Short Communication

MANAGEMENT OF A CHRONIC NECROTIZING WOUND IN A DOG USING NATURAL HONEY THERAPY


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ABSTRACT: Infected skin wounds are common in pet animals. Following an infected severe bite wound in a dog with marked necrotic aftermath, natural honey was successfully used alongside systemic antibiotic therapy to hasten healing. The condition improved with speed and regeneration of skin tissue, avoiding sloughing. The wound took 168 days to heal and to form a scar. Natural honey can be considered as a wound management tool, as it is both highly effective, can render a low cost therapy and less management expenditure compared to other specialized therapies and techniques.

Key words: Honey, Dressing agents, Necrotic wound, Dog.

Wound healing results from a complex tissue repairing process to replace devitalized and missing cellular structures and tissue layers. This process is divided into four precisely and highly programmed phases including blood clotting, inflammation, the growth of new tissue (proliferation), and the remodeling of tissue (maturation) (Stavrou 2008). Several factors such as age, sex, nutrition, stress, infection, and medication can interfere with one or more phases of this process, thus causing improper or impaired wound healing (Stavrou 2008). Although several wound healing agents are used in veterinary practice, new agents are usually discovered (Stavrou 2008).

The aim of wound care is to promote wound healing in the shortest time possible, with minimal pain, discomfort, and scarring to the patient and must occur in a physiologic environment conducive to tissue repair and regeneration (Bowler et al. 2001).

Apart from the conventional therapy with only microbial agents, many other agents and techniques have been successfully used in management of infected wounds. These include Electrical stimulation (Sumano et al. 2002), Laser therapy (Groget and Janes 2013), Aloe vera extract (Sumano 1989), electromagnetic pulses (Houghton and Campbell 1999), fibroblast growth factor (Zheng et al.1994) and propolis (Abu-Seida 2015).

Accounts of the use of honey as a wound dressing are not confined to ancient records. In recent years there have been a number of reports in the medical literature regarding the “rediscovery” of honey as a therapeutic agent, although many of these are clinical observations rather than randomized studies (Greenwood 1993, Quadri et al.1999, Dunford et al. 2000).

Case history

A one year old Nigerian indigenous breed of dog weighing 13kg was presented to the Small Animal Clinic of the Veterinary Teaching Hospital, University of Ilorin, Nigeria with a complaint of the animal being bitten by a baboon. The wound was reported to be pinpoint bite wounds at the time it was first noticed by the client. The client reported to have attempted management using Ciprofloxacin orally for one week and Oxytetracycline spray (with Giemsa-violet) topically at unknown doses for about 3 weeks before presentation.

The patient was a farm dog usually leashed during the day and allowed to roam at night. Contact with other dogs and Wildlife was abundant. The clinical chronology of this case was reported with day 0 being the first day of Honey therapy and reported on an interval of 7 days with wound circumference measured on every report.

Percentage Wound contraction was calculated by

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\text{Percentage Wound contraction} = \left(\frac{\text{Wound circumference on Day (x)}}{\text{Wound circumference on Day 0}}\right) \times 100.
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Laboratory findings

Hematology

Haemoglobin: 8.7g/dl, RBC: 24.88 x 10^{12}/L, MCV: 53fl, MCH: 17.8pg, MCHC: 33.5g/l, WBC: 22.4 x 10^9/l, neutrophils: 73%, band cells: 06%, lymphocyte: 20%, monocyte: nil, eosinophils: 01%, basophils: nil, platelets: 104 x 10^9/l. There was regenerative anemia with a PCV of 26% (Range).

Mild Neutrophilia with microcytic hypochromic cells indicating Iron deficiency anemia.

Parasitology

Ancyclostoma sp. eggs were found in the faeces. It can be co-related with anemia.

Antibiotic sensitivity

The cultural identification and sensitivity of Staphylococcus aureus was performed. It was found sensitive to Gentamicin and Enrofloxacin, intermediate sensitive to Ceftriaxone and resistant to Tetracycline.

Treatment

Day 0

On presentation swabs of the wound site along with blood and fecal samples were taken. Wound swabs were sent to the laboratory for a bacterial isolation and antibiotic sensitivity test blood samples for hematology. Fecal sample was also sent the Parasitology Laboratory. Following collection of samples a treatment plan was established which included a thorough debridement of the wound site to remove all dead tissue from the site, cleaning of the wounds using physiologic saline, commencement of Penicillin/Streptomycin antibiotic therapy along with Vitamin B complex (pending of antibiotic sensitivity results), and application of natural honey as wound dressing. Vital parameters were within normal range except for the temperature which was on a high margin of 38.9°C.

