Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/14382
DOI URL: http://dx.doi.org/10.21474/IJAR01/14382

RESEARCH ARTICLE

THYME HONEY VIRTUES ON BURN WOUNDS HEALING IN YOUNG CHILDREN: A RETROSPECTIVE PRELIMINARY STUDY AND LITERATURE REVIEW

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Manuscript Info

Manuscript History
Received: 10 January 2022
Final Accepted: 15 February 2022
Published: March 2022

Key words:-
Thyme Honey, Burn Wounds, Healing

Abstract

Clinicians have been searching for ways to obtain proper wound healing with an accessible cost. Honey is an ancient traditional remedy for the treatment of infected wounds. We evaluated burn wound healing and antibacterial properties of locally produced Thyme honey on different types of burns in young children (<2 Years Old).This experimental study was conducted over a period of 2 years, in the Department of Plastic Surgery and Burns at the Avicenna Military Hospital of Marrakech on young children. This series includes 20 hospitalized children with ages between 6 months and 2 years, suffering different burn types and areas. All the patients received topical thyme honey based protocol.The average length of hospitalization was 12 days with an average time for burn wound coverage of 2 weeks. All of our patients resulted a flat healing without hard bulges or disfiguring complications. We concluded that using of thyme honey dressings on burns wounds results a comparable healing time to modern dressings with proper healing and a cheaper cost.

Introduction:-

Honey has been used by humans for thousands of years for its culinary, therapeutic and cosmetic properties. Many studies have been able to demonstrate the three main properties of honey, namely antimicrobial, healing and anti-inflammatory.

Universally known to be the main product of the hive, honey has been used for millennia in food, cosmetics and also medicine for its extraordinary therapeutic properties. In the Egyptian Ebers Papyrus (around 1500 BC), it was already the most widely used ingredient in remedies [1]. Honey was later recommended in ointment or preparations to treat ulcers, wounds and burns.

Of both vegetal and animal origin, honey is the very complex product of an alchemy that results from the transformation of flower nectar or honeydew by the bee ApisMellifera.

Today, honey is increasingly fascinating modern medicine: studies and scientific work proving its powerful healing and antiseptic properties. At the same time, the emergence of new resistant bacterial strains as well as the increase of

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treatment (antibiotics and dressings) cost is encouraging to exploit all the virtues of this noble product. Honey has once again become an alternative in the treatment of wounds, particularly when infected and / or torpid.

MaterialsandMethods:-

The objective of this study is to describe the benefit of THYME honey in burns of young children, in order to suggest preventive measures and improve management to improve the prognosis.

This retrospective study was conducted over a period of 2 years, in the Department of Plastic Surgery and Burns at the Avicenna Military Hospital of Marrakech on young children. This series includes 20 patients hospitalized according to these criteria: a Burnt BSA between 2% and 25%, lesions concerning: the face/neck, the perineum, the trunk, circular in the limbs and age between 6 months and 2 years.

An operating sheet which specifies the various epidemiological and prognoses parameters necessary for our study was established.

Results:-

Epidemiology

Age and sex

Among 20 children, 15 were male (75%). The maximum age reached was 18 months, while the minimum age was 6 months with a predominance of the age group of 18 months in 40% of cases, followed by ages between 12 to 18 months (30%). 16 children were of urban origin (80%) against 20% of rural origin.

Context

The majority of burning accidents took place at home (95%), especially in the kitchen, with the presence of a parent in 88% of cases. In 95% of cases the burns were due to scalding by a hot liquid (water in 45% of cases).

Arrival to the hospital

90% of patients consulted on the 1 st day, 40% of which in the first three hours, 30% after a period of 6 hours, while 20% were admitted within more than 12 hours, the delay was explained by the stay in other health structures, outpatient follow-up or initial refusal of hospitalization.

In our series, the face and neck were the most frequently affected locations (55%). The limbs were affected in 20% of the cases and the perineum in 10%.

40% of the infants were admitted with a burnt surface body area (BSA) greater than 15%, including 30% of the cases with more than 20% of affected BSA. A predominance of deep 2nd degree burns was seen in 50% of cases, followed by mosaic burns of deep 2nd degree and 3rd degree (30%).

90% of infants received initial care either through cooling or the use of other traditional products. 70% of the children were treated in the traditional way by applying toothpaste in 55%, and only 30% benefited from cooling.

