Original Article

Comparison between Role of Honey Dressing and Oxoferin (Tetrachlorodecaoxide) Dressing In the Management of Infected Wounds in Diabetic Amputated Limbs

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ABSTRACT

Introduction: Diabetic ulcer is a very common entity encountered in the general surgical practice. The problem needs keen interest and meticulous wound care for its management to prevent serious complications of these infected and gangrenous ulcers. **Objective:** The objective of the study was to compare the efficacy of honey dressing and oxoferin (tetrachlorodecaoxide) dressing in the management of infected wounds in diabetic amputated limbs. **Study Design:** Randomized clinical trial. **Setting:** Surgical Unit-IV of Districted head quarter hospital Faisalabad. **Subjects and Methods:** The total sample size comprises of 98 patients were divided into two groups A and B. Group A was treated with honey dressing while group B was treated With oxoferin (tetrachlorodecaoxide) dressing. Area of the wounds to be dressed was measured in two largest dimensions and noted in cm. Sterile gauzes soaked in commercially available tube packed honey and oxoferin (tetrachlorodecaoxide) solution were applied over the wounds. Outcome of the both methods were assessed by measuring of the size of the wound at presentation and then after one week. **Results:** Significant decrease in wound size in oxoferin group was in 24 patients (49 %) and in honey group was in 11 patients (22.4 %) **Conclusion:** Although the clinical experience detailed in this study showed better results to oxoferin as compare to honey dressing, more quality randomised controlled trials are needed to provide evidence to encourage the use of honey in wound care. **Key words:** Honey, oxoferin, Dressing.

INTRODUCTION

Honey based wound dressing have been used worldwide since ancient time. A honey product received us federal drug administration approval in 2007, making this dressing an option for wound care.

Honey has been found to exert anti-inflammatory and antibacterial effects without antibiotic resistant, promote moist wound healing and facilitate debridment.[1]

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Honey consists of multiple components derived from plants and bees during the maturation process. It is a product obtained from the bees of genera Apes and Meliponinae. [2] Bees collect nectar from flowers, nectar has sugar content ranging from 5% to 60%. The resulting compound is composed of sucrose, glucose and fructose.

The bees also add enzymes to honey including invertase (which convert sucrose into glucose and fructose) and glucoseoxidase (which oxidises glucose and produces gluconic acid). Production of gluconic acid lowers honey's pH and contributes to hydrogen peroxide production.[5]

Honey has a broad spectrum bactericidal and becteriostatic activities. Honey has not been observed to foster bacterial resistance. Instead honey is hypothesized to inhibit bacterial growth primarily due to its high osmolarity.[3,4]

Local tetrachlorodecaoxygen anion complex (TCDO) had three therapeutic effects in difficult wounds, substantiated in day 14 in a multicentre doubledlind randomised clinical trial on 271 inpatients with 0.9 % saline as control. Wound cleansing was intensified; the formation of new tissue (granulation, epithelium) was promoted, and irrespective of the different wound types, wound surfaces decreased more quickly by a factor 2.4.[5]

In clinical practices both oxoferin and honey gauze dressing are used in treating the wounds with patches of slough and pale granulation tissue. According to a previously conducted study, decrease in the wound size by using honey dressing in 43.3 %[6]. A pilot study on 15 patients was carried out by using oxoferin as wound dressing, which showed an efficacy of 20 %.

Diabetic ulcers requiring limb amputation are very commonly encountered in general surgical practice .Mostly these wounds require keen attention of surgeons for their management. By knowing better way of mechanical cleansing and dressing of these wounds, the problem can be addressed in a more effective way. This will guide us towards the better management of these wounds.[8,15]

MATERIALS AND METHODS

Study Design:

Randomized clinical trial.

Setting:

Department of surgery , PMC and affiliated Hospitals, Faisalabad.

Duration of Study:

06 months duration.

