

Original Article

Honey compared with 1% silver sulfadiazine cream in the treatment of superficial and partial thickness burns

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Abstract

Objective To assess the efficacy of honey compared with 1% silver sulfadiazine cream as a burn dressing for the treatment of superficial and partial thickness burns covering less than 15% of the body surface.

Patients and methods In a randomized comparative clinical trial, carried out at the Surgical Department, of Combined Military Hospital, Bahawalpur, from September, 2002 to August, 2003, 50 patients were selected for the study. They were randomly assigned to two groups. Each group contained 25 patients. Patients in group-I were treated with pure honey which was applied once daily after the wound was cleaned with normal saline. Patients in group-II were similarly dressed with a layer of 1% silver sulfadiazine cream once daily. The effectiveness of the two modalities of treatment was judged on the basis of time taken for the wounds to heal, to be relieved of pain and to get sterile.

Results In group-I (treated with honey), 52% of the patients had all the burns healed after 2 weeks and 100% got cured after 4 weeks. In group II (treated with 1% silver sulfadiazine), 20% of the patients had their burns healed after 2 weeks, 60% after 4 weeks and 100% by the end of 6 weeks of the treatment. As regards pain relief, all the patients of group-I were relieved of pain after 3 weeks of the treatment. On the contrary it took 4 weeks for all the patients of group-II to be free of pain. Lastly, it took 3 weeks and 5 weeks for positive swab culture from the wound to get sterile with honey and 1% silver sulfadiazine cream, respectively.

Conclusion With all the three criteria used to compare the effectiveness of the two modes of burn wound treatment, honey was found superior to silver sulfadiazine.

Key words

Superficial burns, partial thickness burns, honey, silver sulfadiazine cream.

Introduction

Burn is one of the most agonizing conditions that a doctor treats. Alleviation of pain and

prevention of early and late complications is a formidable task to accomplish. In a well equipped burn centre the outcome is quite satisfactory, but in other set ups a complication-free cure is very difficult. Since most of the patients in our hospitals are economically handicapped, the cost of treatment is the main hindrance in the proper management of burns. An effective

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treatment at affordable price is the need of the day. This study has found honey not only very economical but also a more effective agent as a burn wound dressing as compared to 1% silver sulfadiazine cream, which is the most popular and regarded as the most potent topical antimicrobial agent for burn wound dressing. The easy availability and lack of side effects of honey makes it all the more promising agent for the treatment of superficial burns.

Patients and methods

The study was a randomized, comparative clinical trial. The objective of the study was to compare the effectiveness of honey in topical dressing with 1% silver sulfadiazine cream in the treatment of superficial and partial thickness burns covering less than 15% of the body.

The effectiveness of the two modalities of treatment was judged on the basis of three criteria:

1. Wound healing.
2. Pain relief.
3. Time taken for the wound to get sterile.

The study included patients of all ages. The mean age was 27.4 years. The patients who were included sustained superficial and deep partial thickness burns. The total body surface area involved was less than 15%. There was no evidence of any other co-morbid condition in the patients. The study excluded patients who sustained deep burns and those who sustained burn on more than 15% of their body, whether it was superficial or deep. It also excluded those patients who were suffering from any

medical illness before or after sustaining a burn.

The study population was the patients who reported in surgical out patient department of Combined Military Hospital, Bahawalpur from September 2002 to August 2003. The patients included both males and females. The total number of patients registered was 50. Among these 32 patients reported to the hospital within 6 hours of burn and 18 after 6 hours of getting burned. The patients were randomly divided in two groups with comparable extent of the injury. General management of the patients, as well as the initial management of the wound regarding cleaning and debridement was the same in both groups.

Patients in group I (n=25) were treated with pure, unprocessed, undiluted honey which was applied once daily after the wound was cleaned with normal saline. A thin layer of honey was spread on the involved area and was covered with sterile gauze. Patients in group II (n=25) were similarly dressed with a layer of 1% silver sulfadiazine once daily.

