http://dx.doi.org/10.1590/1678-4162-12927

Arq. Bras. Med. Vet. Zootec., v.75, n.3, p.451-454, 2023

Use of ozonized sunflower oil in the treatment of skin injury in golden hamster (*Mesocricetus auratus*) – case report]

[*Uso de óleo de girassol ozonizado no tratamento de lesão cutânea em hamster sírio (*Mesocricetus auratus*) – relato de caso*]

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ABSTRACT

Hamster breeding is becoming increasingly popular, mainly because of the simplicity of breeding, low cost, and characteristics of these animals: they are small, quiet, and do not require a large space. Because of this ease of keeping, some people choose to keep more than one animal of the same species in a single enclosure. In some cases, this sociability can lead to fights, because hamsters are extremely territorial animals, which can cause significant injuries. Knowledge of the most efficient methods for wound healing is essential in medicine for wild and exotic animals, as it allows faster clinical treatment and thus, stress reduction. The present case report refers to the therapeutic treatment of an extensive skin lesion in a golden hamster (*Mesocricetus auratus*) using ozonized sunflower oil. The treatment, which lasted 23 days, allowed complete healing of the lesion.

Keywords: ozone therapy, cicatrization, rodents

RESUMO

*A criação de hamsters tem se tornado cada vez mais popular, especialmente pela facilidade de criação, pelo baixo custo e pelas características desses animais: são pequenos, silenciosos, e não necessitam de um grande espaço. Por essa facilidade de manejo, algumas pessoas decidem manter mais de um animal da mesma espécie em um único recinto. Em alguns casos, esse convívio pode causar brigas, visto que hamsters são animais extremamente territorialistas, podendo resultar em injúrias cutâneas significativas. O conhecimento sobre os métodos mais eficientes para a cicatrização de lesões é fundamental na medicina de animais silvestres e exóticos, possibilitando um manejo clínico mais rápido, consequentemente, redução do estresse. O presente relato refere-se ao manejo terapêutico de uma extensa lesão cutânea em um hamster sírio (*Mesocricetus auratus*) com o uso do óleo de girassol ozonizado. O tratamento, que teve 23 dias de duração, possibilitou a cicatrização total da lesão.*

Palavras-chave: ozonioterapia, cicatrização, roedores

INTRODUCTION

Rodents have long been kept in commercial farms and laboratories for research purposes. This attachment to humans has sparked interest at this time, as these species are also kept as pets (Teixeira, 2015).

There are several breeds of hamster bred as pets, of which three are the most popular: the Campbell´s dwarf hamster (*Phodopus campbelli*), the Chinese hamster (*Cricetulus griseus*) and the golden hamster (*Mesocricetus auratus*), the last being the most popular. These animals can be kept in pairs or colonies in the same environment, provided they have been raised together since birth. Otherwise, they

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Submitted: November 15, 2022. Accepted: January 3, 2023.

should be kept in individual cages due to their territorial and aggressive behavior towards other animals, with skin injuries being the most common result of these disputes. These injuries contribute to the increasing frequency of these animals in routine clinical care, and there is a growing need for complementary methods to better treat these types of lesions; solutions that require less containment, lower costs, minimal animal stress and better healing quality (Banks *et al*., 2010).

Sunflower oil is produced manually or industrially from sunflower seeds (*Helianthus annus*) and is already used for the topical treatment of wounds, its effectiveness having been demonstrated in several studies. It is rich in linoleic acid and unsaturated fatty acids, which play an important role in enhancing granulocyte and macrophage chemotaxis, both important components in lesion repair (Wendt, 2005).

Ozone is an unstable and highly reactive gas that has several biological effects. It can exert therapeutic effects in the body, mainly by increasing the oxygen supply to tissues (Garcia *et al*., 2008).

The aim of the present work was to evaluate the healing of an extensive skin lesion in the golden hamster using ozonated sunflower oil applied directly to the wound.

CASUISTRY

A golden hamster, adult male, weighing 105g, was admitted to the veterinary hospital. The animal had a lesion in the dorsolateral region, close to the left thoracic limb, with a foul odor.

It was reported that the lesion had occurred about a week prior to the animal´s admission and the animal had been fed a seed mixture but was very quiet and had reduced the frequency of feeding and water intake. The patient was kept in a cage with another male of the same species and there were occasional fights, which were probably the cause of the injury.

Due to the difficulty of containment, prior analgesia with tramadol (10mg/kg) was administered subcutaneously followed by sedation with midazolam (0.5mg/kg) and ketamine (5mg/kg) intramuscularly for better assessment and cleanliness of the region. After sedation, a trichotomy of the site was performed and a lesion with necrotic, contaminated, and foul-smelling and deep areas extending from the thoracic region over the left thoracic limb to the back of the animal was noted (Figure 1). Mechanical cleansing with sterile saline and a cotton swab was then performed to remove dead tissue from the wound.

