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ORIGINAL ARTICLE

Comparison of Honey Versus Normal Saline in the Management of Post-Operative Infected Wounds in Pediatric Urology Patients

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ABSTRACT

Introduction: Honey exhibits a variety of bacteriostatic and bactericidal factors. Due to its variety of antimicrobial and wound healing properties, honey is an effective remedy in wound infections even caused by microorganisms resistant to antibiotics. Nevertheless, there are many known benefits of normal saline soaked gauze dressing as well such as its osmotic properties, cost-effectiveness, and easy availability with no side effects. It is believed that honey as well as normal saline could be used in the management of infected and non-healing wounds and ulcers, pressure wounds, burns, boils, pilonidal sinuses, diabetic and venous ulcers and even malignant wounds with respect to wound size and cleanliness.

Purpose of Study: The purpose of this study is to compare the effect of topical honey versus normal saline soaked dressing application in the management of cosmetically improved postoperative infected wounds in pediatric urology patients.

Material and Methods: This Randomized Controlled trial was conducted at the Institute of Kidney Diseases (IKD), Hayat Abad Medical Complex (HMC), Peshawar commencing from January 2019 till December 2019 i.e., over a period of one year. Pediatric patients with postoperative wound infections with positive wound cultures were included in the study. The patients were divided into two groups. In group A normal saline soaked dressing was applied and in group B honey was applied three times a day each.

Results: A sample size of 60 patients was taken with males 35(58.3%) and females 25(41.7%). Mean age was 5 years with standard deviation of 2.15 with minimum age 1 year and maximum age 10 years. The bacteria on wound culture came out to be Pseudomonas aeruginosa, Staphylococcus aureus and Escherichia coli in descending order. Patients were divided into two groups. Group A included 30 patients with normal saline soaked dressing application to the wound while Group B included 30 patients with honey application to the infected wound. Both groups were compared in terms of scar improvement and results were found statistically significant 0.028 in group B (Honey).

Conclusion: Honey can be used safely and effectively for the management of postoperative surgical site infections in pediatric urology patients as compared to normal saline soaked dressings.

Keywords: Honey, postoperative infected wound, pediatric patients

INTRODUCTION

Honey is a yellowish-brown, viscous sugar solution made from the floral nectar gathered and modified by honeybees, which is then bio-transformed and stored in the honeycomb[1]. It is composed of carbohydrates (80–85%), water (15–17%), protein (0.1–0.4%), ash (0.2%) with small quantities of enzymes, minerals, vitamins, amino and organic acids [2, 3]. There are numerous factors which contribute to the antimicrobial properties of honey including high osmolarity and viscosity while on the contrary low water content and low pH. Honey also exhibits a variety of bacteriostatic and bactericidal factors including hydrogen peroxide, antioxidants, polyphenols, lysozyme, phenolic acids, flavonoids, methylglyoxal, and bee peptides. Honey also leads to an increase in cytokine release via stimulating the leukocytes and therefore is labeled to have immune-modulating and anti-inflammatory properties likewise acts as a potent anti-oxidant and anti-viral agent. It also provides a protective barrier against invading pathogens which results in initiating tissue repair process. Similarly, the compatibility of normal saline with human tissue labels it a broadly recommended solution for wound dressing [4]. Normal saline has a friendly nature with new tissue and promotes wound healing effectively.

For a long period of time honey has been used as a remedy for treating infected wounds. It has been in vogue yet again as some modern products have failed to give promising results in this regard [5]. With an increasing antibiotic resistance there is growing trend to use honey for the treatment of surgical site infections and other wounds, as further evidenced by laboratory studies. Due to its variety of antimicrobial and wound healing properties, honey is an effective remedy in wound infection even caused by microorganisms resistant to antibiotics [6]. Nevertheless, there are many known benefits of normal saline soaked gauze dressing as well such as its osmotic properties, cost-effectiveness, easy availability with no side effects [7]. Honey can be used as monotherapy or complementary treatment of infected wounds. It also enhances the wound healing by keeping the wound moisturized, causes autolytic debridement and through its antioxidant and anti-inflammatory properties effectively induces tissue regeneration by promoting angiogenesis and re-epithelization [5]. Whereas, normal saline soaked dressing serves as a good moist environment which enhances healing rate. It is applied easily and provides regular wound examination [8]. In regions like Europe and Australia few forms of medically approved honeys have excelled in getting certified as medicinal products in the field of professional wound care [9]. It is believed that honey as well as normal saline could be used in the management of infected and non-healing wounds and ulcers, pressure wounds, burns, boils, pilonidal sinuses, diabetic and venous ulcers and even malignant wounds with respect to wound size and cleanliness [10, 11, 12].