At the time of change of dressing details regarding the condition of the wound such as signs of wound infection, condition of surrounding unburned tissues, discharge, smell, necrotic tissue and state of epithelialization was noted. Swabs for bacterial density and cultures were also obtained regularly. Subjective factors such as pain and local irritation were recorded regularly. Allergies or other side effects were noted in both groups.

A follow up was done for 6 months after the wound healing to record the frequency of

scars, keloids or contractures formation. General laboratory and radiological tests to detect any complications was done on regular basis.

Results

The effectiveness of honey was compared with 1% silver sulfadiazine was judged on the basis of three criteria. These included the speed of wound healing, the rapidness of pain relief without oral medicines and the time taken by the wound to get sterilized. In group I treated with honey, 52% (n=13) of the patients had all the burns healed after 2 weeks and 100% (n=25) got cured after 4 weeks. In group II treated with 1% silver sulfadiazine, 20% (n=5) of the patients had their burns healed after 2 weeks, 60% (n=15) after 4 weeks and 100% (n=25) were cured by the end of 6 weeks of the treatment (**Table 1**).

36% (n=9) of the patients of group I were free of pain after 1 week, 80% (n=20) after 2 weeks and 100% (n=25) after 3 weeks of the treatment. On the contrary 16% (n=4) of the patients of group-II were pain free after 1 week, 44% (n=11) after 2 weeks, 72% (n=18) after 3 weeks and 100% (n=25) after 4 weeks of dressing (**Table 2**). Change of dressing was also less painful in those dressed with honey because it was easily washed with saline compared to 1% silver sulfadiazine which formed a thick layer over the wound and had to be rubbed off and often required general anaesthesia to counter the pain.

The swabs were positive for bacterial growth in 80% (n=20) of the patients in group I and 76% (n=19) of the patients in

group II. Time taken for positive swab culture from the wound to get sterile with honey dressing was 3 weeks and with 1% silver sulfadiazine cream was 5 weeks.

There was an overall 4% higher incidence of hypertrophic scar and hypergranulation in group II as compared to group I after 6 months of follow-up. Hence it may be concluded that there was no significant difference as far as hypertrophic scar formation or the development of contractures in the two groups was concerned. No allergy or any side effects were noted in group I; however mild irritation and burning was complained of by 2 patients in group II after two weeks of the treatment.

The cost of treatment per percent body surface burnt per dressing of 1% silver sulfadiazine was Rs. 10 for 2 grams of ointment and Rs. 0.75 for 5 ml of honey. Hence the cost of honey dressing was 10 times lower as compared to 1% silver sulfadiazine cream. As the duration of wound healing with honey was lesser as compared to 1% silver sulfadiazine, in our study, hence it required lesser number of dressings in group I as compared to group II. This further reduced the cost of treatment with honey.

Hence in accordance to all the three criteria used to compare the effectiveness of the two modes of burn wound treatment, honey was found superior to 1% silver sulfadiazine (**Table 3**).

Discussion

Burns result from disruption of functional integrity of tissues caused by a pathological

Table 1 Time taken for wound healing in group I compared to group II.

<i>Duration of treatment</i>	<i>Number of patients (percentage) in group I</i>	<i>Number of patients (percentage) in group II</i>
2 weeks	13 (52)	5 (20)
4 weeks	25 (100)	15 (60)
6 weeks	-	25 (100)

Table 2 Time taken for the wound to be free of pain in group I compared to group II

<i>Duration of treatment</i>	<i>Number of patients (percentage) in group I</i>	<i>Number of patients (percentage) in group II</i>
1 week	9 (36)	4 (16)
2 weeks	20 (80)	11 (44)
3 weeks	25 (100)	18 (72)
4 weeks	-	25 (100)

Table 3 Comparison of the effectiveness of daily dressings with honey (group I) and with 1% silver sulfadiazine (group II)

<i>Criteria for cure</i>	<i>Time taken for patients of group I to show 100% cure</i>	<i>Time taken for patients of group II to show 100% cure</i>
Wound healing	4 weeks	6 weeks
Pain relief	3 weeks	4 weeks
Negative bacterial culture from the wound	3 weeks	5 weeks

influx of energy.¹ The source of energy may be thermal, chemical, electric or radiation. Burns have a wide clinical spectrum ranging from mild superficial burn to complete destruction of entire thickness of the skin resulting in gross disfigurements, scarring and contractures. It is fatal in patients with involvement of major portion of body surface.

