

Honey Dressing versus Pyodine Dressing for the Treatment of Diabetic foot ulcers

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ABSTRACT

Objective: To compare the effectiveness of honey in healing of diabetic foot ulcers with povidone iodine.

Methods: It was a randomized controlled trial performed in Ayub Teaching Hospital from August 2013 to July 2014. Total 320 diabetic patients with infected wounds both acute and chronic of all ages and both genders were included. Foot ulcers were divided in two groups of 160 patients each through simple convenience sampling. Povidone Iodine was used in one group for wound dressing while honey was used in the other group. Patients were followed in weekly/fortnightly appointments and time to recovery, surgical debridement as well as presence of complications was recorded for each patient. Recovery time (in weeks) and debridement rate were noted for each patient. All the patients underwent initial surgical debridement in operation theater under general or regional anesthesia and then daily dressing was done in the ward.

Results: Recovery time in honey dressing was in first 3 weeks 56.2 % and in 4-6 weeks was 44.6%. In pyodine dressing in first 3 weeks it was 43.8 % and in 4-6 weeks it was 56.6 %. Honey was found to have a faster recovery time as compared to povidone iodine ($p=0.034$), Similarly honey was more effective than povidone iodine in wound healing ($p=0.014$).

Conclusion: Honey is more affective alternative to povidone iodine in diabetic foot ulcers. More studies are needed to validate these results as well as to explore the role of honey in other wounds.

Keywords: Diabetic foot ulcers, Honey dressing, Pyodine Dressing

INTRODUCTION

Throughout the history of mankind, various substances have been selected for their medicinal characteristics and have been used to treat infections; heal wounds; reduce bleeding following trauma; diminish pain and swelling of affected part of body and to promote healing [1]. It wasn't until the 19th century when the discovery of chemical disinfectants and preservatives started a journey to better understanding of pathogenesis of infection & inflammation allowing the physicians an improved control of infection in the wounds [2]. In 1865 Joseph Lister pioneered the use of carbolic acid in operating theaters primarily for disinfection and this led to a significant reduction in mortality associated with surgical procedures in that era. After the discovery of micro-organisms and their role in etiopathogenesis of disease, targeted infection control became possible. There are many methods of classifying wounds. These methods classify wounds depending on the cause, type of trauma, location of wound or presenting symptoms of the patients in addition to the amount of tissue lost as a result of trauma, the depth of the inflicted wound and the clinical appearance of the wound. The severity of different kinds of wounds is graded according to separate grading criteria, for example, EPUAP for pressure sore, Rule of Nine for burns, Wagner / San Antonio criteria for diabetic foot ulcers [3].

Likewise, wounds involving the skin but not secondary to aforementioned causes are also categorized depending on the depth of the wound. Three classes are recognized: Superficial, wherein only epidermis is lost; Partial thickness wounds which also involve the underlying dermis in addition to the superficial epidermis; Full thickness wounds are deep enough to involve the subcutaneous fat in addition to the overlying epidermis and dermis. Full thickness wounds sometimes extend down to the bone. A "visual" classification method for wounds also exists. This method involves identification of tissue type found in abundance at the base of the wound e.g., black tissue represents necrosis. The visual classification method allows for expression of each kind of tissue present in the wound bed in percentage thus it helps in good assessment of wounds, planning of care and future re-assessment [4].

Honey is one of the few ancient remedies that are still in use in modern era of medicine. It has recently been "re-discovered" vis-a-vis its beneficial effects on the wound healing [5,6]. Honey has been described to have a number of therapeutic characteristics in addition to its anti-bacterial action and its ability to promote wound healing [7]. There is an extensive evidence of anti-bacterial action of honey; more than 70 microbes have been found to be susceptible to antibacterial action of honey [8]. In fact, researchers have shown that microbes isolated from wounds, which were otherwise resistant to antibiotics, were found to be susceptible to Manuka honey [9,10].

The spectrum of activity of iodine is broad; it is effective

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against many bacteria, viruses, protozoa and fungi. Earlier iodine containing products were associated with a number of side effects including but not limited to local pain after application, irritation of skin and discoloration of skin, however these side effects are now much rare since the discovery of iodophores (povidone iodine and cadexomer iodine) in 1949.

Since there is a considerable lack of literature comparing honey to iodine / pyodine in treatment of wound infections therefore, this study was designed to determine the role honey in treating infections and promoting wound healing.

METHODS

After approval from the hospital ethics committee, this randomized controlled trial was held in the departments of Endocrinology and Orthopedics, Ayub Teaching Hospital Abbottabad, from August 2013 to July 2014 The study population consisted of 320 patients recruited through consecutive non-probability sampling. The aims and objectives of the study were explained to the patients and an informed consent was obtained from them before recruiting them in this trial.

The study participants were recruited from outpatient clinics, Accident & emergency department as well as the referrals from other units of the hospital. The patients were randomly allotted a group using simple convenience method. Pyodine (povidone iodine) dressing was applied to patients assigned to group A while honey dressing was applied to patients' in-group B.

