dressing versus a traditional paraffin gauze dressing on skin graft donor sites. Specifically, the study objectives are to measure and compare the rate of epithelialization (healing) and the levels of pain experienced by the patient between these two dressing modalities. By quantifying these outcomes, we hope to identify an optimal dressing material that addresses the physical and economic needs of the patient.

## METHODS

This prospective, interventional study was conducted at MGM Medical College and Hospital in Kamothe, Navi Mumbai, over a six-month period from April 2025 to September 2025. Prior to the commencement of the research, necessary approvals from the Institute Ethics Committee were obtained, and informed consent was secured from all participants. The study utilized a sample size of 30 patients who underwent split-thickness skin grafting for healed ulcers. For the statistical analysis, data were collected using standard tools and stored in Microsoft Excel to generate basic descriptive statistics such as frequency, percentage, mean, mode, median, and standard deviation, along with relevant graphs. To determine the level of significance, a p value of less than 0.05 was used for parametric tests, and the statistical package for the social sciences (SPSS) 24 was employed to perform the tests of significance.

The plan of study involved 30 patients who underwent split-thickness skin grafting for healed ulcers at MGM Hospital. After obtaining due informed consent, a prospective randomized controlled trial was performed by dividing the post-operative patients into two groups using a chit system. The first group consisted of 15 patients treated with a honey-betadine dressing at the graft donor site; this involved applying a layer of medical-grade, honey mixed with betadine solution directly onto the wound, which was then covered with paraffin dressing and sterile gauze. The dressing was secured using a sterile cotton roller bandage to provide adequate compression. The second group of 15 patients served as the control and was treated with plain paraffin gauze dressing, also secured with a sterile cotton roller bandage and adequate compression.

All donor site dressings were meticulously observed for signs of soakage, discharge, or infection, such as foul-smelling discharge or profuse exudate. To assess the pain experienced by the patients, a 10-point visual analogue scale was utilized daily, and an average pain score was calculated for the first week. Clinical progress was monitored through a check dress performed on post-op day-7, followed by a second dressing on post-op day-10 and a subsequent evaluation on post-op day-14. During these sessions, the onset of epithelialization and the overall extent of wound healing were observed and recorded. Patients were further followed up for a total period of one month to monitor the long-term healing at the donor site.

The inclusion criteria for the study required patients to have healthy ulcers with good granulation tissue, to provide consent for the surgical procedure, and to demonstrate a willingness to follow up for regular dressing changes. Conversely, the exclusion criteria ruled out patients with unhealthy wounds showing signs of infection such as slough or discharge, those who did not consent to the surgery or the study itself, and any patients who were lost during the follow-up period.

## RESULTS

The two groups were comparable at baseline. The mean age was  $46.8 \pm 17.2$  years in the honey-betadine group and  $47.9 \pm 18.5$  years in the paraffin gauze group, with no statistically significant difference between the groups ( $p=0.87$ ). Males predominated in both groups, accounting for 66.7% in the honey-betadine group and 73.3% in the paraffin gauze group ( $p=0.72$ ). Regarding disease etiology, trauma was the most common indication in both groups, followed by diabetic foot and peripheral vascular disease, with burns and venous ulcers forming the smaller subsets. There was no significant difference in etiological distribution between the two groups ( $p=0.81$ ), indicating that the groups were well matched at baseline.

None of the patients treated with honey had any allergic reactions in the form of urticaria, erythema or other signs of inflammation. It was observed that in the group treated with honey-betadine dressing, complete epithelialisation occurred in 60% cases on day 7, 26.66% on day 10 and 6.66% on day 14.

In contrast, none of the controls treated with paraffin gauze dressing achieved complete wound healing by the end of first week. Only 33.33% wounds in this group were completely healed by day 10 and rest of the 73.33% achieved this by day 14 or two weeks post-operatively.

### *Assessment of pain at donor site*

Although pain is a subjective measure, the following results were obtained on assessing it using the visual analogue scale.

