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Honey impregnated gauze versus polyurethane film (OpSite^{R}) in the treatment of burns – a prospective randomised study

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SUMMARY. **Honey impregnated gauze was compared with OpSite^{R} as a cover for fresh partial thickness burns in 2 groups of 46 randomly allocated patients. Honey impregnated gauze dressed wounds showed healing earlier as compared to OpSite (mean 10.8 versus 15.3 days).**

Prevention of infection and treatment of infection in burn wounds are major aims of treatment. Many systemic and topical regimes are in use, but none is completely satisfactory. It has been shown that wounds epithelialise more rapidly in a moist environment.[1,2] The maintenance of a moist environment depends on the qualities of dressing such as adherence, occlusiveness and limitations of water vapour transport.

Honey has been found, when applied locally, to reduce infection and promote wound healing.[3,4] In the treatment of burns also honey has been used by topical application.[4–7] A clinical trial was undertaken to compare the healing rate of burns using honey impregnated gauze and a commercially available dressing, OpSite^{R}.

Patients and Methods

92 patients with partial thickness burns less than 40% of body surface area who were treated within 6 h of the burn at General Hospital, Solapur during the period January 1990–June 1991 formed the material for this study. After initial management, patients were allotted at random to two groups. In group 1 (n = 46), sterile honey impregnated gauze was applied over the burn area after washing with normal saline and covered with pads and bandage. Honey impregnated gauze was prepared by dipping sterile gauze in unprocessed and undiluted honey obtained from hives. In group 2 (n = 46), the wounds, after washing with normal saline, were covered by bio-occlusive, moisture-permeable polyurethane dressing (OpSite^{R}, Smith and Nephew, UK). In group 1 the dressing was changed on day 2 and if there was no evidence of infection this was repeated on alternate days until the wound had healed. In group 2, the wound was observed for evidence of infection, excessive exudate or leakage. In the absence of these, the dressings were removed on day 8 to examine the wound and a culture swab was taken. If there was infection the covering polyurethane sheet was changed after cleaning. General management of these patients remained the same in both groups. In both groups bacterial culture and sensitivity determinations were performed from swabs taken from the surface of the wound at the time of admission and on days 8 and 21 in all cases or until the wound healed. The time required for complete healing was noted in both groups.

Results

Of the 92 patients, 44 were males and 48 females. The youngest patient was 3 years old and the oldest 65 (mean 42.8) and the burn surface area ranged from 15–35% (mean 22.7%). Extremities and abdomen were involved in 90% of the cases.

In patients treated with honey impregnated gauze, the wounds showed signs of healing earlier (mean 10.8 days, Table 1) ($p < 0.001$, chi square test, statistically significant). During the change of dressing there was no bleeding and there was no difficulty in removing it. No scab formation was observed except in two cases. Of the 46 cases, 36 were sterile at the time of admission and at the end of day 8, 38 were sterile and 8 were infected (Table 2). The wound healed without overgranulation in 44 cases while two showed overgranulation. Contracture was noted in 2 cases.

Polyurethane film (OpSite) required changing in 5 cases between 3–5 days because of exudate oozing from underneath the dressing. In two cases this was frank pus which grew *Staphylococcus aureus*. Of the 46 cases, 29 remained sterile and infection was found in 17. Wounds healed between 12–24 days (mean 15.3 days) ($p < 0.001$, statistically significant). Overgranulation was noted in 2 cases and contracture in one case. Of the total 25 infected patients in both groups on day 8, coagulase positive *Staphylococcus*

Table 1 Healing of burn wounds in 92 patients

No. of patients	*Type of dressing*	*Range (days)*	*Healing time (days) (mean)*
46	Honey impregnated gauze	8–16	10.8
46	OpSite	12–24	15.3

Table 2 Culture swab study in 92 patients

No. of patients	*Type of dressing*	*Before application of dressing (day 1)*		*After application of dressing (day 8)*	
		Sterile	*Infected*	*Sterile*	*Infected*
46	Honey impregnated gauze	36	10	38	8
46	OpSite	37	9	29	17

($p < 0.001$, chi-square test)

aureus (8), *Pseudomonas aeruginosa* (3), *Klebsiella* (6) and *Escherichia coli* (8) were the organisms grown.

Statistical analysis to compare the rates of wound healing with honey impregnated gauze and OpSite was by chi-square test and this was significant ($p < 0.001$).

Discussion

The wound healing properties of honey have been well documented.[3,4,7,8] The antimicrobial properties of honey are attributed to its hypertonicity, low pH, a thermolabile substance called inhibine and enzymes such as catalase.[9,10]

In this prospective randomised study, honey impregnated gauze dressing resulted in a higher number of uninfected wounds and more rapid epithelialisation. Presumably the bacterial count in honey treated wounds was kept low because of the anti-bacterial properties of honey as mentioned above. Debridement of wounds by chemical or enzymatic action and deodorisation of offensive wounds was also noted. Honey impregnated gauze acts as a viscous barrier to wound invasion and fluid loss, although this is not well understood.[3] Subjective relief of pain and soothing effects were noticed, though not documented in detail. Since there was no difficulty in removing the honey gauze and not much pain during dressing, these factors, associated with easy availability, make honey suitable as cover for burns in their management.

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References

1. Winter GD. A note on wound healing under dressing with special reference to perforated film dressing. J Invest Dermatol 1963; 45: 299.
2. Davis JWL. Synthetic materials for covering burn wounds. Progress towards perfection. 1. Short term materials. Burns 1984; 10: 94–103.
3. Bregman A, Yamai J, Wiss J, Bell D, David MP. Acceleration of wound healing by topical application of honey. An animal model. Am J Surg 1983; 145: 374–6.
4. Effem SSE. Clinical observations on the wound healing properties of honey. Br J Surg 1988; 75: 679–81.
5. Philips CE. Honey for burns. Gleanings in Bee Culture 1933; 61: 284.
6. Voigtlander N. Honey for burns and scalds. The Bee World 1937; 18: 128.
7. Subrahmanyam M. Topical application of honey in treatment of burns. Br J Surg 1991; 78: 497–8.
8. Cavanagh D, Beazler J, Ostapowicaz F. Radical operation for carcinoma of the vulva, a new approach for wound healing. J Obstet Gynaecol Br Common W 1968; 77: 1037–40.
9. White JA. Composition of honey. In: Crane E, ed. Honey: a comprehensive survey. London: Heinemann, 1975: 175–206.
10. White JW, Subers MM, Schpartz AI. The identification of inhibine, the antibacterial factor in honey, as hydrogen peroxidase system and its origin in a honey glucose oxidase system. Biochem Biophys Acta 1963; 73: 57–70.

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