In the name of God

Shiraz E-Medical Journal
Vol. 9, No. 4, October 2008

http://semj.sums.ac.ir/vol9/Oct2008/86060.htm

Comparative Study of Therapeutic Effects of Honey and Povidone Iodine in Surgical Wound Healing in Rabbit.

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Received for Publication: February 16, 2008, Accepted for Publication: August 15, 2008.

Abstract:

Introduction: Duration and remainder scar are two important problems in process of surgical wound healing, especially in low midline incisions that usually have more duration and wider scar in their healing process. The aim of this study was a comparison between Honey and Povidone Iodine in surgical wound healing, because of Honey is the world's oldest known wound dressing and there are several reports from its antibacterial properties and stimulating effects on wound healing process.

Materials and Methods: This clinical trial study was performed on 40 female Rabbits that were non-pregnant, 5 months aged with average weight of 1900 grams, belonging to Albino race, in Animal Institute in Tehran, Iran in the year 2006. For beginning, Rabbits were divided into two equal groups randomly, and then similar surgical incisions 10 cm traced were applied after appropriate shaving and local anesthesia on exterior area of right thigh of all rabbits. Then all Rabbits wounds sutured by Silk 2.0 separately and were covered similarly. Covering of wounds in two groups were changed every 12 hours and wounds were dressed with 5 ml of purred natural Honey in first group and in the second group irrigated with 5 ml of Povidone Iodine 10% in every time. The findings were recorded and analyzed with SPSS software by using of chi-square and t test, $p<0.05$ was considered as significant.

Results: Appropriate wound healing in Rabbits 4 days after surgery was significantly different in Honey and Povidone Iodine groups (17/20 or 85% vs. 8/20 or 40%, $p=0.0032$), in 7th days after surgery this differentiation was significant also (20/20 or 100% vs 11/20 or 55%, $p=0.0072$). Width of scar 2 weeks after surgery was significantly different in two groups too (2mm SD±1 vs. 5mm SD± 1, $p= 0.0043$).

Conclusion: Use of Honey as wound dressing after surgery reduces duration of healing and width of scar more than Povidone Iodine and it's a good alternative for stimulating and improvement of surgical wound healing.

Keywords: Honey, Povidone Iodine, surgical wound healing

Introduction:

In process of surgical wound healing, duration of healing and width of remainder scar are two important problems, especially in low midline abdominal incisions that are the commonest form of incisions in urgent surgeries (for example urgent cesarean sections). in these incisions the vertical condition of incision comparison with Longers Lines of abdominal wall result in longer duration and wider scar in their healing process.[1]

Honey is the worlds' oldest known wound dressing, its use being recorded over 4000 years ago, Researchers started to document the wound healing properties of Honey in the early 20th century, but the introduction of antibiotics in 1940 temporarily halted its use. Now concerns about antibiotic resistance, and a renewed interest in natural remedies, have prompted resurgence in the antimicrobial and wound healing properties of Honey.[2] Several properties of Honey have reported that make it an ideal wound dressing material, such as:

1. Honey provides a moist healing environment, thus healing occurs rapidly with minimal scarring

2. Honey provides a non stick barrier by its osmolarity

3. Honey has an anti-inflammatory action, it also reduces edema, thus improves circulation and reduces pain and exudation in wound

4. Honey stimulates angiogenesis, granulation and epithelialisation by stimulate the growth of fibroblasts, and thus it helps skin regeneration

5. Honey has anti-bacterial effects

6. Honey prevents scarring and hypertrophyication.[3, 4]

The biochemical analysis of Honey shows that it contains: 18-20% of water, glucose, and fructose, several vitamins like A, B complex, D, E, K, beta carotenes, minerals, and different enzymes. Honey also has anti-bacterial as well as anti-viral properties, because of presence of hydrogen peroxide in its structure, Honey by provocation of white blood cells can induce production of cytokines, interleukins 1, 4, plus tumor necrosant factors that have strong anti-microbial effects.

Honey gives good results on a wide range of wound of varied etiology, including: abscesses, surgical wounds, traumatic wounds, ablation wounds, burns, decubitus ulcers and leg ulcers (venous and diabetic).

Honey is very effective in cleaning up infected surgical wounds, it is effective even in the treatment of Fourniers'gangrene.[5]

Several studies in humans and animals have shown good effectiveness of Honey in stimulating and improvement of healing process, and treatment of infection, by using it on open infected surgical wounds and burns before, but we take a decision that compare the effectiveness of Honey and Povidone Iodine (routine irrigating agent for wound after surgeries) on healing

process, by using them on closed non infected surgical wound, therefore we preferred do this study first in Rabbits.

Materials and Methods:

This study was a prospective and randomized clinical trial that was done on 40 female, non-pregnant, Albino Rabbits, that were 5 months aged and with average weight of 1900 grams, in animal institute in Tehran, Iran, in the year of 2006. Prior to beginning of the study, the Rabbits were kept under standard condition of animal house for one month that had light and dark conditions for each 12 hours and temperature of 18-24°C. After adaptation period, all Rabbits were divided into two equal groups randomly, each group consisted of 20 Rabbits.

In both groups, after proper shaving and local anesthesia by application of 3 ml of lidocaine 2%, a surgical incision traced 10 cm was applied on Rabbits' right thighs with similar depth from skin to muscular surface. Each incision was sutured by silk 2.0, the sutures were separated from together with equal distances and covered similarly.

