



Topical honey for the treatment of diabetic foot ulcer: A systematic review



Ramya Kateel^a, Prabha Adhikari^{a,*}, Alfred J. Augustine^b, Sheetal Ullal^c

^a Department of Medicine, Kasturba Medical College Mangalore, Manipal University, India

^b Department of Surgery, Kasturba Medical College Mangalore, Manipal University, India

^c Department of Pharmacology, Kasturba Medical College Mangalore, Manipal University, India

ARTICLE INFO

Article history:

Received 16 May 2016

Received in revised form

27 May 2016

Accepted 13 June 2016

Keywords:

Topical honey

Diabetic foot ulcer

Wound dressing

ABSTRACT

Topical honey has been used for the treatment of wound since ancient time. But the medical evidence proving it is limited. Hence a systematic review was planned. An exhaustive literature search was done in PUBMED, COCHRANE, GOOGLE using 'topical honey', 'diabetic foot ulcer', 'chronic wounds' as key words. Literature search showed total of five clinical trials and about ten observational studies in various part of world. Out of five clinical trials three concluded that honey dressing is better than conventional dressing, all the clinical trials proved safety of honey for the treatment of diabetic foot ulcer. Observational studies included total of 320 patients which also showed safety of honey but efficacy cannot be considered from observational studies. This review showed that honey dressing is safer for treatment of diabetic foot ulcer but there is insufficient good quality data to realistically conclude on the efficacy of honey on diabetic foot ulcers.

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1. Introduction

Honey is a commonly used natural bee product which is available in most parts of the world. It has been used for the treatment of various infected wounds since ancient times because of its antimicrobial properties [1]. The introduction of effective antibiotics in the 20th century led to a decline in the use of topical honey for

wounds. However the recent medical literature has shown a change in the trend with several studies reporting its efficacy in treating different types of wounds, including burns and infected wounds [2–6]. Honey has multiple properties which attribute to its wound healing capacity. These include antibacterial [7] property by releasing hydrogen peroxide in a quantity which causes auto debridement of necrotic tissue without harming granular tissue [8], acidity and osmotic effect which minimizes the growth of pathogens [9], an increase in the rate of healing by stimulating release of growth factors [10] an antioxidant and anti-inflammatory action which contributes to wound healing [11].

Ulceration of the foot is common in diabetes and may lead to amputation of the leg. It is one of the common causes of morbidity

* Corresponding author.

E-mail addresses: ramyakateel@gmail.com (R. Kateel), prabha.raghuv eer@gmail.com (P. Adhikari), alfred.augustine@manipal.edu (A.J. Augustine), sheetal.ullal@manipal.edu (S. Ullal).

Table 1
Randomized controlled clinical trials on topical honey for treatment of diabetic foot ulcer.

Authors study design	Sample size and patient selection	Comparator and follow up duration	Outcome measured	Conclusion
Shukrimiaetal 2008 [13] Randomized controlled open label clinical trial	Sample size: 30 Inclusion criteria: age 31–65 with Wagner type II diabetic foot ulcer	Povidone iodine dressing. First post-operative day till surgical closure of wound or further debridement. Conventional dressing. 16 weeks.	Mean duration for surgical closure Control-15.4 (9–36) days Topical honey-14.4 (7–26) days p < 0.005 No adverse effect observed	Honey can be a safe alternative dressing for Wagner type II diabetic foot ulcer
Kamaratos A V et al., 2014 [14] Randomized controlled open label clinical trial	Sample size: 63 Inclusion criteria: patients with neuropathic diabetic foot ulcer.	Conventional dressing. 16 weeks.	Mean healing time Control 41 ± 3 days Manuka honey- 31 ± 4days p < 0.05 Percentage of ulcer healed- Control-90% Honey-97% P > 0.05 Percentage of disinfected ulcer control-35.5%, 12.9%, 0%, 12.9% for I, II, IV, VI week respectively Manuka honey-78.13%, 15.62%, 38.7%, 6.25% for I, II, IV, VI week respectively P < 0.05 No adverse effect observed	Manuka honey impregnated dressing represents an effective treatment for neuropathic diabetic foot ulcer
Jan W A, etal 2012 [15] Randomized controlled open label clinical trial	Sample size: 100 Inclusion criteria: Patients with Wagner grade I to IV.	Pyoidone iodine dressing. 10 weeks.	Percentage of ulcer recovered 2–4 week-30%, 60% 5–7 week-26%, 34% 8–10 week-44%, 6% for control and topical honey group respectively P < 0.0001 amputation rate control-34% Honey-28% Recovery rate Control-66% Honey-72% p = 0.658 No adverse effect data available	Honey dressing was more effective than conventional Pyodine dressing in terms of recovery time for diabetic foot ulcer
Rehman E U etal, 2013 [16] Randomized controlled open label clinical trial	Sample size: 60 Inclusion criteria: Wagner's grade I & II diabetic foot ulcer.	Povidone iodine/normal saline dressing 2 weeks	Percentage reduction in ulcer size Control-54.63 ± 3.42%, Honey-80.81 ± 17.27% p < 0.001 Less complication in honey group.	Wound healing was better with honey dressing compared to povidone iodine dressing
SiavashMetal2015 [17] Randomized placebo controlled open label clinical trial	Sample size: 60 Inclusion criteria: diabetic foot ulcer patients with infection control	Placebo 3 months	Control v/s topical royal jelly There was no significant difference between two groups in terms of reduction in ulcer depth, width, length, incidence of complete healing and duration of complete healing with p values 0.69,0.95,0.7,0.74 and 0.6respectively	5% topical royal jelly did not show any superiority over placebo

in diabetic patients and has a negative impact on quality of life [12]. Topical honey is used as one of treatment options by many clinicians to treat diabetic foot ulcer mainly because of its wound healing properties and cost effectiveness. There are several randomized controlled clinical trials and observational studies reporting the use of honey for treating diabetic foot ulcers. But there is a lack of a systematic review on the use of topical honey for the treatment of diabetic foot ulcers. Hence this review was planned.

2. Materials and methods

An exhaustive literature search was performed using PUBMED, COCHRANE, GOOGLE using 'topical honey', 'diabetic foot ulcer', and 'chronic wounds' as key words. Articles published in English language were included. All clinical trials with or without control, blinded or open, placebo or active drug control which included at least one diabetic foot ulcer patient treated with honey were included. Observational studies, case reports and case series were also included. All studies assessing the efficacy of honey were

included due to the paucity of randomized controlled trials.

3. Results

A total of five randomized controlled trials and 10 observational studies were included. All the studies were between 2008 and 2015. Out of five randomized trials, one was a placebo controlled, double blind study, whereas other 4 were open label active control studies. Details of randomized control trials are given in Table 1.

The literature survey showed a total of 10 observational studies out of which three were case reports, two case series, two experimental studies and three observational prospective studies. Their details are given in Table 2.

4. Discussion

Studies on the use of honey for different types of diseases are increasing. It has been used for treatment of wound since ancient time. Honey because of its antibiotic, antioxidant, anti-inflammatory, auto debridement, growth factor stimulation and

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