The purpose of this study is to compare the effect of topical honey versus normal saline soaked dressing application in the management of cosmetically improved postoperative infected wounds in pediatric urology patients as there is an increased incidence of wound infection by multidrug resistant micro-organisms in this group of patients.

MATERIAL AND METHODS

This randomized controlled trial was carried out at the Institute of Kidney Diseases (IKD), Hayatabad Medical Complex (HMC), Peshawar commencing from January 2019 till December 2019 over a period of one year. Pediatric patients with postoperative superficial surgical site infections with positive wound cultures were included in the study. Patients with deep infections/abscesses were excluded from the study. The patients were divided into two groups. In group A Normal Saline soaked dressing was applied three times a day and in group B Honey

dressing (gause piece soaked with 10 ml of commercially available honey)three times a day was applied. Both groups were on IV antibiotics according to culture and sensitivity report.

All the data was collected on structured proforma and the analysis was done using SPSS version 20. Mean and standard deviation were computed for numerical variables like age and duration of treatment in reference to type of surgery and organism on culture. Frequency and percentage were computed for categorical variables like gender, infected wound in different types of urological surgeries and types of organisms on culture. Chi square was applied to comparison in terms of scar improvement with normal saline and honey.

RESULTS

A sample size of 60 patients was taken with males 35(58.3%) and females 25(41.7%). Mean age was 5 years with standard deviation of 2.15 with minimum age 1 year and maximum age 10 years.

Surgeries with post operative infections were bladder augmentation 34(56.7%), pyeloplasty 3(5%), pyelolithotomy 5(8.3%), ureterolithotmy 5(8.3%), bladder augmentation with mitrofanoff with MACE 5(8.3%) and extrophy bladder repair 8(13.3%).

Most common organisms on culture are given in the following table; 1.

Patients were divided into two groups. Group A included 30 patients with normal saline soaked dressing application to the wound while Group B included 30 patients with honey application to the infected wound. Both groups were compared in terms of scar improvement and results were found statistically significant 0.028 in group B (Honey).

Table 1: Organisms causing Wound infections

	Organism	Frequency (percentages)
1.	Pseudomonas aeruginosa	41 (68.3%)
2.	Staphylococcus aureus	12 (20%)
3.	Escherichia coli	7 (11.7%)

In Group A (Normal Saline soaked dressing) the mean duration was 25.03 days (standard deviation of 4.69) minimum of 17 days and maximum of 32 days.

In Group B (Honey) the mean duration was 12 days (standard deviation of 3.14), minimum 7 days and maximum 18 days. No honey related side effects observed in the study period.

Figure 1: (a) infected wound in 10-year-old male (b) wound after 4 days of application of honey (c) wound after 12 days of honey application (b, c) shows significant amount of improvement; decrease in wound size, decreased inflammation and exhibit approximation of edges.

Figure 1 shows sequential improvement in wound healing after application of honey dressings.

DISCUSSION

The type of dressing for wound healing has always been a debate. For instance, a number of modalities are considered for the search of appropriate dressing such as it should be effective, cheap and easily available [13]. Regardless of the other properties of wound dressing, it should aid in providing a moist environment which would further favor in cell migration and matrix formation to enhance wound healing [14]. Honey has excelled to be accepted as an edible item as well as a medicinal product in various generations and civilizations and has been used for different ailments since centuries in folk medicine. The broad-spectrum antimicrobial properties of honey have been widely confirmed in literature at multiple times [15]. With increasing antibiotic resistance and an increase reported in an incidence of multidrug resistant infection we are moving towards a pre-antibiotic era and this has made resurgence for honey use in infected wounds. There is no resistance by micro-organisms to honey reported to date [6]. Also, there are no allergic reactions or side effects reported. All the beneficial effects of honey are based on its high osmolarity. The use of simple sugar paste, honey and normal saline dressing can be an effective tool in achieving high osmolarity. Normal saline dressing aids in fluid evaporation from the saline soaked gauzes making the dressing hyperosmolar and resulting in withdrawal of more fluid from the wound. Therefore, normal saline dressing can help in management of infected wounds in a couple of ways including anti inflammatory action, increasing the blood flow and desloughing the wound [7].

