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Medihoney™ Dressings made easy

PRODUCTS FOR PRACTICE

Introduction

Honey is an ancient remedy for the treatment of infected wounds and was first recognised as a topical antibacterial agent in 1892 (Molan, 2001). There are now many published reports describing the effectiveness of honey products in all phases of wound healing, with no adverse effects on the healing process. This made easy describes the role of Medihoney™ dressings in the management of hard-to-heal wounds.

Authors: *Grothier L, Cooper R.*

WHY DOES HEALING STALL IN SOME WOUNDS?

Normal wound healing is a staged process that comprises inflammation, cell proliferation and tissue remodelling. The inflammatory phase has an essential role in cleaning the wound of bacteria and debris and in initiating the later stages of wound healing.

Most wounds heal uneventfully and in a timely manner, requiring minimal input from clinicians. However, some wounds have the potential to become chronic, where healing is stuck in the inflammatory stage (Boyd et al, 2004). This may be due to the patient's age and the presence of co-morbidities, as well as factors related to the wound itself such as high bioburden, size, depth, location and duration of the wound (EWMA, 2008).

For wounds that are not progressing, wound bed preparation is essential for effective management. It enables clinicians to remove the barriers that may lead to delayed wound healing, by identifying the presence of infection, devitalised tissue or moisture imbalance (Falanga, 2004).

WHAT ARE MEDIHONEY™ DRESSINGS?

The Medihoney™ antibacterial range of dressings include: Medihoney™ Antibacterial Medical Honey; Medihoney™ Wound Gel; Medihoney™ Gel Sheet; Medihoney™ Apinate Dressing; Medihoney™ Tulle Dressing and Medihoney™ Barrier Cream. All products are derived from *Leptospermum scoparium* (manuka).

Additionally, Medihoney™ Wound Gel contains natural waxes and oils and Medihoney™ Barrier Cream contains coconut oil, German chamomile flower extract, evening primrose oil, aloe vera and vitamin E. Medihoney™ Apinate Dressing is a calcium alginate dressing impregnated with manuka honey and Medihoney™ Tulle Dressing is a non-adherent wound contact dressing with manuka honey. Medihoney™ Gel Sheet is a flexible dressing with manuka honey and sodium alginate.

All products are sterilised by gamma irradiation, which does not affect the antibacterial properties of honey.

Medihoney™products can be considered for use as part of a wound bed preparation protocol to:

- **Promote a moist wound environment**
- **Debride sloughy wounds**
- **Reduce inflammation**
- **Reduce bioburden**
- **Reduce malodour**
- **Stimulate the immune system.**

HOW DOES MANUKA HONEY WORK?

The role of honey in the management of wounds is based on its antimicrobial properties and its ability to influence wound healing (Molan, 1999). This is achieved in a number of ways:

Antibacterial action

In laboratory studies, manuka honey has been shown to have an antibacterial action against a broad spectrum of bacteria and fungi, including:

- *Staphylococcus aureus* (Cooper et al, 2002; Blair et al, 2009)
- *Pseudomonas aeruginosa* (Cooper and Molan 1999; Blair et al, 2009)
- MRSA, vancomycin-sensitive and vancomycin-resistant enterococci (Cooper et al, 2002; George and Cutting, 2007).

Antibiotic-sensitive strains and their respective antibiotic-resistant strains have also demonstrated similar susceptibility to manuka honey.

Although undiluted honeys possess broad spectrum antibacterial activity due to their high sugar content, lower water content, not all exhibit similar activity on dilution (Cooper and Jenkins, 2009). Manuka honey has a distinctive, heat stable antibacterial component, known as methylglyoxal (MGO) (Mavric et at, 2008). It is formed from dihydroxyacetone, which is typically found in the nectar of manuka flowers (Adams et al, 2008). This allows it to maintain

its antibacterial activity even when it comes into contact with wound fluid and becomes diluted.

Structural changes observed by electron microscopy indicate that manuka honey prevents bacterial cell division in *Staphylococcus aureus* (Henriques et al, 2010) and also in MRSA (Jenkins et al, 2011). The inability to divide, limits the potential of bacteria to establish an infection. Loss of integrity to cell surfaces leading to cell lysis has been reported in *Pseudomonas aeruginosa* cells exposed to manuka honey (Henriques et al, 2011).

