

The CRP levels in patients of alveolar osteitis treated with euginol and Honey-Research

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Abstract:

Background: As natural products garner attention in the medical field due to emergence of antibiotic resistant strains of bacteria, honey is valued for its antibacterial activity. In Kashmir- honey is considered to be one of the best domestic produce and is known worldwide for its purity. It has been reported from various clinical studies on the usages of honey as a dressing for infected wounds that the wound become sterile in 2-5 days, others have al so reported that the honey is effective in cleaning up infected wound. Honey is one of the oldest known medicines. Its use has been rediscovered in later times by the medical profession, especially for dressing wounds.

Materials and Methods: This study was under taken to evaluate the effect of honey dressing in management of dry socket along with estimation of CRP levels. The 100 patients of dry socket were selected from the from the outpatient department of oral and maxillofacial surgery. A diagnosis of dry socket was made clinically.

Results: In this study there was significant reduction in CRP level on post operative days with significant reduction if inflammation, hyperemia, edema and exudation after honey dressing that results in soothing effect and reduction in pain and discomfort..There was no side effect of honey was observed in our study, so it can be used as alternative for the management of dry socket.

Discussion: As a dressing on wounds, honey provides a moist healing environment, rapidly clears infection and reduces inflammation, edema, and exudation. It has been found that honey act as barrier preventing wounds from becoming infected, preventing cross infection, and allowing wound to heal rapidly. It has al so been reported that the honey dressing halt advancing necrosis

Conclusions: As honey is easily available in the market and is inexpensive so honey can be used as medicament for the management of dry socket. There are no side effects of honey. Excess use of euginol, can lead to necrosis of bone.

Keywords: Dry socket, euginol, honey, CRP.

I. Introduction

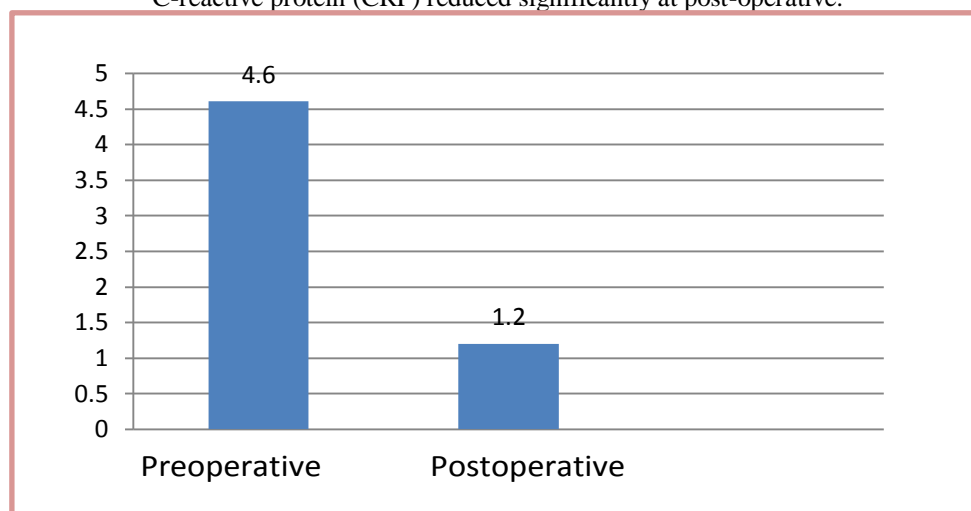
There has been a renaissance in recent times in the use of honey, an ancient and traditional wound dressing, for the treatment of wounds, burns, and skin ulcers. In Kashmir- honey is considered to be one of the best domestic produce and is known worldwide for its purity. Honey is one of the oldest known medicines and its use has been rediscovered in later times by the medical profession, especially for dressing wounds. It has been reported from various clinical studies on the usages of honey as a dressing for infected wounds that the wound become sterile in 3-6 days, others have also reported that the honey is effective in cleaning up infected wound. Dry socket or alveolar osteitis is one of the most common post-operative complications following the extraction of permanent teeth. It is a condition in which there is a loss of clot from the socket clinically post-operative discomfort can range from simple local inflammation to classic alveolar osteitis including halitosis regional trismus dull thrombing pain irradiating from empty socket, normally to ipsilateral ear, temporal region or eye. Occasionally regional lymphadenopathy is al so noted. It is believed to be multi factorial in origin and these are some commonly etiological aggravating and precipitating factors. Oral microorganism, trauma during surgery, roots and bone fragments remaining in the cavity, excessive curettage and irrigation, dislodgement of blood clot, oral contraceptives and smoking are the some of the important factors.

