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NECROTIC SKIN LESION IN A DOG ATTRIBUTED TO *Loxosceles* (BROWN SPIDER) BITE: A CASE REPORT

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ABSTRACT: Envenomations caused by *Loxosceles* (brown spider) have been reported throughout the world. Clinical signs associated to bites of these spiders involve dermonecrotic lesions and intense local inflammatory response, besides systemic manifestations such as intravascular hemolysis, thrombocytopenia, disseminated intravascular coagulation and acute renal failure. The present study aimed to report and to describe dermonecrotic lesions probably caused by a *Loxosceles* envenomation in a four year-old poodle female dog, treated at the Dermatology Service of the Veterinary Hospital of the Veterinary Medicine and Animal Husbandry School, São Paulo State University, Botucatu, Brazil. Initially, the animal presented two skin lesions with blackish aspect that evolved into ulcerative crusts. The owner reported the presence of a brown spider near the place where the animal spent most of the time. Histological examination of lesions revealed necrosis of the epidermis extending to adnexa and panniculi, which is compatible with *Loxosceles* bite reaction. The animal was treated with systemic antibiotic and local curatives. Lesions healed by second intention in two months.

KEY WORDS: *Loxosceles*, dermonecrotic toxin, dogs.

CONFLICTS OF INTEREST: There is no conflict.

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INTRODUCTION

Reports of accidents involving spiders are not frequent in veterinary medicine (1). *Loxosceles* (brown spiders) are found in temperate and tropical regions of the globe (2, 3). In Brazil, seven species have been identified up to now, most of them in south and southeast regions whereas three of them are frequently associated to human envenomation cases (*L. intermedia*, *L. gaucho* and *L. laeta*) (4, 5). Reports show that approximately 3,000 cases of human *Loxosceles* envenomations occur every year at the Brazilian state of Paraná (6). The adaptive ability of these spiders to adverse conditions may explain why they are capable of surviving in such different parts of the world (7). *Loxosceles* spiders may resist temperatures varying from 8 to 43ºC and can survive for several months without food or water (8, 9).

Loxosceles spiders are small, approximately 1 cm body length, have six eyes in pairs with triangular disposition and present nocturnal habits, living inside residences, behind furniture, inside basements, roof or pantries (10). Due to their small size, brown spiders rarely bite dogs; however, the most affected places are the tongue or oral mucosa that are bitten when the animal removes the spider from other parts of its body with the mouth. Therefore, usually the cause of the envenomation is difficult to determine, unless the spider is recognized (11).

Brown spider venom presents a complex composition and contains different proteolytic and hemolytic toxins (8, 10, 12). The bite may be unnoticed or there may be pain similar to mild burn (8). Few hours after the bite, an edematous plaque with vesicles and ecchymosis appear where venom was inoculated (8). This lesion is called marmoreal plaque because of its blue (cyanosis), white (ischemia) and red (erythema) colors and it may evolve to necrosis and long lasting ulcers (12, 13). Additionally, renal failure may occur due to hemoglobin deposits secondary to hemolysis. Furthermore, urine may become darker or brownish and the victim may develop oliguria, anuria or acute renal failure similar to that caused by *Crotalus* snake venom, but with a different reason, since in *Crotalus* accidents there is myoglobinuria while in loxoscelism there is hemoglobinuria (10). As death is an eventual occurrence, this type of accident can be classified as mild (14).

More than 90% of human patients of loxoscelism inform that saw the spider, but only a few bring the spider for identification (5). Because of this, diagnosis is frequently based on epidemiology, history, clinical signs and on the exclusion of other causes instead of on the spider identification (4, 5, 15-17).

There is no specific treatment (*Loxosceles* antivenom) available for veterinary patients, thus complementary treatment with fluid therapy, osmotic diuresis with manitol, analgesia and broad spectrum antibiotic therapy may be necessary (10, 18,19). In some cases, surgery may be necessary to repair skin lesions (11).

Any disease that causes skin ulceration and local tissue necrosis may be included in the differential diagnosis of *Loxosceles* envenomation. Consequently, when the causes are not determined, the animal should be treated for this type of accident (13).

The aim of the current study is to report the occurrence and to describe dermonecrotic lesions caused by *Loxosceles* envenomation in a four year-old female poodle, admitted at the Dermatology Service of the Veterinary Hospital of the Veterinary Medicine and Animal Husbandry School, UNESP, Botucatu, SP, Brazil.

CASE REPORT

A four year-old female dog was taken to the Veterinary Hospital of the Veterinary Medicine and Animal Husbandry School presenting two skin lesions with four-day evolution, a lumbosacral one measuring 5 x 2 cm and the other at the dorsal region of the thorax with 10 cm of diameter. The dog owner reported that initially the lesions were purple-colored sensible plaques that worsened into tissue necrosis (Figure 1).

Figure 1. Ulcerated lesions with purulent exudate and blackish limits.

Physical examination revealed that the clinical parameters evaluated were normal, except for the two ulcerated skin lesions reported by the owner. The wounds were necrotic, presenting hemorrhagic-purulent exudate and hemorrhagic crusts, extending from the lumbosacral until interscapular region. The animal presented mild pruritus and painful sensibility observed after the onset of lesions.

