

Translation:

Honey for the treatment of skin wounds

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Wounds occur regularly with dogs and cats, and these are often discussed during visits at veterinary clinics. For treatment, pet owners as well as veterinaries often use medicines for local application. There seems to be a perceived need to apply something to the wound, and several ointments or creams are intended for this use. In general, these are not necessary and in many cases even counterproductive as almost all treatments delay the wound healing process. However, there are recent signs that two compounds actually stimulate the wound healing process, i.e. 65% glycerol (12, 16) and honey. This article focuses on the latter compound.

Introduction

Fresh wounds can best be cleaned with a physiologic salt solution and be closed by sutures. Superficial wounds do not require antibiotics if they are well treated and if there is minor tissue damage. Only infected, deep wounds may require antibiotic treatment (10). For these, a broad spectrum antibiotic that is active against most common skin bacteria, such as cephalosporins and amoxicillin with clavulanic acid, is systematically applied during five to seven days. It is important that before surgery the blood level of active antibiotics is sufficiently high. This can be realised by intravenous application of the antibiotic just prior to anaesthetization. In fact, there exists no indication for local application of antibiotics. However, there exist anecdotal stories about wound healing stimulating compounds such as honey, which has been used for centuries because of its beneficial effect on wound healing. This is explained by the fact that honey has a cleaning effect, that is absorbs oedema and odours, that it shows an antibacterial and anti-inflammatory effect, and that it stimulates granulation, epithelialisation, tissue regeneration and supplies nutrients to the wound tissue.

Antibacterial effect of honey

Honey works antibacterial against several bacteria, such as *Pseudomonas*, *Staphylococcus*, *Streptococcus* and *E. coli*. Even antibiotic resistant bacteria, such as MRSA (Methicillin Resistant *Staphylococcus Aureus*) and VRE (Vancomycine Resistant *Enterococcus*) are sensitive (2,3,9). A ten percent concentration of honey(v/v) is sufficient for complete inhibition of wound bacteria (5). The antibacterial effect is caused by hyper osmolarity, a low pH of 3.6, the presence of heat-sensitive compounds like inhibine, hydrogen peroxide and enzymes such as catalase. Hydrogen peroxide is formed together with gluconic acid from honey due to an enzymatic reaction of the enzyme glucose-oxidase (added by the honey-bee) with honey. This reaction occurs when honey is diluted with wound exsudate. The slow release of hydrogen peroxide has an adverse effect on bacteria, but not on intact cells so that no tissue damage occurs. It is assumed

that additional antibacterial compounds derived from various flowers are present (17). Research has shown that bacteria showed varying sensitivity towards different monofloral honey types (1,17).

Additional effects of honey

Experimental research on animals showed that honey reduces the amount of inflammatory cells that infiltrate a wound. Furthermore, during clinical studies reduced oedema and a decrease of exsudation were observed. Hyper osmolality of honey stimulates enzymes present in the body, by which autolytic debridement of necrotic tissue is achieved.

Honey stimulates granulation and epithelialisation by the activity of hydrogen peroxide that enhances the angiogenesis process and the proliferation of fibroblasts. The low pH and angiogenesis increase the availability of oxygen, which stimulates tissue regeneration. The odour neutralising effect is realised because bacterial growth and the production of waste are reduced. Furthermore, bacteria ferment honey sugars directly to odour-free lactic acid (5).

Clinical studies in humans and pets

Very good results were obtained from treatment of burn wounds with honey in comparison with treatment with silver sulphadiazine (13) and polyurethane coverage (14). With the sterile antibacterial wound ointment on the basis of honey, a multi-centre case report study is published with 139 patients in old people's homes and family doctor practices with ulcers, decubitus, superficial and burn wounds. With various wound types, several wound treatment products (such as Betadine®, Duoderm®, silversulphadiazine) were compared on the same patient. Although no statistical analysis was carried out, 14 to 47% faster wound healing was reported with honey. The wound ointment on the basis of honey also showed an antifungal effect against *Candida albicans*. In the mean time, the first case studies are available with dogs and cats.

Necessity to use sterile honey

Obviously, it is attractive to use a natural product for the treatment of patients, but one important aspect needs to be addressed to prevent problems that may occur when treating animals or humans with honey.

Only one single study mentions that sterile honey is used (14). Often, this aspect is not mentioned or it is assumed that honey is self-sterile (13). This, however, is an important misunderstanding. Honey can contain *Bacillus* sp. and *Clostridium* spores and, therefore, can cause botulism. Accordingly, the use of natural honey on necrotic wounds is contraindicated. Moreover, natural honey can contain pesticide residues as well as residues from antibiotics used to treat honey bees, such as tetracyclin.

Accordingly, for medical use it is advised to use honey from specific pathogen free (SPF) honey bees that are not treated with medicines and originate from areas where no chemicals are used. Also, irradiation of honey leads to a sterile product of which the functionality is not affected. In the Netherlands, a sterile honey ointment is available in

tubes of 20 and 50 g. The ointment can be used in combination with a wound dressing and, according to the product instruction, one application per day is sufficient.

Scientific research of the wound healing effect of honey on pets and animals is not carried out, but must take place in the future to obtain an independent proof that honey ointment is a worthwhile addition for the treatment of (infected) wounds in veterinary practice.

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