Bees make medicine for mankind

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Honey, as a product from bees, has multiple properties, and is being therapeutically used since time immemorial. Its antibacterial, anti-inflammatory and wound healing properties are promising. Detailed discussion on honey is made in present review for its various biological properties.

Keywords: Honey as medicine, Wound healing

'Honey is a product from bees which is versatile, nourishing and healing, and is being used therapeutically since time immemorial. It has multiple properties, which are promising. Detailed discussion on honey is made in present review for its various biological properties.

Honey in ancient period

The usage of honey as a medicine is referred to in most ancient, written records²³. Honey was prescribed by the physicians of many ancient races of people for a wide variety of ailments. The ancient Egyptians, Chinese, Greeks and Romans used honey to treat wounds and diseases of the gut. The Muslim prophet Mohammed recognised honey for the treatment of diarrhoea. Aristotle (35 BC) wrote of honey as a remedy for wounds and sores of eyes. Dioscorides (50 AD) wrote about honey as a good remedy for sunburn and spots on face, inflammation of throat and tonsils⁴. But the usage of honey in Ancient India overwhelmed all. It is mentioned in Rigveda⁵ and extensively used in Ayurveda²³, specially as a carrier of drugs.

Instead of dirt and poison we have rather chosen to fill our hives with honey and wax, thus furnishing mankind with the two noblest of things, which are sweetness and light'—Jonathan Swift, The battle of books.

Bees make honey which gives ‘light’ (here light indicates new life) to the mankind, rather a wounded man. Indian priests used to mix honey in Panchamrita¹, a sacred liquid-mixture served to the people in worship-place for a long time.

Indian physicians used to dress wounds with honey even in acute wounds of soldiers in the battlefield since ancient time.

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Honey in ancient literature

Ohm madhu vata ritawate  
Madhu ksharanti sindhabah  
Madhyirna santousadhiih  
Ohm madhu naktwamutosaso  
Madhumat parthivang Rajah  
Madhu dvourastu nah pita  
Ohm madhumatro vanaspati  
Madhuman astu suryah  
Madhirgarvo bhabantu nah  
"Rigveda"  

In present days as a folk medicine

In India Padma madhu (lotus honey) is said to be a panacea for eye diseases. The ancient use of honey for coughs and sore throats is also continued into the traditional medicine of modern times. It is used as a traditional therapy for infected leg ulcers in Ghana. In Nigeria it is used traditionally in earache. It is also used as a topical medicine for measles in eyes to prevent corneal scarring. It is a traditionally used for the treatment of gastric ulcers.

In present days as an experimental medicine

In gastric problems

A solution of honey (5%, v/v) as a rehydration fluid has been reported to be effective in diarrhoea in children. Numerous reports have been published from Russia and Arabic countries on oral usage of honey to treat upper gastrointestinal dyspepsia, gastritis, duodenitis and ulceration. Recent studies showed that honey has an excellent killing effect on Helicobacter pylori, the bacterium believed to be responsible for peptic ulcer.

According to a report, when 30 ml of honey is given orally before meals, 3 times a day in bleeding peptic ulcers, the presence of blood in faeces had decreased from 100% to 10.8% of patients very quickly. The healing effect of honey on gastric ulcer has also been shown in a trial carried out on rats with ulcers caused by aspirin. Other studies with rats have shown that honey has a protective action on stomach from ulceration caused by NSAID.

In ophthalmic diseases

Dr. M. C. Sharma, an ophthalmic surgeon from Rangaraya Medical College, Kakinada, Andhra Pradesh, India, has been treating corneal ulcers with honey. The use of honey in blepharitis, catarral conjunctivitis, keratitis has also been reported and satisfactory results were obtained in all cases.

Adverse effects

No adverse effects of honey have been reported till now. Allergy to honey is rare. Honey sometimes contains spores of clostridia which possesses a small risk of wound botulism. But no such report has been published. The problem of attraction of flies and ants to honey dressings can be overcome by using secondary dressings.

For wound healing

Many experimental reports on honey suggest that honey can be considered as the best universal topical medicine for the healing of wounds.
Though various types of honey are available, the chemical composition is more or less same in each variety. Only the dark honey (the best honey) contains more minerals mainly Fe, Cu, Mg\textsuperscript{13}. Honey is a complex mixture of sugars, minerals, trace metals, different organic acids, amino acids, enzymes, vitamins, antibiotics. Its sugar content is very high (75\%) and its pH is about 3.6\textsuperscript{13}. Molan (1992) determined 7 types of tetracyclines in honey\textsuperscript{14}.

