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A Case Report: Pilonidal Sinus Management with Medical-Grade Honey

Due to its antimicrobial properties, medical-grade honey has shown to be effective in management of pilonidal sinus disease. This case report describes the potential therapeutic options of medical-grade honey for preventing infection and inducing wound healing.

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ABSTRACT

Background

Pilonidal sinus disease arises from folliculitis and is commonly resolved by surgery. The subsequent management of recovery is difficult and often a chronic state ensues, negatively affecting patient health. Conventional therapies are limited to providing antibiotics, which can impair the healing process. Medical-grade honey (MGH) addresses infection while improving wound healing.

Aim

We observed the use of MGH to determine its effectiveness in the management of chronic wound recovery following surgical excision.

Method

A 23-year-old male received excisional surgery of a pilonidal sinus followed by primary closure. The wound dehisced 1 week later, and conventional treatment remained ineffective for 4 months. Healing stagnated as the wound continued to bleed, which adversely impacted the patient's health and day-to-day activities. Hence, the treatment strategy was changed to monotherapy with daily application of MGH and standard dressing.

Results

Wound depth was reduced by 93% within 16 weeks and infection was prevented successfully, without administration of antibiotics. The patient was able to resume day-to-day activities as the wound was tended on a self-care basis, visiting the hospital every other week for a follow-up examination until complete healing.

Conclusions

The application of MGH has been shown to be highly effective, even in difficult area treatment that is at risk of infection.

Implication for clinical practice

MGH should be considered as a first-line therapy for the management of pilonidal sinus wounds that show no signs of healing to prevent further delay in healing and to reduce impact on a patient's life.

INTRODUCTION

Pilonidal sinus disease (PSD1) refers to an inflammatory condition of the natal or inter-gluteal cleft. The prevalence of PSD is approximately 25–28 of every 100,000 individuals.[1,2] It predominantly affects adolescent and young adult males between 15 and 30 years of age. Although the exact aetiology is yet to be elucidated, folliculitis is considered the cause of abscess and sinus formation and risk factors include familial history, hirsutism, a sedentary lifestyle, obesity, and local irritation.[3,4] The introduction of loose hair to the sinus can also trigger a foreign body reaction, further reinforcing the inflammatory response and leading to the pathology of PSD.[2,5] Studies have reported that patients with PSD generally experience pain, with an average lapse of 3–5 years from the time the first symptoms arise until the diagnosis.[5]

Whilst a single occurrence of a cyst can be easily managed via drainage and surgical incision, standardised guidelines for surgical techniques and post-surgical wound management are lack- ▶

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Conflicts of Interest:
The first author, Renée Hermanns, is an employee of Triticum Exploitatie BV which provided the medical grade honey formulation L-Mesitran that was used in this study free of charge. The author declares that there is no further conflict of interest.

ing, complicating the successful treatment of chronic conditions.[6-8] It is widely accepted that the ideal treatment method should lead to a low recurrence rate with minimum excision followed by a short hospitalisation time to allow the patient to return promptly to a normal lifestyle.[6] Due to its location, however, the wound is at an increased risk for infection.[7] Compared to other complications, infections are most frequently reported to interfere with the healing process and contribute to longer hospitalisation time and more frequent hospital visits.[7,9] To control infection and reduce the risk of sepsis, conventional treatment includes the administration of systemic antibiotics to limit the bacterial load in the sinus.[5] The presentation of clinical signs of a pilonidal abscess requires the excision of the infected cyst, which results in a wound that often presents drainage problems.[10] This can cause the patient to experience an altered body image, low self-esteem, and embarrassment.[11] Postoperative anxiety and depression are common outcomes, and studies have suggested that these might worsen in patients with prolonged recovery periods, which are frequently observed in PSD.[1,4,12-14] Additionally, frequent hospital visits can result in a loss of work time, and day-to-day activities are often restricted, either due to pain and discomfort or the psychological toll the wound has on the patient and effect that this has on his relationships.[5] Hence, the patient's quality of health, comfort, and long-term psychological status following the surgical procedure are factors that should be considered when deciding on treatment aims.

The lack of a clinical consensus or gold standard for a treatment strategy has led to the use of new modalities, including medical-grade honey (MGH)2 which has demonstrated particular potential both for the prevention and control of infection, as well as stimulation of the healing process.[11] Within the medical community, the ongoing demand to employ effective healing agents in a setting where conventional methods such as common antimicrobials begin to fail, has led to a resurgence of this ancient natural substance.[15-19]

Honey harbours multiple essential modes of action that facilitate wound healing, such as promoting a moist wound environment and reducing inflammation and oedema. Furthermore, it exerts an antimicrobial effect because of its physicochemical properties and has previously been integrated in the management strategies of PSD and a diverse range of other wounds, from burns to chronic ulcers.[2,20-22] This case report describes the use of MGH as a mode of treatment for PSD.