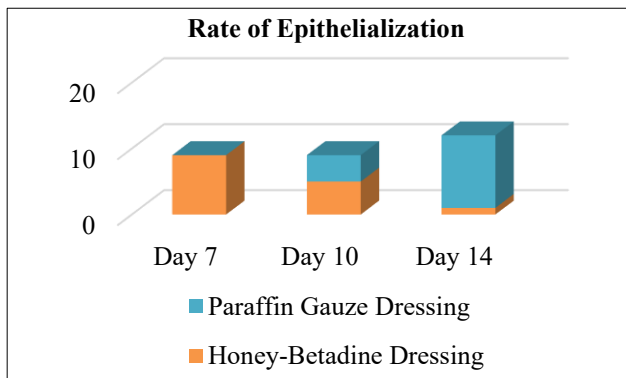
**Table 1: Baseline demographic and clinical characteristics of the study population.**

Variables	Honey–betadine group (n=15)	Paraffin gauze group (n=15)	P value
Age (years), mean±SD	46.8±17.2	47.9±18.5	0.87
<b>Gender (%)</b>			
Male	10 (66.7)	11 (73.3)	
Female	5 (33.3)	4 (26.7)	
<b>Disease etiology (%)</b>			
Trauma (RTA/fall/fasciotomy)	5 (33.3)	6 (40.0)	
Diabetic foot	4 (26.7)	5 (33.3)	
Peripheral vascular disease	4 (26.7)	3 (20.0)	
Burns	1 (6.7)	2 (13.3)	
Venous ulcer	1 (6.7)	1 (6.7)	

Values are presented as mean±SD or n (%)

**Table 2: Comparison of complete epithelialization over time.**

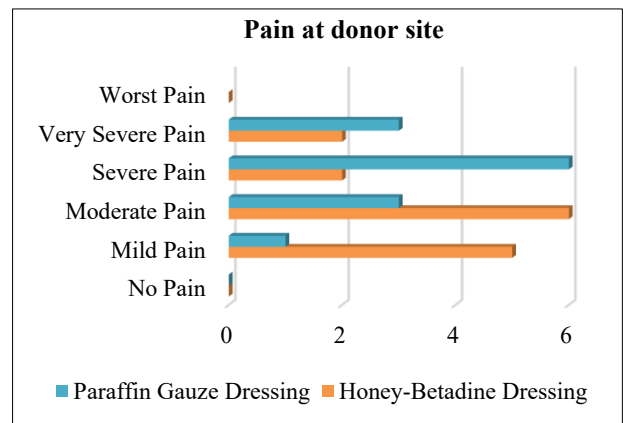
Epithelialization complete	Day 7	Day 10	Day 14
Paraffin gauze dressing	0	4	11
Honey-betadine dressing	9	5	1



**Figure 1: Rate of epithelialization.**

Out of the patients that were dressed with honey-betadine dressing, 33.33% experienced mild pain, 40% experienced moderate pain, 13.33% experienced severe pain and 13.33% very severe pain. It was observed that none of the patients from this group experienced either no pain or worst pain.

Out of the patients that were dressed with paraffin gauze dressing, 6.66% experienced mild pain, 20% experienced moderate pain, 40% experienced severe pain, 20% experienced very severe pain and 13.33% experienced worst pain. It was observed that none of the patients from this group experienced no pain. Mild or moderate pain (reduced amount of pain) was experienced by only 26.66% as compared to 73.33% of cases treated with honey-betadine dressings.



**Figure 2: Pain at donor site.**

On an average, patients that were dressed with honey-betadine experienced less pain and had a more comfortable recovery.

**Table 3: Distribution of pain severity scores.**

Variables	No pain 0	Mild 1-3	Moderate 3-5	Severe 5-7	Very Severe 7-9	Worst 9-10
Paraffin gauze dressing	0	1	3	6	3	2
Honey-betadine dressing	0	5	6	2	2	0

**DISCUSSION**

The management of skin graft donor sites remains a clinical challenge, as patients frequently report higher levels of pain and discomfort at the donor site compared to the recipient site. Despite various available options, there

is no universally standardized, cost-effective dressing that promotes rapid healing while minimizing patient distress. This study demonstrates that a honey-betadine dressing significantly outperforms traditional paraffin gauze in both the speed of epithelialization and the reduction of postoperative pain.