Regarding the vascular access of our patients, the peripheral venous line was used in 16 of our patients (80%), while 4 (20%) received a central venous line. All patients underwent volume expansion according to the Carvajal formula, the solution used for the filling was 0.9% saline.

Food was introduced within an average of 3 days enterally in 75% of our patients, with a high protein and high calorie diet based on tolerance. Paracetamol and Nalbuphine were combined for analgesia in 45% of patients.

Transfusion was performed in 20% of our patients, including 80% by red blood cells for hemoglobin levels below 8g / dl, fresh frozen plasma in 10% of cases depending on the time of prothrombin and albumin for hypo albuminemia less than 20g / l in 10% of cases. Moreover, 80% of patients received oral iron.

The average length of hospitalization was 12 days; the patients were later discharged with follow-up consultation. The average time for burn wound coverage was of 2 weeks. All of our patients resulted a flat healing without hard bulges.

Dressing protocol

- The use of local antiseptics and antibiotics was excluded
- The Honey used was collected from the nectar of thymus plants in the Moroccan Atlas Mountains and was kept at room temperature 25-30 °C and protected from the light.
- The wound:
  1. Cleanse the wound with physiological serum and dry it without rubbing with a sterile compress;
  2. Apply a thin layer of thyme honey over the entire wound surface (spoon, tongue depressor, clean material);
  3. Cover: non-adhesive dressings, renewed every 24 to 48 hours.

Case reports

Case 1:

1 year old female, suffering burns on the chin, neck and trunk from thermal contact with the oven. On arrival to the hospital, the burn was of the 2nd degree / 3rd degree type. Thyme honey dressing protocol was set up with a neutral interface after cleaning the wound with soap and water; under general anesthesia. After 10 days wound recovery and reshaping took their course(Figure 1).

Three weeks later, the wound is completely covered, meaning that proliferation and remodeling phases have been completed. In less than a month, the honey allowed a flat healing without hard bulges(Figure 2).

Figure 1:- Day 10.

Figure 2:- Day 27.

Case 2:

8-month-old male, suffered burns on the abdomen and lower limbs from hot water. On arrival at the hospital, the burn was of the deep 2nd degree type (Figure 3-A). The wound was washed with soap and water, thyme honey was then applied with a neutral interface, a compress and a retaining band; under general anesthesia (Figure 3-B).

After 5 weeks of using thyme honey, the inflammatory phase was over; we note the presence of a few dyschromic scars (Figure 4).

Figure 3:- A: Day 0; B: Application of Thyme honey dressing.

Figure 4:- Day 34.

Case 3:

14-month-old female suffered burns on the trunk, abdomen, two upper limbs and right thigh with hot oil.

On arrival at the hospital, the burn was of the 2nd deep / 3rd degree mosaic type(Figure 5-A). The wound was manually debrided with a curette before using THYME honey dressing. After 5 weeks, we noted the presence of minimal cutaneous sequel :dyschromic scars (Figure 5-B).

Figure 5:- A: Day0 ; B: Day 35.

Discussion:-

Child Burn:

Despite prevention efforts, burns remain a frequent accident in child population (incidence 29-51%) with functional, aesthetic and psychological consequences. Both sexes are affected, with male predominance of 59%. Inattention and ignorance of risk, exposes children to accidents, especially domestic accidents (90-95%)[2], [3]. The age group between 0 and 6 years old is by far the most affected (50-70%)[4]. Thermal burns are leading causes (85-96%). The main mechanism is contact with hot liquids (50-80%)[5]–[7].

Causal mechanisms of burns depend on various national features [8]. Scalding burns and thermal contact are frequent due to promiscuity, recklessness and maternal errors during culinary preparation. Butane flame burns can also occur in the context of collective accidents mainly due to the 3 kg small bottle of gas due to its accessibility and the lack of its sealing system[3].

Gasoline and thinner flame burns are also a commun mechanism in series that include elder children; they account for 6.3% in Zahid and al. series [3]. They are explained by the accessibility of flammable products to children especially in the context of fun activities in Moroccan culture (bonfires during Achoura festivity).

The speed of management of a burnt child is based on a good assessment of the case severity of the lesions and initial pre-hospital management (cooling). Only serious prevention measures could reduce significantly the incidence if not the severity of the injuries. This could be done through educational programs via media, by urging safety standards (gas cylinder, sale of flammable products ...), and by preparing the general public on how to behave when burning accidents occur in order to decrease initial severity.

