

Review Article

Antibacterial honey (Medihoney[®]) for wound care of immunocompromised pediatric oncology patients

Antibakterieller Honig (Medihoney[®]) zur Wundpflege bei immunsupprimierten Kindern

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Abstract

The physiologic process of wound healing is impaired and prolonged in paediatric patients receiving chemotherapy. Due to profound immunosuppression, wound infection can easily spread and act as the source of sepsis. Referring to in vitro studies, which confirmed the antibacterial potency of special honey preparations against typical isolates of nosocomially acquired wound infections (including MRSA and VRE) and considering the encouraging reports from other groups, Medihoney[™] has now been used in wound care at the Department of Pediatric Oncology, Children's Hospital, University of Bonn for three years. Supplemented with exemplary clinical data from pediatric oncology patients, this presentation reviews the scientific background and our promising experience with Medihoney[™] in wound care issues at our institution.

Zusammenfassung

Der physiologische Prozess der Wundheilung ist bei pädiatrischen Patienten unter Krebschemotherapie beeinträchtigt und verlängert. Auf Grund der ausgeprägten Immunsuppression kann die Wundinfektion leicht metastasieren und Quelle für eine Sepsis werden. Auf Grund von in vitro Studien, die die antibakterielle Wirkung spezieller Honigpräparationen gegen typische nosokomiale Wundinfektionserreger einschließlich vom MRSA und VRE bestätigen, und auf Grund ermutigender Berichte von anderen Arbeitsgruppen, wird Medihoney[™] seit drei Jahren in der Wundversorgung in der Abteilung für Pädiatrische Onkologie der Kinderklinik der Universität Bonn eingesetzt. Ergänzt mit exemplarischen Daten von pädiatrischen onkologischen Patienten wird ein Überblick über den wissenschaftlichen Hintergrund und unsere viel versprechenden Erfahrungen mit Medihoney[™] in der Wundbehandlung in unserer Klinik gegeben.

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Text

The ideal wound antiseptic (according to Kramer et al. 2004) [1]

- Shows a quick onset of activity and a remanent, broad spectrum effect against bacteria and fungi, even under the unfavorable condition of an exudating, colonized or infected wound (dilution, different protein consistence, chemical inactivation).
- Enhances and accelerates the physiologic process of wound healing (debridement, granulation), even if applied for prolonged periods.
- Does not cause adverse local or systemic effects (allergy, toxicity related to absorption).
- Is of moderate cost even if applied two times daily.

Even though Octenidin does have some elevated cytotoxic effects in vitro relative to iodophores or polyhexanide [1] it is our first choice for antiseptic treatment of infected wounds within the first 48 hours. We switch to antibacterial honey (Medihoney[™]) as soon as possible. Later on, wounds are rinsed with sterile Ringer solution during each daily dressing change with non-touch, sterile techniques and systemic analgesia if necessary [2].

According to scientific literature and clinical experience, antibacterial honey (Medihoney[™]) seems to fulfill most of the above mentioned requirements of an ideal antiseptic in wound care. The only open question for Medihoney[™] is the residence time needed to kill bacteria in a colonized wound, which is supposed to be less than 5 minutes for Octenidin or Polyvidoniodine.

Theoretical adverse reactions such as anaphylaxis or systemic toxicity (i.e. hyperglycemia in diabetic patients) have not been reported so far. Nevertheless, meticulous clinical observation and documentation should ensure that severe adverse events related to the use of honey in wound care are immediately reported and published, when such a situation arises. Complex wounds and wounds of immunocompromised patients should only be treated under professional medical supervision. The additional administration of systemic antibiotics is often necessary in pediatric oncology patients during periods of profound neutropenia ($< 0.5 \times 10^9/l$).

Even the best antiseptic, anti-edema and granulation stimulating local treatment does not abrogate the need of early surgical drainage of retentions and the early debridement of necrotic wound areas [3], [4].

Vardi et al. observed the complete healing of complicated, deep sternal wound infections with honey in 9 neonates and infants after surgical intervention for congenital heart disease within 21 days of treatment. The majority of these patients had been treated unsuccessfully with local antiseptics and systemic antibiotics for more than 14 days (*Pseudomonas*, *S. aureus*, MRSA, *E. coli*, *Enterobacter* spp.). For 6 of 9 patients the antibiotic treatment was finished at the beginning of wound care with honey [5]. There are many impressive case studies but only a few controlled trials [6], [7], [8], [9], [10] concerning the use of honey for wound care. In superficial burn wounds, but not for deep necrotic burns [11], an advantage of honey relative to other applied remedies [12], [13] was shown.

Johnson et al. performed a randomized, controlled trial comparing the prophylactic effect of thrice-weekly exit-site application of Medihoney[™] versus mupirocin on infection rates in patients who were receiving hemodialysis via tunnelled, cuffed central venous catheters [14]. A total of 101 patients were enrolled. The incidences of catheter-associated bacteremias in honey-treated ($n = 51$) and mupirocin-treated ($n = 50$) patients were comparable (0.97 versus 0.85 episodes per 1000 catheter-days, respectively; not significant). The authors concluded that thrice-weekly application of standardized antibacterial honey to hemodialysis catheter exit sites was safe, cheap, and effective and that with local Medihoney[™] the problem of resistance induction against mupirocin can be circumvented. Biswal et al. investigated the use of honey in 40 adult patients with head and neck cancer. In the study arm, patients were advised to take 20 ml of pure honey 15 min before, 15 min after and 6 h post-radiation therapy. There was significant reduction in the symptomatic grade 3/4 mucositis among honey-treated patients compared to controls; i.e. 20% versus 75% ($p < 0.001$). Fifty-five percent of patients treated with topical honey showed no change or a positive gain in body weight compared to 25% in the control arm ($p 0.053$), the majority lost weight. The authors concluded that topical application of natural honey is a simple and cost-effective treatment in radiation mucositis, which warrants further investigation in a multi-centre randomised trial [15].

In the near future, an internet-based documentation system with standardized items for the documentation of wound healing in children treated with Medihoney[™] will be available. The main

objective of this database will be the cumulative analysis of prospectively documented treatment experiences from many pediatric centers. Prospective randomized and controlled studies comparing the use of Medihoney[™] with conventional regimes of wound care are desirable, but double-blinding of honey use in wound care is not possible in clinical practice.

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