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Research Article

To Assess the Efficacy of Honey in Comparison with 1% Silver Sulfadiazine Cream as A Burn Wound Dressing in Superficial and Partial Thickness of Burns

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Abstract: Aim of this prospective randomized comparative study was to evaluate the efficacy of honey and silver sulfadiazine cream in the management of superficial and partial thickness of burns. This prospective randomized study was conducted in 110 patients who had partial thickness burns less than 50% of total body surface area and carried out at the department of Surgery, G.R. Medical Collage Gwalior, during September, 2009 to August, 2011. Our study plan was approved by the ethical committee of our institution. After stabilization, patients were randomly divided into two equal groups. Patients in group-I were treated with undiluted pure honey which was applied every alternate day after the wound was cleaned with normal saline. Patients in group-II were similarly dressed with a layer of silver sulfadiazine cream every alternate day. Both groups were statistically similar in age, sex, and size. Time of re-epithelialization was significantly shorter in the Honey treated group (10 +/- 4 days in Honey Group versus 12 +/- 6 in 1% silver sulfadiazine treated Group) between both groups ($p < 0.05$). Early wound epithelialization, time taken in wounds to get culture negative and cost of treatment were compared between both groups. The results reveal that the honey dressings are superior to Silver Sulfadiazine cream in the management of Superficial and partial thickness of burns.
Keywords: Silver sulfadiazine, Burn wounds, Honey dressing.

INTRODUCTION

Burn wounds, even of partial depth, can present challenging clinical problems if the surface involved is sufficiently extensive. The final aim of burn management and therapy is wound healing and epithelization as soon as possible in order to prevent infection and to reduce functional and aesthetic effects[1]. The use of topical chemotherapy is fundamental and has helped to improve the survival of patients with major burns and to minimize the incidence of burn wound sepsis which is a leading cause of mortality and morbidity in these patients [2].

Management of the burn wound still remains a matter of debate and an ideal dressing for burn wounds has not been discovered [3]. Bee products have been extensively studied for their healing powers and have become part of cosmetic preparations and folk medicine [4]. There are so many clinical observations indicate that honey may initiate or accelerate the healing of chronic wounds, therefore, claimed to have anti-inlamatory properties. [5]. Although honey has been used as a traditional remedy for burns and wounds, the potential for its use in mainstream medical care is not well recognized [6]. Honey, a natural product of bees of the genera *Apis* and *Meliponinae*, is a mixture of sugars prepared by the bees from the natural sugar solution called nectar obtained from flowers. By inverting sucrose in the nectar, the bee increases the attainable density of the final product and thus, raises the efficiency of the process in terms of caloric density [3].

The medicinal properties of honey have been recognized since antiquity [7]. Various researchers have shown that honey exerts an antibacterial activity against various organisms, including both Gram-positive and Gram-negative bacteria.

The antibacterial activity of honey is mainly due to inhibines in honey. These inhibines consist of hydrogen peroxide, flavanoids, and phenolic acids, plus many other unidentified substances [8, 9]. A number of reasons for this have been suggested: shrinkage disruption of the bacterial cell wall due to the osmotic effect of the sugar content, induction of an unfavorable environment with low-water activity, thereby inhibiting bacterial growth, a low pH of 3.6 and the fermentation of honey producing alcohol. *In situ* honey acts as a highly viscous barrier preventing bacterial penetration and colonization of the wound surface [10-12].

The antimicrobial effect of honey may well be an answer to the question of a cheap, easily available,

nontoxic, nonirritant, antibacterial agent for burn dressing in a developing country like India.

MATERIALS AND METHOD

In this study, out of the 110 patients 52 were male and 58 were female. The age ranged between 10 - 50 years. 40 patients (36.36 percent) were in the age group of 21-30 years.

Our study plan was approved by the ethical committee of our institution.

After admission in ward, general condition of the patient was assessed; shock was managed by rapid intravenous infusion of ringer lactate, and other supportive measures including tetanus toxoid, antibiotic, analgesic. Swabs were taken on admission and weekly thereafter. Once the patient was stabilized, then patient is divided in two group; Honey group and SSD group.

Patients included in the honey group wound was examined carefully and washed with normal saline, then undiluted, pure honey applied to the wound. After the application of honey wound was dressed with sterile gauge, cotton pad, roller bandage. Dressing of the wound was done alternate day and status of wound assessed on alternate day and at the completion of study, then patients had followed up every 15 day till epithilisation.

In SSD group everything was same as in Honey group, except for the dressing which was done by Silver sulfadiazine, alternate day. Wound was assessed alternate day and on the day of discharge. Patients were followed up every fortnight for 2 months. Final outcome was measured after 2 months of follow-up.

RESULTS

In this study, out of the 110 patients 52 were male and 58 were female. The ages ranged between 10 and 50 years. 40 patients (36.36 percent) were in the age group of 21-30 years. Table 1 and 2 shows age, and extent of burns in 110 patients divided randomly in two groups.