After allocation to each group detailed medical history was taken from each patient followed by a through general and physical examination. The examination of wound was documented after which proper surgical debridement was carried out. The next step was application of conventional pyodine dressing to the wounds of patients in group A and daily honey dressing to the wounds of patients in group B. Different variables that were recorded for each patient included, in addition to demographic data, time to recovery in weeks and outcome of the wound in terms of healing or amputation. Those who had undergone amputation were also examined for the type of amputation they underwent. .

RESULTS

The data collected through a pro forma was entered into and analyzed using SPSS 16. The mean age of the study cohort was 26.56 ± 16.68 years. Age of the youngest study participant was 8 years while the oldest study participant was 70 years old. Majority (n=266; 83.2%) of study participants were males while females comprised only 16.8% (n=54) of the study cohort. The male to female ratio in this study was 4.9:1. The patients were divided into two equal groups of 160 study participants each. Almost a quarter (n=73; 22.8%) of study participants were smokers. More than one third of study participants were illiterate (n=112; 35%). up-to one-third (n=97; 30.3%) study participants had attended primary school only.

The different types of amputations performed on study participants are shown in table-1. Interestingly, the debridement rates comparatively less in the honey-dressing group.

Table-1: Different Amputations performed on study participants

AMPUTATIO NS.	NUMBER	.PERCENTAGE
Trans-metatarsal	27	8.4
Ray	24	.7.5
Digital	54	16.9
.Below Knee	16	5.1
No amputation	199	62.1

Table-2: cross tabulation of time to recover in both groups.

Treatment Type	1-3 weeks	4-6 weeks	p-value	Odd Ratio	95%CI
Honey Dressing	90 (56.2)	70 (44.4)	0.034	1.612	1.037 - 2.506
Pyodine Dressing	71 (43.8)	89 (55.6)			

Patient's in-group B took less time to recover when compared with group A (p = 0.034) 95% confidence interval [CI] 1.037–2.506.

Table 3. Treatment Outcomes

Treatment Type	Healed	Amputated	p-value	Odd Ratio	95%CI
Honey Dressing	79 (43.6)	80 (57.6)	0.014	1.751	1.120 - 2.736
Pyodine Dressing	102 (56.4)	59 (42.2)			

When treatment outcomes were stratified according to the groups, it was revealed that healing was better with honey dressing. (P = 0.014) The rate of healing with honey dressing was found to be 1.751 times higher than with pyodine dressing (95% confidence interval [CI] 1.120 – 2.736).

DISCUSSION

The use of honey in wound dressings can be traced back to roman civilization and early Muslim civilization; perhaps it was being used much earlier. Honey is characteristically sterile because of its hyper-osmolar sugary content. This characteristic of honey helps in inhibition of microbial growth. Honey contains a heat labile inhibin protein that acts as an anti bacterial agent owing to its low pH and non-absorptive properties. Owing to the presence of inhibin, honey has wide clinical application ranging from decubitus ulcers, chronic leg ulcers, burns, chronic wounds and radiation necrosis. In addition to inhibin, the presence of catalase in honey contributes to the process of wound healing and re-growth of epithelium [11].

The study participants were diagnosed diabetics and were younger in our study when compared with some reported literature with a mean age of 26.56 ± 16.68 years [12]. The male to female ration in our study (1.62:1) was also comparable with other published studies and this could be indicative of a male dominated society among a number of factors [12,13].

Since this study enrolled only patients with diabetes, it is difficult to ascertain the role played by diabetes in impairment of wound healing. We did not seek to measure this effect. Abbottabad is city in northern Pakistan and it receives patients from as far as Gilgit. Expectedly, most of the patients belonged to rural areas and similar demographics have been reported in studies from India and China. Rural populations usually tend to rely on traditional medicine, which doesn't always have good wound care. Additionally, illiteracy also plays an important role affecting the care of wounds in a population [14,15].

Even though the results of this study favor honey with respect to time to recovery and the treatment outcome, it was a single center study and more, large-scale studies are required to confirm these results. Honey has been subject of research for its medicinal characteristics in healing of wounds especially with reference to abrasions, amputations, and abscesses in diabetic foot ulcers [16,17,18]. Application of honey is cost effective since no concomitant antibiotics are apparently needed for the wound itself, although it is not clear if this observation is valid when widespread sepsis is present. Reports also exist in literature that cites the role of honey in impairing wound healing [19].

However, there is abundance of evidence in favor of the possible therapeutic role for honey in care of wound. More research is needed on the effect of honey on individual wound types thereby identifying the patient populations benefiting best from the use of honey.

CONCLUSION

Honey can be used as an alternative to povidone iodine as it was found to have significantly better recovery time in wounds of diabetic patients. However, large randomized

studies are needed to verify these effects and before extending these results to general population.

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