Removal of biofilms and MRSA

Biofilms are now recognised to impede wound healing and there is a need to inhibit their development in wounds (Phillips et al, 2011). Honey containing a high value of MGO (ie equivalent to manuka honey) has been shown to inhibit *Staphylococcus aureus* biofilms (Jervis-Bardy et al, 2011), while laboratory tests have shown that the concentration of manuka honey required to prevent biofilm formation is lower than that required to disrupt established biofilms (Cooper et al, 2011). Inhibition of *Pseudomonas aeruginosa* biofilms was found to be dependent on contact time and concentration of manuka honey (Okhiria et al, 2009).

Eradication of MRSA from colonised wounds following topical application of manuka honey has been reported in patients with leg ulcers (Dunford et al 2000; Natarajan et al, 2001; Gethin and Cowman, 2005; Chambers 2006;), paediatric oncology patients (Blaser et al 2007) and in patients with maxillofacial wounds (Visavadia et al, 2006). The removal of MRSA from wounds reduces the risk of systemic infection and cross-infection to other individuals.

Reduction in malodour

Patients with exuding and/or infected wounds may experience maladour. The ability of honey to eliminate unpleasant odours from wounds may be due to the inhibition of anaerobic bacteria that are able to ferment amino acids to malodorous organic amines. Honey contains a range of sugars that may be metabolised by bacteria to many odourless products and glucose is used preferentially by most bacteria. Honey has been shown to have a rapid deodorising effect in patients with malodorous fungating wounds, with a reduction in odour within 24 hours (Molan and Betts, 2004; Segovia 2010) and in leg ulcers (Gethin et al, 2008).

Debriding effect

Patients presenting with a wound containing slough and eschar are at increased risk of infection as the devitalised tissue provides a focus for bacteria and is a significant barrier to healing. Wounds that are not progressing require repeated debridement to remove necrotic and sloughy tissue to establish a healthy wound bed (Falanga, 2004).

Honey provides an autolytic debriding effect whereby the osmotic action of honey encourages lymph fluid to rehydrate devitalised tissue, helping to remove sloughy and necrotic tissue by moving fluid away from the wound bed (Gethin et al, 2008).

Anti-inflammatory effect

Chronic wounds have increased inflammation, giving rise to elevated levels of proteases that appear to degrade the extracellular matrix components, growth factors and receptors that are essential for healing. Manuka honey has a low pH, which may help to achieve sub-optimal levels at the wound surface to control protease activity in the wound (Gethin, 2007). This may promote healing, with evidence that a low pH wound environment may be associated with a reduction in wound size (Gethin et al, 2008). It is likely that the antioxidants in honey also confer anti-inflammatory influences by scavenging free radicals that arise in both acute and chronic wounds (Henriques et al, 2006).

Immune-modifying effect

Manuka honey stimulates the immune system to produce pro-inflammatory cytokines, which are important for wound healing. It is likely this stimulation of the immune system helps to promote progression towards healing (Tonks et al, 2007).

WHEN ARE MEDIHONEY™ DRESSINGS INDICATED?

The antibacterial properties of manuka honey indicate a role in the management of locally infected wounds, wounds colonised by antibiotic-resistant bacteria, necrotic or malodorous wounds and, since the establishment of an association between the presence of biofilms and failure to heal (James et al, 2008), chronic wounds (such as venous leg, diabetic foot and pressure ulcers). In addition it may be used in patients with fungating lesions, radiotherapy-impaired wounds, burns and surgical incisions, including donor and recipient graft sites.

Patients with leg ulceration and diabetic foot ulcers are at high risk of developing multiple episodes of infection. Identification of local symptoms can promote timely intervention to reduce bacterial bioburden and help to avoid the need for systemic antibiotics. Repeated treatment with antibiotic therapy may increase the risk of the patient developing MRSA and *Clostridium difficile* infections, which can be costly for the healthcare facility and impact negatively on the patient's quality of life (Best Practice Statement, 2010).