Due to the severity of the injury, we decided to hospitalize the animal for monitoring, scar control, and implementation of the therapeutic protocol, which consisted of enrofloxacin (10mg/kg) intramuscularly q24h, for 7 days, meloxicam (1mg/kg) subcutaneously q24h, for 3 days and topical ozonated sunflower oil q24h for 23 days.

Figure 1. Aspect of the skin lesion in the golden hamster (*Mesocricetus auratus*), cleaning and trichotomy of the region.

DISCUSSION

During the treatment period, the animal showed no discomfort with the application of ozonated sunflower oil and no changes in behavioral and dietary profiles were observed. The applications were performed quickly to keep the physical confinement time as short as possible and thus reduce stress during the applications. The ozonated oil was spread throughout the lesion

area using a cotton swab, allowing the oil to meet all the injured tissue.

Sunflower oil has been shown to have a healing effect (Sartori, 1994). Being rich in linoleic acid, it is converted into arachidonic acid, which in turn is converted into pro-inflammatory mediators (Wendt, 2005; Souza, 2018), protecting the skin from water loss and supporting cell migration in the final phase of healing (Balbino *et al*., 2005).

The use of ozone therapy in veterinary medicine is new but is already showing very positive results in the short and medium term. Ozone is indicated for topical application in multifactorial skin diseases, inflammations, skin reactions to drugs, ulcers, wounds, and burns (Sartori, 1994). According to Oliveira e Dias (2013), one of the main causes of delayed healing is local bacterial infection, so ozone is thought to have a bactericidal effect (Chagas and Mira, 2015; Santana, 2018), which in this case helped to improve wound healing. Also, according to Santana (2018), the use of sunflower oil in combination with ozone allowed a rapid improvement of the healing process without complications, which allowed a rapid development of the treatment (Figure 2).

Other factors cited as common reasons for the failure of the healing process are perfusion and inadequate oxygenation (Gantwerker and Hom, 2011), with ozone being a solution, due to its proven effect on the fluidity of the blood by causing reduced viscosity through the reduction of macromolecules and the ability to form clots (Zee and de Monte, 2001), and additionally acting on the oxygenation of epidermal cells responsible for the final coverage of the granulation tissue (Balbino *et al*., 2005).

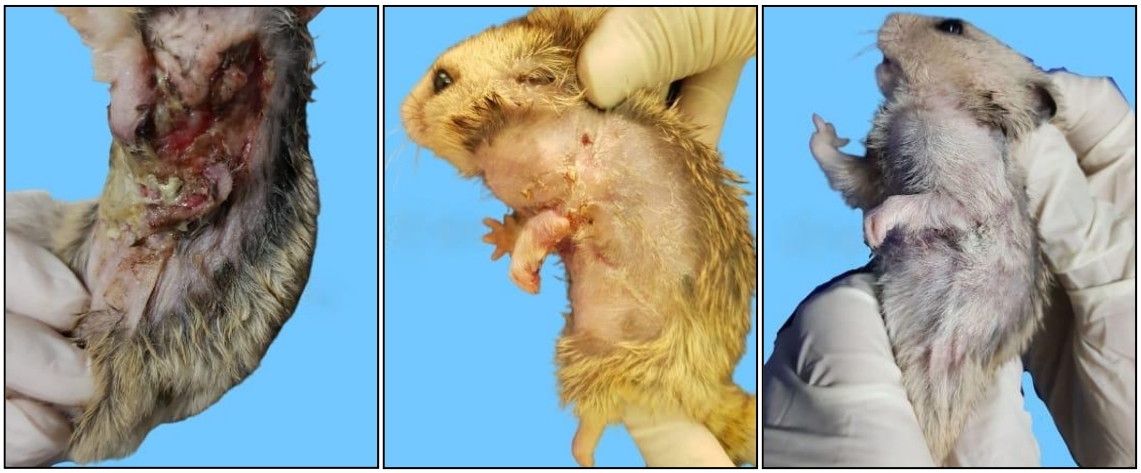

Figure 2. Development of the healing process of skin lesions in golden hamsters *(Mesocricetus auratus)* treated with ozonated sunflower oil. A) fifth day; B) fourteenth day; C) twenty-third day.

CONCLUSIONS

The use of ozonated sunflower oil has shown excellent results in healing skin lesions and may be an alternative for rapid and high-quality treatment, with low toxicity potential, and ease of use in wildlife, especially in animals that are difficult to keep. Growth of the granulation tissue required for wound healing occurred uniformly and remained constant over the treatment days, with final healing achieved after 23 days, with complete remodeling of the lesion area.

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