Wound healing and honey:

Wound healing includes three phases: inflammation, proliferation, and remodeling. Immediately after a skin ulcer cell reaction occurs, blood clotting and degranulation of mast cells happens. Then, inflammation phase occurs by the release of chemical mediators.

Honey is a viscous, supersaturated sugar solution extracted from nectar collected and modified by the honeybee, Apismellifera. It contains approximately 30% glucose, 40% fructose, 5% sucrose, and 20% water, as well as many other substances, such as amino acids, vitamins, minerals and enzymes. It is the oldest wound dressing material known to human, although it was more usually used as an ingredient or carrier vehicle rather than a specific treatment. It was proven to be used as an Anti-bacterial, Anti-inflammatory Anti-oxidant and Anti-viral Agent. [9]

Honey initiates the tissue repair process by stimulating leukocytes that release cytokines. It also stimulates immune response to infection. Other aspects of the immune system are stimulated by honey (Proliferation of B- and T-lymphocytes and the action of phagocytes). Honey stimulates the production of antibodies [10]. Further, the physicochemical nature of honey makes it an ideal wound dressing, adequate to moisturize injured tissue, go against microbial infections, sooth inflammation, and prevent dressing sticking to the wound [11].

A review of literature carried by Krishnakumar et al. on 36 papers studying honey based treatment strategies, out of which 10 were conducted on burn wounds. The average healing period was between 8-28 days in case of small animal models and 8-42 days for horses [12].

AnjuYadav et al. successfully demonstrated that medicinal honey in combination with 904 nm super pulsed laser-mediated photo bio modulation (PBM) improves the healing of burn wounds in rat model[13]. Another study demonstrated that considerable epithelization with higher neovascularization was seen when using herbal ointment formulated from sesame oil, camphor and honey on second degree burn wounds. Reza Vaghardoost et al. concluded that this ointment was effective in comparison to the control groups [14]. Reham et al. treated burn wounds in mice dorsal skin defect using a honey-based hydrogel containing chitosan, carbopol 934 and different concentration (25%, 50%, and 75%) of honey. The formulation with 75% of honey was found to have the highest healing rate of burn wounds with greater effectiveness and efficacy [15]. Scheneke et al. used Ulmo honey and ascorbic acid to evaluate the morphometric healing effects of burns. The study conducted on guinea pigs reported positive findings in support to Ulmo honey demonstrating that the antioxidant effect of ascorbic acid helps appropriate healing and that the synergy of Ulmo honey and ascorbic acid serves to strengthen the healing effect [16]. The effect of an ointment made of honey, milk and aloe vera on dorsal skin burn defect in rat model was evaluated by Farzadinia et

al. who concluded that this ointment stimulated cell proliferation and increased wound closure rate; moreover, it also reduced wound secretion, inflammation and scar formation [16]. Osuegbu et al. developed a honey based gel that showed rapid wound size reduction with early wound healing on day 9 [17]. MohdZodhi et al.applied honey, Polyvinylpyrrolidone (PVP), agar and Polyethylene glycol (PEG) on a rat model. They showed significant wound closure and enhanced rate of re-epithelization in comparison to control animals in a burn defect [18]. Sukur et al. evaluated the effects of Tualang honey on infected burn injuries in rat model. In comparison to the control (chitosan gel and hydrofibre silver) groups, honey treated animals showed faster rate of healing with improved anti-bacterial effects [19]. Likewise, Khoo et al. also led a study using Tualang honey on rat burn defect. The results showed rapid reduction in wound size on day 6 and effectiveness in controlling Pseudomonas aeruginosa infections [20].

Cost is also one treatment with honey strengths and an important feature that directly affects the patient's adherence to treatment. Mashood reported cost data of dressing treatments using standardised unit costs (per percentage of BSA). They reported that honeys cost 0.75 Rupees per percentage BSA compared with 1% Silver Sulfadiazine which costs 10 Rupees per percentage BSA. Thus, honey is 13.4 times cheaper than Silver Sulfadiazine [21].

Conclusions:-

In conclusion, it is highly imperative to take serious approaches toward the use of honey as a burn healing agent. It has almost equal or slightly superior effects when compared with conventional treatments for burn wounds and superficial partial thickness burns and a better price accessibility.

Informed Consent Statement:
Informedconsentwasobtainedfromallsubjectsinvolvedinthestudy.

ConflictsofInterest:
Theauthorsdeclarenoconflictofinterest

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