Box 1 *Indications for use*

Chronic ulcers (diabetic, venous leg and pressure ulcers)
Infected wounds
Necrotic wounds
Sloughy wounds
Malodorous wounds
Fungating wounds
Donor and recipient graft sites
Burns
Surgical wounds
Superficial wounds

HOW TO APPLY MEDIHONEY™ DRESSINGS

Patients may present with a variety of challenging wounds so it is essential that the product chosen is able to meet the needs of individual patients. Following a thorough holistic assessment, clinicians need to decide which product to choose to meet the needs of the wound and the patient.

Medihoney™ dressings can be used for all stages of wound healing. There are different preparations that can be used throughout the various stages of wound healing, from highly exudating infected wounds through to epithelisation.

Tip: When honey is applied to the wound bed, it becomes less viscous and is diluted through exudation. High levels of exudate require more frequent dressing changes to maintain a good therapeutic effect.

Medihoney™ Antibacterial Medical Honey

This is made up of 100% manuka honey and can be used in all types of wounds. It is suitable for applying to wounds with mild to moderate levels of exudate as well as deep cavity wounds where the honey can seep down into the cavity to be most effective. Medihoney™ Antibacterial Medical Honey can also be used for wounds in and around the mouth as it is safe if ingested. The product should be applied to the wound bed directly (approximately 3mm thickness) and covered with an appropriate absorbent secondary dressing.

Medihoney™ Antibacterial Wound Gel

The gel comprises 80% manuka honey and 20% plant waxes and has a consistency more like an ointment. It has been developed specifically to keep the honey static at the site of the wound, even in the presence of wound fluid and body heat.

It is suitable for surface wounds with mild to moderate levels of exudate as well as partial or full thickness wounds. It should be applied to the wound bed (approximately 3mm thickness) and covered with an appropriate absorbent secondary dressing. Selection should be dependent on exudate levels to maintain a balanced moist wound environment.

Tip: Medihoney™ Antibacterial Honey and Medihoney™ Wound Gel can be removed by rinsing with saline or tap water at each dressing change.

Medihoney™ Barrier Cream

This can be used to protect the skin from breakdown (eg where the skin has been damaged by irradiation treatment or in wet areas due to incontinence). This can help to maintain the skin's pH and help to prevent damage caused by shear and friction.

The cream can be applied three times a day or as required and repeated after bathing, at each dressing change, or after each episode of incontinence.

Medihoney™ Gel Sheet

The Medihoney™ Gel Sheet provides an effective barrier to wound pathogens, offers fast autolytic debridement of slough and necrotic tissue and can be used to reduce malodour. It is suitable for use on mild to moderately exuding wounds and in patients with pressure ulcers presenting with a leathery eschar. To apply, remove the liners and place in direct contact with the wound bed. Cover with an appropriate absorbent secondary dressing.

Medihoney™ Tulle Dressing

This is a non-adherent dressing that is suitable for lightly exuding wounds with a suspected biofilm. The dressing is not capable of absorption and requires a secondary dressing to maintain an optimal moist wound environment. It may be cut to size and can be used on first and second degree burns, donor sites and superficial wounds such as abrasions. To apply, ensure the dressing is in contact with the wound bed and cover with an absorbent secondary dressing.

Medihoney™ Apinate Dressing

This calcium alginate dressing is impregnated with manuka. It is easy to apply, conforms to the wound shape and is non-adherent to the wound bed, helping to reduce trauma and pain on removal. The dressing may be used for wounds that require autolytic debridement as it is capable of absorbing a small amount of exudate, although a suitable secondary absorbent dressing should be used to manage the exudate appropriately.

The low profile of Medihoney™ Apinate makes it suitable to use on leg ulcers under compression as it will not cause indentation. The dressing may be cut to size and is available as a rope, which can be used for cavity wounds, including pressure ulcers and dehisced surgical wounds. It is important to ensure that the dressing is placed in contact with the wound bed.

Tip: For deep wounds or cavities, the wound bed can be filled with medical honey before applying the honey-impregnated dressing, such as Medihoney™ Apinate or Medihoney™ Tulle Dressing. This is to ensure that the antibacterial components of honey diffuse into the wound tissues (Molan, 2001).

HOW FREQUENTLY SHOULD THE DRESSING BE CHANGED?

All of the Medihoney™ products are licensed to remain on the wound for a seven-day period. The frequency of dressing changes, however, will depend on how rapidly the honey is diluted by the wound fluid and may require daily changes in the initial stages of wound healing.