It is reported from various parts of the world that honey can be considered as an excellent and safest wound healing agent in topical wound care\textsuperscript{15,16}. It assists in the healing of wound in various ways\textsuperscript{17}. Honey cleans the wound without any surgical interference. It induces sloughing of necrotic tissues, gives comfort in dressings and cleans infection rapidly from the wound\textsuperscript{18}.

Honey reduces inflammation, stimulates healing process, hastens tissue regeneration, causes minimum scarring and reduces malodour.

**Mode of application of honey**

Honey is used as a dressing-material soaked in gauze called ‘Honey Pad’. The amount of honey required per unit area of the wound would depend on the amount of exudation. This honey-pad has to be changed once daily, sometimes twice daily.

**Cleansing action on wounds**

The high sugar content of honey causing high osmolarity induces out flow of exudate and dilutes honey. This may assist in lifting dirt and debris from the bed of the wound so that no surgical debridement is necessary or a minimum surgical debridement is required\textsuperscript{19}.

**Debridging effect**

Dead tissues separate easily from the wound bed after honey has been applied to the wound. This is due to chemical or enzymic debriding effect of honey, thus saving the patient from pain or the risks associated with anaesthesia\textsuperscript{20}.

**Non adherent property**

Honey generally causes no pain, no bleeding, no difficulty on removing of dressings because there is no adhesion due to moist environment in the wound surface. It does not cause allergic reaction and has no harmful effects on wound tissues\textsuperscript{21}.

**Antibacterial property**

Honey prevents bacterial growth and causes quick sterilisation of the wound even in infection with antibiotic resistant bacteria. This antibacterial property is due to low pH (3.6) of honey which prevents bacterial growth. It is hygroscopic in nature. So it kills bacteria by withdrawing water from bacterial cell. It contains an enzyme, inhibitine which generates free radicals, in effect sterilizing the honey. It provides a supply of glucose to leucocytes essential for ‘respiratory burst’ that produces H\textsubscript{2}O\textsubscript{2}, the dominant component of the antibacterial activity of macrophages. It produces gluconolactone which is acidic and it kills bacteria. Viscose barrier formed by honey prevents sterile wounds from being colonised by bacteria\textsuperscript{22}. (Fig. 1).
Anti-inflammatory action

Honey reduces inflammation in wound surface, which is observed in animal studies also where WBC involved in inflammation, is reduced in number. This reduction of inflammation is due to direct effect of honey, not a result of removing inflammation-causing bacteria.\textsuperscript{23}

Healing property

The high glucose content of honey would be used by bacteria in preference to amino acids from serum and dead cells, and thus give rise to lactic acid instead of ammonia which causes mal odour as well as toxicity to the wound. Therefore, it promotes healing process. Honey promotes the formation of healthy granulation of tissues and growth of epithelium over the wound. Thus it helps skin to regenerate making plastic surgery unnecessary. It is due to direct nutrient effect of honey on regenerating tissues. In addition, the high osmolarity of honey causes out-flow of lymph which also provides nutrition for the tissues.\textsuperscript{24}

Special advantages

Dressing with honey gives a clear margin and clear boundaries to the wound area that allows early grafting, promotes prompt graft taking and facilitates surgical procedures. In spite of its high sugar content (75\%), honey can be safely used as dressing material in diabetic ulcers due to its healing and antibacterial properties.\textsuperscript{25}

Conclusion

The reports published on the effect of honey on gastroenteritis, upper gastrointestinal dyspepsia including gastritis, duodenitis, ulcers, ophthalmic diseases, are few in number. But a wide range of reports on the effect of honey on topical wound care has been published from various corners of the world since last few decades.

From these clinico-experimental observations it can be concluded that honey can be considered as an universal topical medicine as the currently available topical agents have short
comings; some of them have appreciable toxicity and they are costly. It is thought that due to safety, economy and easy availability even in a remote corner of a country, honey may have widespread applicability. It is also expected that research workers will pay more attention to the effectiveness of honey on the diseases other than wounds. No product made by man can mimic honey made by bees.

References
1 Bhattacharyya S M, Purohit Darpan (Bengali), (Satyanarayan Library, Kolkata), 1987.
2 Charaka Samhita, Sutrasthana, Chapter 8, verse 4 and Chikitsasthana chapter 15, verse 16.
3 Sushruta Samhita, Sutrasthana, chapter 14, verse 10.
5 Rigveda, Mandala 1, Sutra 90, Verse 6-8.