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New trials for the treatment of hot spots in dogs

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ABSTRACT

Background: Acute moist dermatitis, this is a surface skin infection that is very itchy, smelly, and often appears wet or moist causing serious skin problems. The main object is to control hot skin affections in dogs.
Hypothesis/Objectives: Bacteria and fungi in dogs are causing serious skin problems; some strains of bacteria (*such as Staphylococcus spp.*) tolerate the antibiotic treatments as MRSA (Methicillin-Resistance *Staphylococcus aureus*) and tolerate the fungicidal treatments. Therefore, it is necessary to get novel strategies and to identify new antimicrobial agents to control microbial infections and hot skin affections in dogs.
Animals: This study was carried out on police service dogs at different regions and some clinics in Egypt. 20 affected dogs (7 MRSA-affection, 9 Mycotic affection; 4 Autoimmune affection) were selected to test a new potential therapeutic agent on hot spots (colony and hospital populations).
Methods: Anolyte (1\100) [pH 2.5~ 6.5, ORP 1150 ~ 900 mV, C_{active} ~5 - 500 mg/l], Catholyte [pH=l0.5±0.5; ORP = (-750) ±100 mV] were used as a trial to treat the hot spots in the diseased dogs. All diseased dogs were received local washing of the skin lesion and shock doses of Anolyte in drinking water followed by drinking Catholyte.
Results: Results revealed that, Anolyte (strong degree of ionization and oxidants) and Catholyte were induced high curing rate of skin affection in dogs.
Conclusions and clinical importance: The use of electrochemical stimulated-water containing super-oxidized solutions as skin affection products is a cutting-edge concept.
KEYWORDS: Technology; Skin affections; Ionized water.

INTRODUCTION

The veterinary name for dog hot spot is called acute moist dermatitis. This is a surface skin infection that is very itchy, smelly, and often appears wet or moist.

Hot spots form more often during the warm summer months, but can happen at any time. Often they will start with a scratch or wound and then this causes the skin to become infected and develop into a hot spot. Allergic dogs will often scratch at their skin, allowing the bacteria to flourish locally and turn into an infection , they include: Foliaceus (scales, crust, pustules, redness and itchiness develop in the skin, affecting mostly the head area but may do other parts of the body), Erythematosus (the symptoms for this are mainly the same as Foliaceus, except that skin lesions are confined to the face, head and footpads, the lips may also lose their color) and Phemigus (refers to a group of autoimmune diseases that result in the ulceration or crusting of the skin).

METHODS

Diagnosis of hot spots

Isolation and identification of bacteria from skin lesions in dogs

All skin swabs were inoculated onto the following media: Standard nutrient agar and Gassner agar. All plates were investigated twice, first after 1 8 h and 36 h of incubation at 37 °C. Staphylococcal isolates were identified (Merlino J *et al*., 2002; Songer J G *et al*., 2005).

Isolation and identification of skin fungal lesions (Dermatophytosis)

Skin swaps cultured for about 4 to 7 days at 25 - 28°C by using Sabaroud dextrose agar (Mackenzie, 1963).

Treatments

Anolyte (1\100) [pH 2.5~ 6.5, ORP 1150~ 900 mV, C_{active}~ 5 - 500 mg/l]. It contains various mixed oxidants predominantly hypochiorous acid and sodium hypochiorite (HC1O, ClO_2, $HC1O_3$,

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$HC1O_4$, H_2O_2, O_2, ClO^-, ClO_2^-, $C1O_3^-$, O^-, HO_2^-, OH^-) working substances. All diseased dogs were received local washing of the skin lesion with l\l00 Anolyte, the treatment applied twice daily for 7 successive days.

Shock doses of anolyte [pH 2.5-3.5, ORP>l l50 mV] 200 ml per day diluted in 1 .5 L of water and drinking during 3 days followed by drinking Catholyte [pH=l0. 0.5±0.5; ORP = (-750) ±100 mV], doses of 150 ml daily during 5 days. Similar course with slight dosage alterations was repeated after 3 and 20 day intervals.

Clinical cure was defined as the disappearance of clinical signs which were observed on day before treatment and confirmed by negative bacteriological or mycotic isolation of pathogens.

RESULTS

The cured cases were; 1 00 % for all the diseased dogs with improvement of local clinical signs. Anolyte was induced high curing rate after successive 7 days local treatment.

DISCUSSION

Some strains of bacteria (*such as Staphylococcus spp*.) tolerate the antibiotic treatments as MRSA (*Methicillin-Resistance Staphylococcus aureus*). Dermatophytes that affects dogs, usually develop immunity so some of these infections tolerate the fungicidal treatments (Merlino *et al.,* 2002; Songer *et al.,* 2005; Walther *et al,* 2008; Leonard and Markeya, 2008; Epstein *et al.*, 2009).

Electrochemically activated solutions (Anolyte and Catholyte) have been found to contain compounds whose co-presence in a solution is impossible from the standpoint of equilibrial chemical thermodynamics. Electrochemically activated Anolyte demonstrates universal action, i. e. produces damaging effect on all major systemic microbial groups (bacteria, fungi, viruses, protozoa), being harmless for the tissue cells of higher organisms.

Electrochemically activated water (ECA-water) *Hypothetical mechanisms of ECA-solutions' action on a cellular level*

Water as a pure chemical substance or as a solvent of aqua-mineral media of mineralization no higher than ≈5 g/l subjected to unipolar electrochemical treatment, metastable, possessing anomalous reactional and catalytic activity and relaxation electron-unbalanced (electron-donor or electron-acceptor) qualities.

Action of ECA-solutions on cellular objects seems to be carried out in several conventional ways. Stable and metastable products of electrochemical synthesis directly affect lipid membranes, cell organoids and intracellular molecular complexes and chemical compounds.

Chemical potential of molecules and ions in electrochemically activated biocidal solutions is much higher than that in non-activated ones. Furthermore, low mineralization of such solutions and their better hydration ability are increasing cell wall and membrane permeability that ensure intensive and electro osmotic oxidant transfer into the inter-cellular medium. Osmotic oxidant transfer through microbial cell membranes is much more vigorous than that occurring through somatic cell membranes. Accelerated electro osmotic oxidant transfer is intensified by a multitude of electrically charged micro-bubbles of electrolysis gases creating powerful local electric fields with high level of heterogeneity in areas of contact with biopolymers.

In organs or tissues affected by disease, there is consistent evidence that the expression and activity of antioxidant enzymes are altered (Prilutsky and Bakhir, 1997) and the cells loss of electron-donor properties followed by their transfer into such a phase of individual development (abnormality) whose histological characteristics are similar to those of the phenomenon of functional-morphological differentiation associated with the loss of normal proliferation activity and subsequent aging or malignization.

Therapeutic doses of Anolyte are supposed to promote terminal oxidation of under-oxidized toxic products of metabolism, thus performing oxidative detoxification and stimulate energogenesis. Catholyte action on cellular objects seems to be carried out in several conventional ways. It alters the ORP of peri- and intracellular media, thus regulating the activity of endogenous bio-oxidants and bio-antioxidants. Shifts of ORP gradient on biological membranes affect transfer of substances in the cell due to electro-osmosis. Penetration of structurally altered water inside the cell activates aqueous media of cytoplasm and speeds up biochemical reactions taking place there.

“Alkaline (cathodic, “live”) water certainly augments cell regeneration and development.

Recommendations

Preliminary results suggest that this non-antibiotic technology appears to offer a broad new paradigm for the prevention and treatment of acute and chronic skin affections in dogs (Dalla Paola *et al*., 2005; Kaoud and Yosseif, 2013).

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