As exudate levels decrease, fewer dressing changes are required and they can be left *in situ* for up to 3-7 days. If strikethrough occurs on the secondary dressing, this may need to be changed more often to prevent maceration.

Table 1 Summary of clinical studies using manuka honey

Reference	Title	Type	Main findings
Johnson et al (2005) *J Am Soc Nephol* 16: 1456-62	Randomized, controlled trial of topical exit-site application of honey (Medihoney) versus mupirocin for the prevention of catheter-associated infections in hemodialysis patients	Open-label RCT Catheter exit sites: honey (n=51) vs mupirocin (n=50)	No significant difference in incidence of bacteraemias
Jull et al (2008) *Br J Surg* 95: 175-82	Randomized clinical trial of honey-impregnated dressings for venous leg ulcers	Open-label RCT Venous leg ulcers: honey (n=187) versus usual care (n=181)	No significant differences in healing at 12 weeks
Gethin G and Cowman S (2008) *J Clin Nurs* 18: 466-74	Manuka honey versus hydrogel – a prospective, open label, multicentre, randomised controlled trial to compare desloughing efficacy and healing outcomes in venous ulcers	Open label, multicentre RCT Lower leg ulcers: honey (Medihoney™ Apinate) dressings (n=20)	Use of honey dressings was associated with significant decrease in wound pH and a reduction in wound size at 4 weeks
Robson et al (2009) *J Adv Nurs* 65: 565-75	Standardized antibacterial honey (Medihoney™) with standard therapy in wound care: randomized clinical trial	Open-label RCT Medical honey (n=52) versus conventional treatment (n=53)	No significant differences in healing at 12 weeks
Lund-Nielsen et al (2011) *Ostomy Wound Manage* 57: 28-36	Qualitative bacteriology in malignant wounds- a prospective, randomized, clinical study to compare the effect of honey and silver dressings	Prospective, single-blind RCT Malignant wounds in advanced-stage cancer patients: honey dressings (n=34) versus silver dressings (n=33)	61% of wounds reduced in size. No significant differences in type and variety of pathogens, or wound size were found
Robson et al (2011) *Br J Oral Maxillofac Surg* (epub 8 Aug)	Randomised controlled feasibility trial on the use of medical grade honey following microvascular free tissue transfer to reduce the incidence if wound infection	Randomised feasibility study Microvascular free tissue transfer reconstruction for cancer of the head and neck: honey wound gel (n=25) versus conventional therapy (n=24)	Patients in the honey group had a significantly shorter hospital stay than those in the standard treatment group ($p<0.05$)

WHEN SHOULD MEDIHONEY™ DRESSINGS BE DISCONTINUED?

It is important to monitor all patients regularly and check for signs of improvement or deterioration of the wound. If there is no response to treatment after 14 days an alternative approach should be considered (Stephen-Haynes, 2011).

Medihoney™ products should be discontinued when the primary objective is achieved; this may be until the wound is fully healed. In the case of the barrier cream, this should be discontinued when the skin is no longer at risk of breakdown.

WHEN ARE MEDIHONEY™ DRESSINGS CONTRAINDICATED?

Medical honey should not be used in patients with a known sensitivity to honey, calcium alginate or sodium alginate. Due to the viscosity (thickness) of Medihoney™ Wound Gel it is particularly suited to cavity or deep wounds. However, where gravity may affect it staying in place (eg leg ulcer wounds) an alternative product may need to be selected such as the Medihoney™ Gel Sheet or Apinate Dressing. It is contraindicated in very deep wounds or where there is undermining/tracking with sinuses. This is because the plant waxes can potentially block sinuses.

Safety and tolerability

As with all products that provide autolytic debridement, the patient should be warned this could initially make the wound appear larger. In addition, some patients may complain of pain due to a drawing sensation, although why this occurs is not fully understood. Analgesia may be indicated and in some patients it may be advisable to change to a honey that is less concentrated and contains waxes (Peiper, 2009).

Although medical honey is absorbed by the body it is safe to use in patients with diabetes and there is no evidence to show that it significantly raises blood sugar levels (Simon et al, 2005). There are no known toxic effects for honey, which indicates it is a safe product and can be used in paediatric wound management (Blaser et al, 2007).