Sample size:

By using WHO sample size calculator for two proportions:

P1= 43.3 % 6

P2= 20.o% (Pilot Study)

Power of the study:

Level of significance= 05%

Sample size = 98 (49 in each group)

Sample technique:

Non probability consecutive sampling.

Inclusion Criteria:

All the patients of any age or gender presenting to hospital with infected wounds in amputated diabetic limbs during 06 months of study.

Exclusion Criteria:

1) Post traumatic infected wounds
2) Post surgical infected wounds
3) Any infected wound with known underlying malignancy
4) Ischemic and venous infected wounds

RESULTS

In honey group the minimum age of the patient was 40 years and maximum 80 years with a mean of 55.35 and standard deviation of 8.77.

In oxoferin group the minimum age of the patient was 40 years and maximum 73 years with a mean of 57.20 and standard deviation of 8.75.

In honey group 27 (55.1 %) patient were in age group 40-55, 20 (40.8 %) patient in age group 56-70 and 2 (4.1 %) patients in group 71-85.

In oxoferin group, 22 (44.9 %) patients were in age group 40-55,23(46.9 %) patients in age group 56-70 and 4 (8.2 %) patient in group 71-85.

In honey group, 21 (42.9 %) patients were male and 28 (57.1 %) patients were female.

In oxoferin group, 22 (44.9 %) patients were male and 27 (55.1 %) patients were female.

In honey group, the wound site on toes was in 24 (49.0 %) patients, below knee in 15 (30.6 %) patients, above knee in 08 (16.3 %) patients and fingers in 2 (4.1 %) patients.

In oxoferin group, the wound site on toes was in 22 (44.9 %) patients, below knee in 16 (32.7 %) patients, above knee in 08 (16.3 %) patients and fingers in 2 (4.1 %) patients and above elbow in 1(2.0 %) patients.

In honey group, the mean size of wound in cm square at baseline was 143.3498 with standard deviation 181.8554.

In oxoferin group, the mean size of wound in cm square at baseline was 155.3382 with standard deviation 191.4965.

In honey group, the mean size of wound in cm square after one week was 122.0808 with standard deviation 157.3564.

In oxoferin group, the mean size of wound in cm square after one week was 135.5955 with standard deviation 174.5955.

By applying independent sample test on wound size in cm square at baseline: p-value=0.751.
By applying independent sample test on wound size in cm square after 01 week: p-value=0.689.
In honey group, decrease in wound size was in 11(22.4 %) patients.
In oxoferin group, decrease in wound size was in 24(49.0 %) patients.
Chi square value=7.511
DF=1
P-value=0.006

Data Analysis

Group	n	Minimum	Maximum	Mean	Std. deviation
Honey dressing age of the patients	49	40	80	55.35	8.77
oxoferin dressing age of the patients	49	40	73	57.20	8.75

		Group		Total
		Honey dressing	Oxoferin	
Age distribution	41-55	27 55.1 %	22 44.9 %	49
	56-70	20 40.8 %	23 46.9 %	43
	70-85	2 4.1 %	4 8.2%	06
Total		49	49	98

		Group		Total
		Honey dressing	Oxoferin	
Gender	Male	21 42.9 %	22 44.9 %	43
	Female	28 57.1 %	27 55.1 %	55
Total		49	49	98

		Group		Total
		Honey dressing	Oxoferin	
Wound site	Toes	24 49.0 %	22 44.9 %	46
	Below knee	15 30.6 %	16 32.7 %	31
	Above knee	8 4.1 %	8 16.3%	16
	Fingers	02 4.1 %	02 4.1 %	04
	Above elbow		01 2.0 %	01
Total		49	49	98

Group	n	Mean	Std. Deviation
Size of wound in cm honey dressing square at baseline oxoferin	49 49	143.3498 155.3382	181.8554 191.4965
Size of wound in cm honey dressingsquare at 01 week oxoferin	49 49	122.0808 135.5955	157.3564 174.9586

DISCUSSION

Diabetic foot complications are the most common cause of non-traumatic lower extremity amputations in the industrialized world. The risk of lower extremity amputation is 15 to 46 times higher in diabetics than in persons who do not have diabetes mellitus. Furthermore, foot complications are the most frequent reason for hospitalization in patients with diabetes, accounting for up to 25 percent of all diabetic admissions in the United States and Great Britain[1,11].