Case Presentation

A 23-year-old male patient was admitted for surgical excision and primary closure of a pilonidal sinus in August 2017. This was the first time the patient was diagnosed with PSD. Otherwise, he was in general good health but did have a history of asthma, which was controlled with budesonide (160 mcg) and formoterol fumarate dehydrate (4.5 mcg) per inhalation. The patient reported being allergic to azithromycin and denied smoking or alcoholic habits.

On 4 September 2017, the patient returned for suture removal where wound dehiscence of approximately two-thirds of the wound was observed. Daily lavage with saline was commenced, followed by application of a sterile compress dressing on the open wound. Progression was markedly slow, and the wound opened and bled easily throughout a timeframe of nearly four months. During this period, systemic antibiotic therapy was administered on two different occasions, consisting of amoxicillin and clavulanic acid. The prolonged unaltered state of the wound had a negative impact on the patient, who was further restricted in his daily activities because he had to visit the hospital daily. The negative experience stemming from the wound's condition led to a change in the treatment strategy to include MGH products starting from 8 January 2018. From this point, data were collected in the form of wound measurements and photographs for which the patient consented.

METHOD

The wound was initially cleansed with saline, followed by the application of an MGH gel3 containing 40% honey and vitamin C and E along the length of the wound, covered with a hydrogel net dressing4 containing the same honey formulation rolled into the cavity. This was covered with a secondary compress and repeated daily. During the examination at week 6 post implementation of the new treatment regimen, the wound edges were gently mechanically debrided, and dressings were applied after cleansing. The same protocol was followed, and daily changes were maintained for 9 weeks. At week 15, the 40% honey gel was substituted for a 48% honey ointment[5] from the same manufacturer. The regimen of daily dressing changes was changed to every other day which was maintained until the end of the six-month observation period. From week 22, the patient performed self care of the wound at home, and the wound was examined in the clinic once per week.

RESULTS

At the start of treatment, the wound measured 7.5 cm in length with a depth of 1.5 cm, and bled at the slightest manipulation (Figure 1 – A).

At 6 weeks of treatment, the wound maintained a length of 7.5 cm but the depth was reduced by more than one-half, to 0.6 cm (Fig. 1 – B). During the examination at 10

weeks, the wound maintained the same length and became slightly more superficial, at 0.4 cm in depth, and less bleeding was observed on manipulation (Fig. 1 – C). After a full 14 weeks, clear improvement was visible (Fig. 1 – D) and the wound showed additional healthy granulation tissue in week 15 (Fig. 1 – E); it was decided to apply a higher concentration of the MGH product. Following the change to 48% MGH at week 15, the wound presented closed areas along its length and measured 0.1 cm in depth at the examination at week 16 (Fig. 1 – F). This improvement