Burn may be industrial, domestic and environmental in origin. The incidence of industrial burns is showing a positive decline,² but the cases of domestic burns still contribute a major portion of the burn patients reporting in our set up. The main victims are children and house wives. Victims are most commonly poor who cannot afford expensive treatments.

The depth of burn can simply be classified as superficial partial thickness (restricted to epidermis), deep partial thickness (involve

epidermis and dermis) and full thickness (include epidermis, dermis and subcutaneous tissue).³ This classification is very important as regard the management, hospital stay and prognosis of the patients. The assessment of area of burn is also equally important, as it directly affects the fluid requirement. The simplest method to determine the percentage of the area burn is by applying “rule of nine”, which divides areas on the body into area of 9% or multiples of 9%.

The principle of burn wound management is to achieve healing as quickly as possible with minimum of scarring. The two clinical aspects that determine the severity of burn injury are the depth of burn and its extent. Vast majority of burns are small and superficial and are best treated with derroofing of blisters, gentle cleansing with saline and the application of non-adherent

dressing.⁴ For full-thickness burns surgery is definitely indicated; however, for partial thickness burns the choice of surgery or conservative treatment depends upon the extent of injury.⁵ Another concern in the burn management is the colonization of wound with gram positive cocci. *Streptococcus pyogenes* group-A is still regarded as the most serious pathogen but now there is more concern about staphylococcal toxemia particularly in children with small burns.⁶ When surgery is not indicated and the burn wound is to be managed conservatively then topical anti-bacterial creams are used. 1% silver sulfadiazine is active against both gram positive and gram negative bacteria, and is the most widely used anti-bacterial cream. In the present study the effectiveness of this cream is compared with a traditional medicine “honey” in accordance to a set protocol.

Honey has been used since Roman civilization as a dressing for burns. Celsus described a mixture of honey and bran as a burn dressing. It is a useful treatment for many diseases including burns in “Tib-e-Nabvi”. Honey consists of simple sugars, mainly fructose and is an excellent source of energy. Due to the osmotic effects it remains sterile indefinitely and inhibits the growth of both gram negative and gram positive bacteria. The main factor responsible for its antimicrobial effect is a thermolabile substance “inhibin”, which is a very potent antimicrobial due to its low pH (3.6) and its hygroscopic properties. This product was first discovered in honey in 1962.⁷ Honey contains the enzyme catalase which aids in healing process and promotes epithelialization. It also modifies excessive

collagen production to prevent scarring.⁸ After the discovery of “inhibin”, honey was widely used for various indications and found to have excellent results in healing of chronic wounds,^{9,10,11} decubitus ulcers,¹² chronic leg ulcers,¹³ radiation mucositis¹⁴ and burns.^{15,16}

In our study honey in comparison with 1% silver sulfadiazine cream produced excellent results as a burn dressing. It produced wound healing in 4 weeks as compared to 6 weeks in patients treated with 1% silver sulfadiazine cream. It also took lesser time for the wound to be pain free (3 weeks as compared to 4 weeks) and sterile (3 weeks as compared to 5 weeks). These results are much similar to the previous studies. In a study conducted in 1991 in India, 91% of the burn wounds treated with honey got sterile within 7 days compared to only 7% of the wounds treated with 1% silver sulfadiazine.¹⁶ In another study conducted in India in 1998, 100% epithelialization occurred in burns treated with honey by the 21st day compared to 84% healing with 1% silver sulfadiazine. It was further concluded in the study that in honey dressed wounds, there was early subsidence of inflammation, better control of infection and quicker wound healing compared to the other group.¹⁵

Hence according to the results of this study and all the previous studies it is recommended that honey must be used in the treatment of superficial burns, as beside being an effective treatment it also relieves pain earlier, makes the wound sterile and is cost effective as compared to 1% silver sulfadiazine.

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