Common risk factors for amputation of the diabetic foot include peripheral neuropathy, structural foot deformity, ulceration, infection and peripheral vascular disease. It is important to recognize that foot ulcers can have a multifactorial aetiology.[9,10]

Foot deformities, which are common in diabetic patients, lead to focal area of high pressure. When an abnormal focus of pressure is coupled with lack of sensation, a foot ulcer can develop. Most diabetic foot ulcers form over areas of bony prominences.[7]

Adequate debridement is the first step in the evaluation of a foot ulcer. Debridement should remove all necrotic tissue and surrounding callus until a healthy bleeding edge is revealed. Patients (and physicians) often underestimate the need for debridement and may be surprised by the appearance of the newly debrided ulcer. Topical debriding enzymes are expensive and have not been conclusively shown to be beneficial. The antibacterial property of honey was first recognized in 1892 by van Ketel.[15,18] It has often been assumed that this is due entirely to the osmotic effect of its high sugar content. Honey, like other saturated sugar syrups and sugar pastes, has an osmolarity sufficient to inhibit microbial growth, but when used as a wound contact layer, dilution by wound exudate reduces the osmolarity to a level that ceases to control infection[13]. The clearing of infection seen when honey is applied to wound may reflect more than just antibacterial properties.[19] Recent research shows that the proliferation of peripheral blood B-lymphocytes and T-lymphocytes in cell culture is stimulated by honey at concentrations as low as 0.1%; and phagocytes are activated by honey at concentrations as low as 0.1%[3]. Honey has been used to treat infections in a wide range of wound types. These include burns, venous leg ulcers, leg ulcer of mixed aetiology, diabetic foot ulcers, pressure ulcers, unhealed graft donor sites[14], abscesses, boils, pilonidal sinuses, and infected wounds from lower limb surgery, necrotising fasciitis and neonatal postoperative wound infection.[16,17]

Oxoferin (Topical Solution) contains Tetrachlorodecaoxide, and enjoys the distinction of being the only product that contains oxygen in solution and stable form. One more exclusive benefit that makes Oxoferin stand out is its ability to kill all pathogens, though it does not contain any antibiotic. Oxoferin acts by simulating the immune system of the body, and that is why it is known as IMMUNOMODULATOR. When applied topically Oxoferin is absorbed rapidly both by wound surface and border area.

Oxoferin combines with the heam part of the haemoglobin, myoglobin and peroxidase, forming a TCDO-haemo complex; this in turn activates the macrophages and accelerates the process of "Phagocytosis".

The process of phagocytosis engulfs all the pathogens present on the surface of the wound, including the cell debris, thus cleans the wound surface, a prerequisite for regenerative phase by giving rise to two impulses, namely Mitogenic and Chemotactic.

The mitogenic impulse gives rise to two factors, MDGF (macrophage derived growth factor) and WAF (wound angiogenesis factor). The MDGF deposits fibroblasts and synthesizes collagen fibers which fill the gap in the wounds, the WAF helps in the formation of new capillaries which further enhances the healing process. The chaemotactic impulse acts on the myocytes (muscle cells) and causes it to contract, thereby reducing the wound surface.

All these three factors are influencing the regenerative phase simultaneously and thus accelerate the wound healing with minimal scarring.

This study has several limitations. As the sample size was small and only one institution was included. The results did not reflect the practice of internal medicine physicians and general surgeons in other hospitals. Not recruiting all patients at random likely generated selection bias. These factors introduce uncertainty, but the conclusion of this are still valid.

CONCLUSION

The clinical experiences detailed in this study showed better results to Oxoferin as compared to honey dressing. So we recommend that Oxoferin has better results in diabetic wound as compared to honey.

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