### **Interpretation of healing outcomes**

In the present study, the honey-betadine group showed a remarkable acceleration in healing, with 60% of patients achieving complete epithelialization by day 7. In stark contrast, no patients in the paraffin gauze group achieved complete healing within the first week. By day 10, 86.6% of the honey-treated group had healed, compared to only 33.3% in the control group.

The physiological basis for this accelerated healing lies in the biochemical properties of honey. Its high osmolarity creates an osmotic pressure that draws lymph from the underlying tissues, providing a moist environment rich in nutrients and growth factors necessary for tissue regeneration. Furthermore, the acidic nature of honey (pH 3.2–4.5) promotes oxygen release from hemoglobin and inhibits protease activity that could otherwise delay healing. These results align with the findings of Subrahmanyam (2015), who noted that honey dressings significantly accelerate split-thickness skin graft donor site healing compared to conventional dressings.<sup>5,6,9,13</sup>

### **Pain assessment and patient comfort**

Pain management is a primary goal in wound care, as traditional dressings like paraffin gauze often adhere to the wound bed, causing trauma and severe pain during removal. Our study found that 73.3% of patients in the honey-betadine group experienced only mild or moderate pain. Conversely, the paraffin gauze group experienced significantly higher pain levels, with a combined 73.3% reporting severe, very severe, or worst pain.

Honey maintains a moist interface that prevents the dressing from sticking to the newly formed epithelium. This non-adherent property protects delicate nerve endings and reduces mechanical irritation. These observations are consistent with a systematic review by Zhang et al, which identified honey-based dressings as superior in reducing visual analogue scale (VAS) scores compared to iodine-based or paraffin dressings.<sup>3,6,11,19</sup>

### **Antimicrobial and synergy effects**

The combination of honey and betadine (povidone-iodine) likely provides a synergistic antimicrobial barrier. While honey produces low levels of hydrogen peroxide and contains inhibitory compounds like phenolics, betadine offers rapid, broad-spectrum bactericidal action. This dual-action approach prevents wound infection and removes slough, which is essential for maintaining a healthy granulation bed. Previous literature by Hamdy et al supports this, showing a 50–100% decrease in microorganisms in septic wounds treated with honey.<sup>4</sup>

### **Clinical and economic implications**

For healthcare systems in developing countries like India, the ideal dressing must be accessible and affordable.

Honey-betadine is a cost-effective alternative to expensive modern hydrocolloids and silver-impregnated dressings. Its ability to reduce hospital stays through faster healing and improved patient compliance makes it a highly viable option for widespread clinical use.<sup>12,20</sup>

### **Limitations**

While the results are compelling, this study has several limitations. First, the sample size of 30 patients is relatively small, which may limit the generalizability of the results to a larger, more diverse population. Second, the assessment of pain is inherently subjective and can be influenced by individual thresholds and psychological factors. Third, the study was conducted over a relatively short period of six months at a single institution, potentially introducing center-specific bias. Furthermore, the study did not utilize a double-blind design due to the visible differences between the dressing materials, and the use of "medical-grade" honey was not standardized against varied commercial or local sources.

### **CONCLUSION**

From an economic and social point of view, an ideal dressing for a skin graft donor site must be easily available and affordable in a country like India in order to cater to the needs of the many. From a surgical point of view, it should be a hydrating agent that locks in the moisture, prevents wound infection and provide an anti-bacterial barrier. From a patient's point of view, it should lead to quicker healing and result in a cosmetically appealing wound with an overall low pain or pain-free experience. Honey proves to check all these boxes. Although patient satisfaction is a controversial and subjective purview of matter, wound healing is excellent with this practice and should be considered for more widespread uses in wound healing.

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