After a thorough debridement the circumference of the wound was 92 cm where the wound extended from the 1st thoracic vertebrae to the iliac wing (Fig. 1). The honey was applied generously to the wound surface and left opens to heal.

The frequency of honey application was done generously twice a day in the first 100 days and then once a day afterwards. The commercial table honey was used, made and packaged by University of Ilorin.

Day 7

Following 5 days of penicillin G at 0.04mg/kg therapy the dog was rested for 3 days and Enrofloxacin at 2.5mg/kg was used while cleaning of the wound continued daily and dressing with natural honey. The circumference of the wound had reduced to 80cm (Fig. 2, Table 1). Helminthosis was treated using pyrantel pamoate at 5mg/kg.

Day 14

After 5 days of Enrofloxacin treatment the dog was rested for another 3 days and commenced Gentamicin treatment at 6mg/kg for 5 days. Daily cleaning of wound using normal saline and dressing with natural honey continued. The circumference of the wound was measured at 73.0 cm (Fig. 2, Table 1).

All antibiotic therapy was seized after the Gentamicin therapy and just natural honey dressing was done till the last day.

Staphylococcus aureus is most commonly isolated from chronic wound infections (Gjødsbøl et al. 2006), which is in agreement with the isolate from this case. It can express bacterial factors and proteins, which secure its adherence to tissues and affect the host immune responses (Fedtke et al. 2004).

Although the benefits of honey in wound and burns...
management have been clearly identified, the use of honey as a topical agent has yet to gain routine clinical status (Dunford 2000). As Eyarefe et al. (2016) showed that the use of honeys wound dressing in Nigeria is still in its neonatal stages and is much unpopular due to various reasons (cost, availability and dissatisfaction with its effects).

Due to the non-sterile nature of the application and the agent itself there is a risk of bacterial inoculation into the wound site, however in a study conducted by Efem (1988) in 51 recalcitrant chronic wound cases, which were infected at the beginning of treatment all became sterile within 1 week following honey treatment. Honey has been reported to be an effective antibacterial agent against strains of *Staphylococcus aureus* (Cooper et al.1999), a characteristic which must have been helpful in this case.

Large cutaneous lesions, where poor blood supply, tissue necrosis, excessive scarring, inflammation, and bacterial contamination are possible complications, would take significant advantages from the application of honey as it has been reported to inhibit bacterial growth due to its high sugar content, inhibits growth of most pathogenic bacteria within wounds due to the acid pH of honey (3.2 to 4.2). Honey also kills bacteria without causing tissue damage and aids in debridement of wounds as a result of low level production of H$_2$O$_2$ within wounds (Lusby et al. 2002).

Fig. 2. Photographs of wound from day 7 to day 147. A slower wound closure was noticed after day 77 mainly due to the tension in the area.

Fig. 3. Graphical representation of the rate of closure of the wound (%) at different time intervals (days).
Phytochemicals are responsible for the anti-oxidant activity of honey, and the anti-bacterial activity of honey is partly due to the presence of phytochemical components (Bergman et al. 1983). Different antioxidants present in honey include flavonoids, monophenolics, polyphenolics and vitamin C (Schramm et al. 2003, Van den Berg et al. 2008); these are very vital in tissue regeneration processes.

These results suggest that the use of honey as dressing is indeed an effective therapeutic option to manage soft tissue wounds where a large amount of tissue is destroyed, especially when surgery alone cannot guarantee satisfactory results. Honey therapy/dressings can be considered by surgeon both to improve the quality of tissue regeneration and to speed up the wound healing process (Fig. 3). It is both highly effective and cost implication for management is minimal compared to other specialized therapies and techniques like laser therapy, platelet-rich plasma (PRP) or mesenchymal stem cell use as used by other authors who managed similar wounds (Sardari et al. 2011, Grognet and Janes 2013, Zubin et al. 2015).

This case report documents the positive effect of honey therapy on a large severe necrotizing wound in a canine patient bitten by a baboon. The area involved in the lesion was too extended to allow a successful reconstructive surgery.

**REFERENCES**


Management of a chronic necrotizing wound in a dog using natural honey therapy