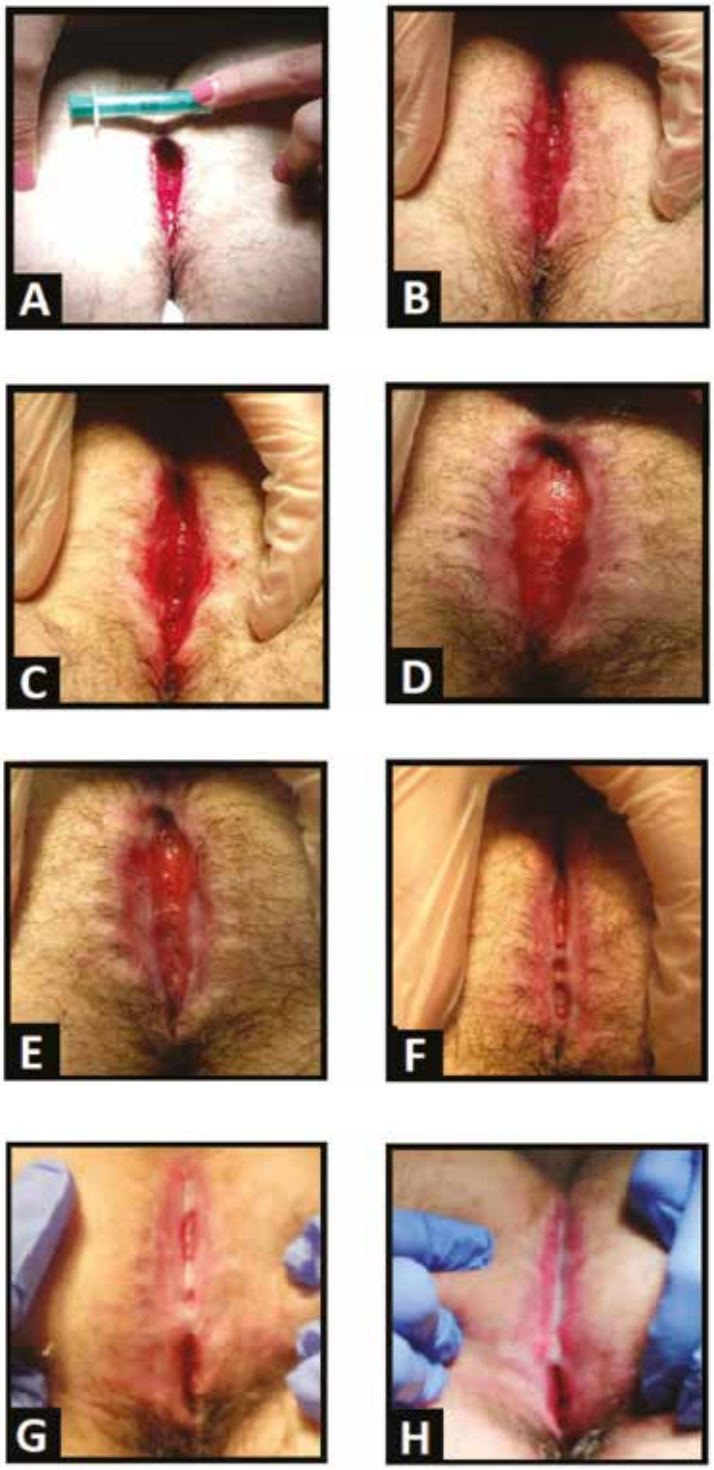

Figure 1.
Progression of the wound during the 6-month treatment at A) 1 week, B) 6 weeks, C) 10 weeks, D) 14 weeks, E) 15 weeks, F) 16 weeks, G) 19 weeks, and, finally, almost complete closure at H) 22 weeks.

translated into a 93% decrease, as shown in Figure 2 below.

At week 19, the wound presented with additional areas of closure along its length. A 1-cm opening remained at the cranial end and a 2-cm opening at the caudal end, both with granulation tissue and progressing towards closure

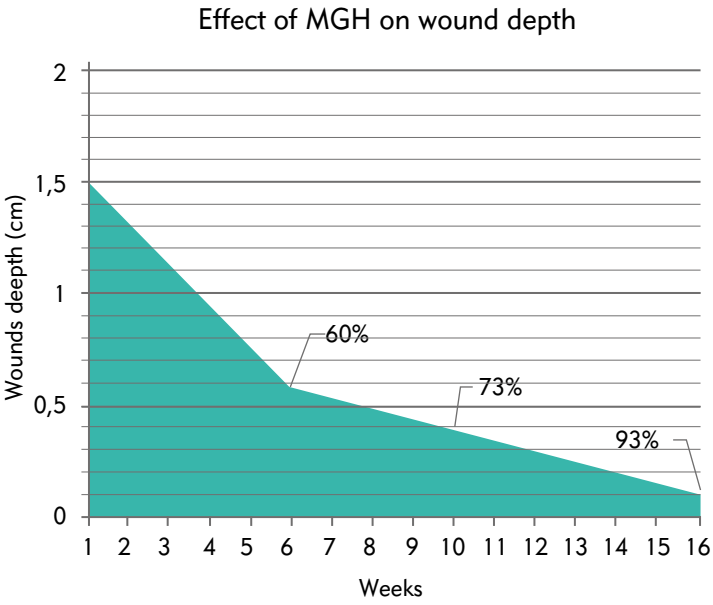

Figure 2. Reduction of the wound depth following the initiation of medical-grade honey treatment, displaying a 60% reduction, 73% reduction, and 93% reduction when measured at 6, 10, and 16 weeks, respectively.

(Fig. 1 – G). Finally, at 22 weeks of treatment, the length of the wound was closed except for the 2-cm opening at the caudal end, which still presented with granulation tissue (Fig. 1 – H). From here, the patient was on a self-care routine at home, under careful instructions to maintain the dressing changes following personal hygiene. Due to the favourable evolution of the wound, from then onwards, the follow ups at the hospital were conducted once per week. During the last follow up 2 weeks later, the wound still presented as closed, except for the caudal end opening which continued to decrease in size (Fig. 3).

DISCUSSION

In the present case, the chronic pilonidal sinus wound responded very well to the MGH treatment employed when all other forms of management failed, including the initial attempt at surgical resolution. This result agrees well with existing literature on applying honey for the same condition, as well as for various other wound types.[2,21] Due to the necessity for the wound to heal by second intention, it was crucial to prevent infection throughout the prolonged recovery process. Whereas the patient received antibiotics on multiple occasions before the honey treatment was applied, no systemic antibiotics were administered during the honey-based treatment and no signs of infection were observed throughout the 6-month documented time frame. This can be accredited to several potential mechanisms. Due its hygroscopic properties, honey provides an osmotic effect that stimulates autolytic debridement of the wound whilst maintaining an outward flow of wound exudate, thus preventing pathogens from entering the wound environment.[23,24] Furthermore, the osmotic effect also applies to the content of bacterial cells, which dehydrate and die when honey is applied to the wound.[25,26]

Figure 3. Closed wound at 24 weeks on 20 June 2018.