In addition, bacterial resistance to honey has not been observed (Blair et al, 2009; Cooper et al, 2010). While this does not indicate that honey resistant strains will never emerge, it suggests that the likelihood is remote, unlike antibiotics.

WHAT IS THE EVIDENCE FOR USE?

There is clinical evidence to support the use of manuka honey in wounds with different aetiologies and at different stages of healing (Table 1).

AVAILABILITY OF PRODUCTS

Medihoney™ products are available on Drug Tariff through the NHS supply chain or to buy direct. For further information please go to http://www.dermasciences.com

Summary

Manuka honey has been proven to support the progression of stalled wounds, provide a moist wound healing environment and to be effective in both the management of wound infection and debridement of devitalised tissue. This is related to its antibacterial and anti-inflammatory properties. Bacterial resistance to manuka honey has not been observed and there are no known toxic effects. The Medihoney™ antibacterial range of medical honey dressings are derived from *Leptospermum scoparium* (manuka). These products are safe to use and have demonstrated clinical effectiveness in wounds with different aetiologies and at various stages of healing. They may have a particular role in the management of hard-to-heal wounds and can be used as part of a wound bed preparation protocol to promote healing.

Case report

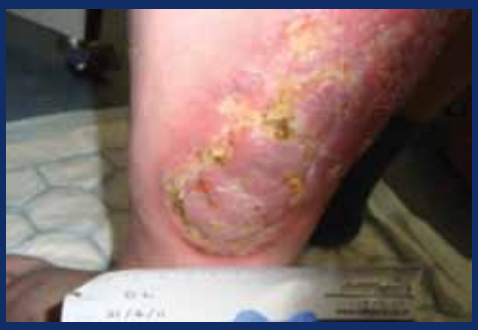

Fig 1: Skin damage following radiation

Background

A 64-year-old male patient presented with a history of lymphoma since 2007. He also suffered from chronic venous hypertension resulting in venous leg ulcers. He was treated with a course of radiotherapy in April 2011, which led to skin damage (Fig 1).

Treatment

The ulcers on his legs were sloughy and malodourous. Medihoney™ Gel Sheet was applied to the skin and ulcers on his lower legs to reduce bioburden and malodour while promoting autolytic debridement (Fig 2).

Outcome

After 22 days of treatment the patient reported a reduction in odour and improved comfort levels (Fig 3). It was felt that the product was a safe choice for this particular patient.

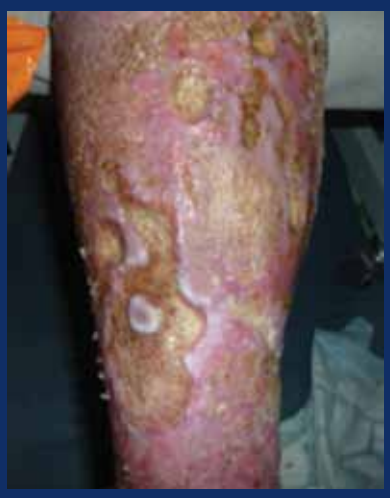

Fig 2: Venous leg ulceration treated with Medihoney™ Gel Sheet (4 August)

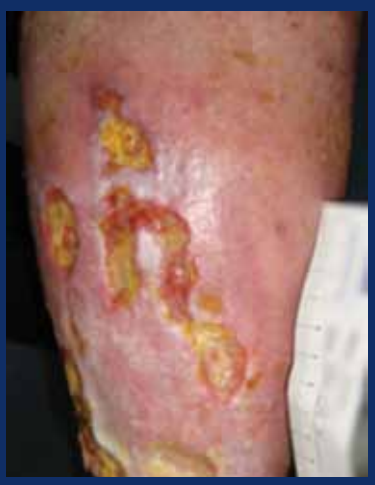

Fig 3: Reduction in wound size, with reduced odour and improved comfort (26 August)

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AUTHOR DETAILS

Lorraine Grothier [1] and Rose Cooper [2]

1. *Clinical Nurse Specialist Tissue Viability, Central Essex Community Services*
2. *Professor of Microbiology, University of Wales Institute Cardiff, Cardiff, UK*