There are various treatment modalities used for management of dry socket like bland obtundant dressing, pain reducing dressing such as zinc oxide euginol dressing, anti-infective agents, systemic or local, antifibrinolytic agent, surgical intervention to remove necrotic clot and encourage the formation of blood clot. It has also been reported that honey dressing halt advancing necrosis. Hence the honey can be used for the management of dry socket.

II. Methodology

The informed consent was taken prior to treatment. Patients with systemic illness like diabetes, pregnant and lactating female were not included in the study. A total of 100 patients of dry socket were selected from the out-patient Department of Oral and Maxillofacial Surgery. Sterile gauze soaked with honey was used as a dressing. A diagnosis of dry socket was made clinically. This packing is changed until the post-operative pain symptoms subsided. This study was under taken to evaluate the effect of honey dressing in management of dry socket [Table 1], [Table 2], [Table 3], [Table 4], [Table 5] and [Table 6].

C-reactive protein (CRP) reduced significantly at post-operative.



The CRP levels are often elevated in patients with odontogenic infection and post-operative complications. [1][7] Rapid reductions in serum CRP level indicate successful treatment. It is a cytokine induced acute phase protein that increases in concentration as a result of inflammation. In our study, CRP levels reduced significantly post-operatively.

All the 100 patients had pain and necrotic slough and 80 patients had halitosis.

In 10 patients symptoms developed at 2nd day, 81 patients symptoms developed at 3rd day and 9 patients reported at 4th day after extraction.

Symptoms-resolutions of symptoms in 80 patients all the symptoms subsided at 5th day in other 16, patient on 6th day and in 4 patients on 7th day after extraction [Figure 1], [Figure 2] and [Figure 3].

No adverse effect have been reported in the present study, honey has been used topically on wound over thousands of years without any adverse effect.

Allergy to honey is rare but there could be an allergic reaction to either the pollen or the bee protein in the honey. Honey gives a fast rate of tissue regeneration and suppression of inflammation, edema exudation and malodor in the wounds.

Honey can be expected to have a direct nutrient effect on regenerating tissues because it contains a wide range of amino acids, vitamins and trace elements in addition to large quantities of readily assimilable sugars.

III. Discussion

Honey whose medicinal uses date from ancient times has been lately rediscovered as therapy for wounds. The antimicrobial effect of honey has been reported by a number of workers it is commonly used as a base for ointments and has very successfully been applied in surgical dressings for open wounds and burns to avoid septic infections.[8] Natural products have been used for several years in folk medicine. Honey has an effective antibacterial potential to combat oral pathogens and hold promises for the treatment of periodontal diseases and mouth ulcers. Honey was used to treat infected wounds as long ago as 2000 years before bacteria was discovered to be cause of infection. 50 AD Dioscorides described honey as being good for all rotten and hollow ulcers. Honey has been reported to have an inhibitory effect to around 60 species of bacteria including aerobes and anaerobes. Gram-positive and Gram negative microorganisms.[2]

The antibacterial property of honey was first recognized in 1892 by van Ketel. The minimum inhibitory concentration was found to a range from 1.8% to 10.8% (v/v) indicating that the honey has sufficient antibacterial potency to stop bacterial growth if diluted at least 9 times due to its hygroscopic properties, its acidic pH and hydrogen peroxide.[2]

Glucose + H₂O + O₂ → Gluconic acid + H₂O₂. It serve to preserve the honey. The major antibacterial activity in honey has been found to be due to hydrogen peroxide produced enzymatically in the honey. Phytochemical factors it has enzyme and tissue nutrition material and vitamins that help repair tissue directly. The proliferation of peripheral blood B lymphocytes and T lymphocytes in cell culture is stimulated by honey at concentration as low as 0.1%. It all so stimulates monocytes in cell culture to release cytokines tumor necrosis factors- α , interleukin-1 (IL-1) and IL-6 which activate the immune response to infection.^[2]

The mechanisms of antibacterial action of honey remain speculative. Honey may inhibit bacterial growth due to a number of different mechanisms. High sugar concentration, low pH, hydrogen peroxide generation, proteinaceous compounds, or other unidentified components present in the honey may all provide antimicrobial activity.[9] Shrinkage and disruption of the bacteria may be due to its osmotic effect, low pH, and also due to the presence of antibacterial substance such as inhibine.[10,11] Several components may contribute to the non-peroxide activities of honey, such as the presence of methyl syringate and methylglyoxal, which have been extensively studied in *Leptospermum* honeys.[12] Besides its antimicrobial properties, honey can clear infection in a number of ways in vivo, like boosting the immune system, anti-inflammatory, and antioxidant activities and via stimulation of cell growth.[13,14]As there is lack of scientific research and documentation, still the medicinal properties of Indian honeys remain in the dark. Further studies on human subjects are required in vivo to understand the efficacy of Indian honeys in eliminating bacteria from wounds.