Table1: Age Distribution

Sl. No.	Age Group	Patients	
		No .of Cases	Percentage
1	11-20 Year	16	14.54%
2	21-30 Year	40	36.36%
3	31-40 Year	32	29%
4	41-50 Year	22	20%
	Total	110	100%

Table 2: Extent of burns

S.no.	TBSA of Burn (in percentage)	Patients	
		No. of Cases	%
1	11-20	20	18.18%
2	21-30	26	23.63%
3	31-40	33	30%
4	41-50	31	28.18%
Total		110	100%

In group-I (Table 3), epithelialization had begun at 5th day, in 31 patients (56%) epithelialization occurred by 10th day. 53 patients (96%) were epithelialized by day 30, and healing all patients was complete by 40th day. While only in 13 patients (20%) in group–II healing occurred by 15th day. In this group epithelialization mainly occurred between 16-30 days in 31 patients (60%), and it took 60 days for epithelialization to occur in all patients. In group–I, wounds of 56% patients epithelialized between 5-10 days while in group II only 12% patient's wound epithelialized between 5-10 days,in this way honey was found associated with early wound epihtelialization. There was a significant difference in time taken for wound healing (p-value =0.002) between the two groups.

Table 3 : Time required for healing (epithelialization) in patients in both study groups (n=110)

Time taken for wound epitheliazation (day)	Group –I (Honey) No. (%)	Group – II (SSD) No. (%)
5-10	31 (56.0%)	8 (12.0%)
11-15	12(24.0%)	5 (8.0%)
16-20	8 (12.0%)	14 (28.0%)
21-30	2 (4.0%)	17 (32.0%)
31-40	2 (4.0%)	7 (12.0%)
41-50	(0.0%)	2 (4.0%)
51-60	(0.0%)	2 (4.0%)

Patients treated with honey dressing, wound swab culture negative in less than 7 days is 65% while 27% patients turned swab culture negative in less than 15 days, 8% patients in less than 21 days.

Patients treated with silver sulfadiazine, 19 patients turned swab culture negative in less than 28 days, 16 patients take more than 28 days to make the wound sterile, 14 patients turned swab culture negative in less than 21 days, only 6 patients became swab culture negative in less than 14 days.

The price of 1000 gm of honey was Rs. 290, whereasthe price of 250 gm of Silver sulfadiazine was approximately Rs. 250. Amount of these topical applicants used inan adult in each dressing was approximately 2gm ofSSD per percent of burn area or

4gm of honey perpercent of burn area. Comparative cost per dressing perpercent burn is shown in Table 4. Cost of treatment with honey is less as compared to SSD.

Table 4: Comparative cost per dressing perpercent burn

Amount used/ Dressing % Burn		Cost in Rs.
Silver sulphadiazine	2 gm	2.00
Honey	5 gm	1.45

DISCUSSION

Burn patient have a higher morbidity than mortality as because presence of necrotic tissue, has great chances of infection and thus requires long periods of dressings, leading to deformities and contracture [3]. Delayed reporting has been found to be an important factor that causes an increase in wound infection and thus morbidity [13]. This is a major problem in the third world countries like India, owing to poor transport condition, illiteracy and relative inaccessibility of tertiary health-care centre's. Delay and inadequate fluid resuscitation and overwhelming infection are the major factors in the morbidity and mortality [14].

In patients with severe burns, wound infection and contamination frequencies have been found to be higher for all admission time points [13]. Infection is one of the most frequent complications of wound healing despite the use of antibiotics and a modern sterile technique. Infection accounts for considerable patient morbidity, discomfort and prolonged hospitalization and it must be avoided to permit proper healing [15].

Honey dressing decreases the average duration of healing as compared to the SSD dressing. The healing process requires clearance of pathogenic organisms. Since antibiotics are ineffective in this situation and antiseptics cause tissue damage, the healing process is slow [16]. Honey is reported to cause no tissue damage and promotes the healing process. A numerous reports are there where sugar is used as a wound dressing [17-19].

Honey acts mainly as a hyperosmolar medium and prevents bacterial growth. Because of its high viscosity, it forms a physical barrier and the presence of enzyme catalase gives honey an antioxidant property. Its high-nutrient content improves substrate supply in local environment promoting epithelialization and angiogenesis. These properties of honey make it an ideal and cost-effective dressing for burn patients.

CONCLUSION

Honey dressing improves wound healing by rendering it sterile in lesser duration of time as compared to SSD dressing. It reduces morbidity, hospital stay so, it is very cost effective and hence can be used in the developing countries like India. Wound treated with Honey dressing have a better outcome in term of hypertrophic scar, soft scar and contracture. Honey dressing patient does not need any associated treatment like debridement, healing is better in terms of cosmetic appearance.

Hence, honey dressing is a better option for dressing in burn, in terms of decreased morbidity, economy, patient well- being and speedy rehabilitation.

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