In both groups the surgical wound covers were changed every 12 hours. In first group the wounds dressed with 5 ml of purred natural Honey of Damavand region, while in second group, wound irrigated with 5 ml of Povidone Iodine 10%.

Surgical wounds in both groups were inspected regularly within each time of changing of their covers for possible infection signs: atypical discharges or abnormal erythema of wounds' edges. And for proper healing: adequate adhering the edges of wound for removing of sutures. Two weeks after surgery the width of midpoint of wounds' scars in all of Rabbits measured with milimetric ruler. The observation forms containing the data related to the condition of wounds in each of inspections and in later examination were completed, non parametric data were analyzed by chi-square and parametric data were analyzed by the T test, using SPSS and P value < 0.05 considered significant. using Sd with the Ttest ta were analyzed with the Ttest n of wounds urese Iodine

Results:

In the first group, who were receiving Honey dressings, surgical wounds of 17 rabbits (85%) healed properly after 4 days and sutures were removed, while in the second group, who received Povidone Iodine irrigation, after 4 days only 8 rabbits (40%) showed proper healing. The surgical wounds in remaining 3 rabbits of the first group 7 days after surgery were healed properly. whereas, in the second group wounds of 3 remaining rabbits (55%) 7 days after surgery and the last 9 rabbits 8 days after surgery were healed properly and their sutures were removed, so that differentiating between two groups was significant ($P<0.05$). In both groups no sign of infection was observed during study, so that the difference of two groups from this point was no significant. Table*

shows the outcomes of wound healing process in both groups.

*Table - Major outcomes of wound healing in both groups of rabbits.

Duration	Appropriate Healing in Honey group	Appropriate Healing in Povidone Iodine group	P value
4th day of wound healing	17/20 (85%)	8/20 (40%)	0.0032
7th day of wound healing	20/20 (100%)	11/20 (55%)	0.0072
8th of wound healing	-	20/20 (100%)	-

pv<0.05 = significant

Two weeks after surgery the width of middle point of surgical wounds scars in both groups of rabbits were measured by a similar milimetric ruler, that its average was 2 mm in first group and 5 mm in the second group, so that differentiating between two groups from this point was significant (P value = 0.0043, P<0.05).

Discussion:

The findings of present research indicate that dressing of closed non-infected surgical wound with Honey in comparison with irrigation it with Povidone Iodine can reduce duration of wound healing and width of remainder scar with significant differentiation.

In a similar study on 40 patients who were suffering from burn injury local application of Honey reduced the period of healing as well as diameter of scar to half comparison with other agents[6]

Researchers in Sanaa, Yemen, treated 50 patients with wound infections following cesarean section or hysterectomy twice daily with either raw wildflower Honey or a standard antiseptic solution of alcohol and Iodine (AI), 26 patients treated by local Honey were infection-free after 6 days compared with 15 days for the 24 patients treated with AI, 84% of Honey patients healed cleanly compared with 50% of AI patients. Honey treatment reduced the average postoperative scar width by nearly two-thirds and hospitalization by half.[7]

According to similar study, local use of Honey after surgical vulvectomy (in vulvar cancer) also prevented of any infection and stimulated wound healing with minimal scar. There are no reports of any type of infection resulting from application of Honey to wounds.[8]

In another research, on 605 patients, sugar compared with Povidone Iodine in healing process of infected wounds, burns and ulcers. The findings showed that, sugar leads to lesser requirement for skin graft and antibiotics as well as reduces duration of hospitalization.[9]

Randomized controlled clinical trials have demonstrated that Honey is more effective than Opsite and silver sulfasalazine for the care of partial-thickness burns. Also a retrospective study has shown that Honey is as effective as silver sulfasalazine for dressing burns, and an animal study on deep dermal burns in Pigs has shown that

Honey is more effective than silver sulfasalazine.[10, 11, 12]

Honey has been shown to inhibit the growth of several organisms responsible for wound infections. A team of researchers from the University of Waikato, New Zealand, tested whether Honey would have any benefit on gastric ulcers due to Helicobacter pylori, within three days, Honey stopped the growth of H pylori. In one preliminary study, 9 infants with large, infected open spina bifida that failed to heal with conventional treatment were treated successfully with topical application of Honey.[13, 14]

Honey is a by-product of bees concentrating plant nectars. It is mainly food for bees, bears and humans. It also is known for its antioxidant, antibiotic and antiviral capabilities, Honey is mostly glucose and fructose, these sugars are strongly attracted to water, forming a viscous syrup, when spreads on a wound, Honey absorbs water and body fluids, thus desiccating bacteria and fungi and inhibiting their growth, on the other hand Honey contains glucose oxidase, an enzyme that, in the presence of a little water, produces hydrogen peroxide that is an antiseptic agent. Honey helps to keep a wound moist, and wounds in moist environment heal quicker, on the other hand a moist environment also promotes bacterial growth, thus a successful dressing material must also be anti-bacterial.[15]

In conclusion, use of Honey as wound dressing after surgery reduces duration of healing and width of scar more than Povidone Iodine and it's a good alternative for stimulating and improvement of surgical wound healing.

Acknowledgment:

The authors wish to thank Dr. Ali Khaajavi for his cooperation.

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