The honey is saturated or supersaturated solution of the sugar 84% being the mixture of fructose or sucrose the water content is usually 15-21% by weight. The strong interaction of these molecules with water molecules leaves very few of the water molecules available for microorganisms. This free water is what is measured as water activity (aw) : m0 ean value for the honey have been reported from 0.562 to 0.62. Many species of bacteria have their growth completely inhibited if (aw) is in the range of 0>94-0.99.

Acidity - it is quite acidic its pH is from 3.2 to 4.5, low enough to be inhibitory for many pathogens.

The major antibacterial activity in honey has been found to be due to hydrogen peroxide enzymatically in the honey. The glucose oxide enzyme is secreted from the hypo pharyngeal gland of the bee in to the nectar to assist in the formation of honey from the nectar.

This serves to preserve the honey. The hydrogen peroxide produced would be the effect as a sterilizing agent only during ripening of the honey. Full strength honey has a negligible level of hydrogen peroxide because this substance is short lived in the presence of transition metal ions and ascorbic acid in the honey which catalyzes its decomposition to water and oxygen. On dilution of honey the activity increases by a factor of 2500-50,000 thus giving a slow release antiseptic at a level which is antibacterial but not tissue damaging.^{[2],[3]} All the antibacterial activity does not account for peroxide generating system it shows that there must be an additional antibacterial factor involved. several chemicals with antibacterial activity has been identified in the honey by various researches, pinocembrin, terpenes, benzyol alcohol, 3,5-dimethoxy-4-hydroxy benzoic acid, methyl 3,5-dimethoxy 4-hydroxy benzoate, 3, 4, 5 trimethoxy benzoic acid, 2 hydroxy, 3 phenyl propionic acid, 2 hydrobenzoioc acid and 1,4 dihydroxy benzene.

It has been reported from various clinical studies on the uses of honey as dressing for the infected wounds that the wounds become sterile in 3-6 days and other reported that honey is effective in cleaning up infective wounds. It has also been reported that the honey dressing halt advancing necrosis. It has also been found to act as a barrier preventing wounds from becoming infected, preventing cross infection and allowing burn wound to heal rapidly. Honey has been reported to promote the formation of clean healthy granulation tissues. It all so reduces inflammation, reduced hyperemia, edema, exudation and soothing effect when applied to wounds.^{[2],[3]} Hence its physical properties provide a protective barrier, by osmosis, create moist healing environment, in the form of the solution, not to stick underlying tissue. The antibacterial properties of honey prevents bacterial colonization, of the moist environment and no impairment of the healing process through adverse effect on wound tissue to the contrary it appears to have a stimulatory effect on tissue regeneration.^{[4],[5],[6]} There are clean indication of anti-inflammatory action, so this can be used as a therapeutic agent for the dry socket.

IV. Conclusions

As honey is easily available in the market and is inexpensive and there are no side-effects of honey so it can be used as a medicament for the management of dry socket. . Excess use of euginol, can lead to necrosis of bone.

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Figures

Figure 1: Pre-treatment



[Figure 2] : Clinical image of dry socket with honey dressing



[Figure 3] Clinical image after dressing



Tables

[Table 1]: Gender

Male	Female	Total
56	44	100

[Table 2] Clinical symptoms

No	Symptoms	Number of patients
1	Pain	91
2	Necrotic slough	88
3	Halitosis	80

[Table 3] Associated clinical symptoms

No.	Symptoms	No. of patient
1	Trismus	48
2	Swelling	52
3	Hemorrhage	0
4	Lymph nodes	11
5	Paresthesia	1
6	Radiating pain	79

[Table 4] Days of onset of symptoms

No	Days	No. of patients
1	1	0
2	2	10
3	3	81
4	4	9
5	5	0
6	6	0

[Table 5] Resolution of symptoms

Days	Resolution (number of patients)
1	
2	
3	
4	
5	80
6	16
7	4

[Table 6] C-reactive protein

Blood sample	N	Mean	SD	Minimum	Maximum
Pre-operative	100	4.6	2.8	1.12	14.2
Post-operative	100	1.2	0.8	0	3.12