Furthermore, honey possesses the enzyme glucose oxidase, which produces gradually increasing amounts of hydrogen peroxide as the honey is diluted with wound exudate. The production rate of this potent antimicrobial agent occurs disproportionally, depending on the dilution factor over time. It has been reported that the production of H2O2 varies among different types of honey and is not cytotoxic because the H2O2 concentration is roughly one thousand times lower than the 3% solution generally used as an antiseptic.[24,27] Hydrogen peroxide has been found to stimulate fibroblasts and epithelial cells alike, as well as promote healing.[28,29] Moreover, the continuous production of H2O2 from glucose oxidase has been found to be more effective than H2O2 added as a bolus.30 Likewise, the amount of endogenous H2O2 has been correlated with antibacterial activity.[31,32] Frequent dressing changes might aid in the constant supply of hydrogen peroxide to the wound, which clinically translates into faster healing times witnessed in wounds treated with honey. [27,33-36]

In addition to its antimicrobial properties, honey can exert immunomodulatory action on different immune cells, and its components influence the formation of reactive oxygen species (ROS6) produced by these cells. Honey's anti-inflammatory actions can be explained by several mechanisms, including: 1) inhibition of the classical complement pathway; 2) inhibition of ROS formation; 3) inhibition of leukocyte infiltration; and 4) inhibition of cyclooxygenase-2 (COX-27) and inducible NO synthase expression.[37-39]

Furthermore, several studies have described honey's effect on epithelial growth because honey stimulates cell migration, proliferation, and collagen matrix production.[24,36,40] By changing to a higher concentration of MGH, the wound in this case presents rapid closure towards the end of the treatment that can be accredited to the augmentation of epithelialisation, as shown from April 26, 2018 onwards (Figure 1 – F-H).

Another likely important contributor to the success of the treatment was the unique composition of the specific MGH product used for the patient presented in this case. L-Mesitran contains additional pro-healing elements, such as the antioxidant vitamins C and E. In many biological systems, vitamin C functions as the major protector of aqueous environments and vitamin E protects lipid membranes from free radical attack by providing electrons for oxidation.[41] Studies have shown that vitamin E prevents ultraviolet (UV) irradiation-induced damage to the skin because it is depleted by UV irradiation.[42] Upon oxidation by free radicals, vitamin E is regenerated in the membrane by vitamin C, which is present in a 200-fold greater concentration than vitamin E.[43-47]

Topical application of vitamins C and E protects the skin against UV-induced erythema and immunosuppression, photoaging changes and photocarcinogenesis in mice, inhibits melanogenesis and maintains epidermal barrier function.[22,48-56] The photoprotective effects exerted by these two antioxidants have been found to increase four fold when applied together.[57] In wound healing, this synergy is of equal value because it has been shown to enhance wound healing.[53] Furthermore, vitamin C is essential in proper wound healing because it plays a critical role in collagen synthesis and maintenance of the collagen network by being an essential cofactor for enzymes crucial in collagen structure and cross-linking, improving the tensile strength of the skin.[58-60] The effectiveness of the L-Mesitran formulation has been documented in a range of diverse patient populations.[23,61]

CONCLUSION

Due to its antimicrobial properties, MGH has been shown to be effective in preventing infection and inducing healing. Concerning wound healing, MGH should be considered a potential therapeutic option to reduce the prolonged or repeated use of antibiotics. Based on this case, it is suggested that MGH should be considered as a first-line modality when a wound is showing signs of delayed healing.

IMPLICATIONS FOR CLINICAL PRACTICE

- Infection remained absent during MGH treatment, suggesting that MGH might control and prevent infections effectively during pilonidal sinus management, which is further supported by the literature.

- The immediate initiation of MGH treatment might aid in preventing chronic conditions and can result in a speedy recovery with minimal impact on the patient's life.

FURTHER RESEARCH

Further research could investigate the management of surgical excision of a pilonidal sinus using MGH in a cohort of patients. ■

FOOTNOTES

[1] PSD: pilonidal sinus disease
[2] MGH: medical-grade honey
[3] L-Mesitran Soft, Triticum Exploitatie BV, The Netherlands
[4] L-Mesitran Net, Triticum Exploitatie BV, The Netherlands
[5] L-Mesitran Ointment, Triticum Exploitatie BV, The Netherlands
[6] ROS: reactive oxygen species
[7] COX-2: cyclooxygenase-2

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