In our study we have compared two physiological dressings with similar mechanism of action. According to a study by Bashir M.M the wound is prepared quicker with normal saline dressings as compared to commercially available honey dressings. They considered the purity and sterility of a food product ought to be used as a medicinal product and concluded saline dressings to be better [16]. Hereby, they did not comment on the cosmetic improvement of the healing wound using both the dressings. In our study the cosmetic appearance of the infected wounds was seen far better with honey dressings as compared to saline soaked dressings. Studies have considered saline soaked dressings to he cost effective as compared to commercially available honey which may also need gamma radiation for sterilization thus adding to the total cost of treatment [17]. But our results have been satisfactory with commercially available honey keeping its cost effectiveness in mind.

The potential outcomes of honey in the process of wound healing have been corroborated in variable types of wound. According to literature, honey exhibited favorable effects in evolving healthy granulation tissue, curtailing the burning sensation and lowering the erythema formation around the skin edges observed on seventh day and decreasing pain, edema and tenderness on fifteenth day; in a total number of 10 patients (aged 10-70) with skin wounds [18]. In another clinical study, 75 women who underwent caesarean section were taken; honey excelled to reduce swelling, redness, discharge, ecchymosis, and accomplished in the wound edges' approximation observed on seventh and fourteenth day as compared to placebo [19]. For the assessment of wound healing characteristics and cosmetic outcomes induced by honey on surgical wounds; a randomized clinical trial was conducted on female patients undergoing elective plastic surgery procedures. The application of honey impregnated dressings not only decreased the size of the scar but was also associated with minimal probability of contracting surgical site complications such as marked infection and dehiscence [20]. The advantageous outcomes of honey have been mentioned in burn wounds as well; specifically, those with superficial burns (<30% TBSA). Bacterial load on cutaneous wounds was markedly decreased after the sixth day, depicting that Tualang honey might consist of both the bactericidal and bacteriostatic effects [21]. In contrast to wounds treated with silver sulfadiazine, the wounds treated with honey resulted in fast healing and subsequently quick recovery [22, 23]. Honey has been reported to reduce pungent odor evolving from certain wounds which then has societal implications [24]. In our study, we applied honey and normal saline soaked dressings to postoperative infected wounds after multiple urological procedures. In our study we divided the patients into two groups. There were 30 patients in group A (saline soaked

dressings) and 30 patients in group B (honey impregnated dressings). Both groups were compared in terms of cosmetically enhanced wound healing and the results were statistically significant (0.028) in group B. In group A the mean duration of wound healing was 25.03 days (standard deviation of 4.69) with minimum of 17 days and maximum of 32 days while in group B the mean duration of wound healing was 12 days (standard deviation of 3.14) with minimum 7 days and maximum 18 days. These findings were on contrary to literature, as they found saline to result in earlier improvement as compared to honey [16]. In our study, we also found that the most common organism grown on culture was Pseudomonas aeruginosa, Staphylococcus aureus and Escherichia coli.

Sufficient work is done on preference of honey use in wounds and burns. There is utmost need for evidence-based trials which would support the implication of honey use in practice. Therefore, we conducted a randomized controlled trial considering pediatric urology patients and the response noted to local application of normal saline and honey in infected wounds. In the study we conducted, all wounds treated with honey-based dressings rapidly underwent granulation tissue formation and thereby re-epithelialization as compared to saline soaked dressings. A remarkable reduction was noticed in peripheral edema and inflammation upon the foremost honey implementation. Debridement of any necrotic tissue was implicitly carried out whenever detected. Slough was diligently eliminated resulting in no signs of infection, irrespective of former presentation of wound. There was slightest formation of scar detected. In wounds at high risk for infection, we now regularly use honey prophylactically in addition to postoperative antibiotics and this has significantly reduced the incidence of postoperative wound infections in our practice. Furthermore, research need to be done on comparison of wound healing and cosmetically better scars in infected wounds treated with antibiotics alone and antibiotics plus honey application. According to the limitations of this study further research need to be done on types of honey recommended with regards to different grades of infected wounds on a much bigger sample size for yet more accurate results.

CONCLUSION

Honey can be used safely and effectively for the management of postoperative surgical site infections in pediatric urology patients as compared to normal saline soaked dressings. It can also be used as a complementary therapy to antibiotics in preventing wound infection to occur in patients at major risk for wound infection post operatively. It is high time to be prepared to implement complementary therapies available, in addition to the long-standing conventional treatments.

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