Subcutaneous swabs were cultured and both *Enterobacter* spp. and *Streptococcus* spp. were isolated. Complete blood count revealed anemia (hematocrit 29%) and neutrophilic leukocytosis with left deviation. Urine exam and serum biochemistry results were normal.

The animal was submitted to short term anesthesia and skin lesions underwent biopsy with an 8 mm punch and sent to histopathological examination. Histopathology demonstrated extensive coagulation necrosis of the epidermis and follicular adnexa and extensive degeneration of collagen fibers, edema and mucin (Figures 2 and 3). Inflammatory infiltrated was predominantly interstitial, polymorphonuclear, primarily eosinophilic, with fibrovascular tissue intermingled inflammatory cells. Subcutaneous lesion was characterized by neutrophilic panniculitis.

During anesthesia, debris of skin lesions was removed. Topic treatment was initiated with triclosan antiseptic soap associated with systemic antibiotic therapy with cefalexin (30 mg/kg orally, twice per day). The possible necessity of a plastic surgical repair of the lesions was explained to the owner, but there was complete skin recovery in approximately two months.

After the owner returned home, he reported the presence of a brown spider where the animal remained most of the time. Since he brought the spider to the hospital, it was possible to confirm that it was a *Loxosceles* spider. However, the animal was in bad conditions of preservation, thus it was not possible to determine its species or to photograph it.

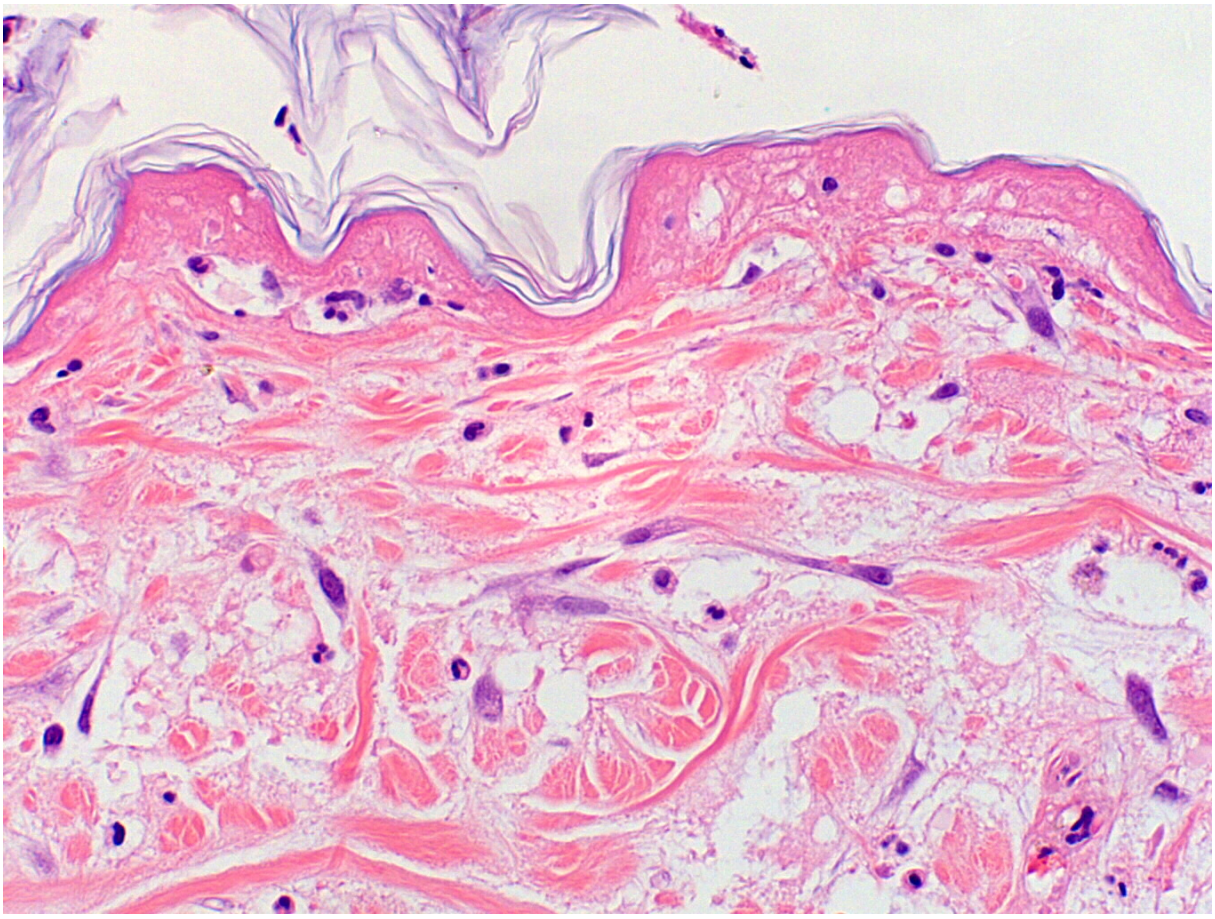

Figure 2. Effects of loxoscelism on skin. Extensive coagulation necrosis of epidermis with orthokeratotic hyperkeratosis. The dermal infiltrate is moderate, interstitial and comprises eosinophils primarily, accompanied by fibrovascular tissue, variable edema and mucin. Hematoxylin-eosin stain, 400x.

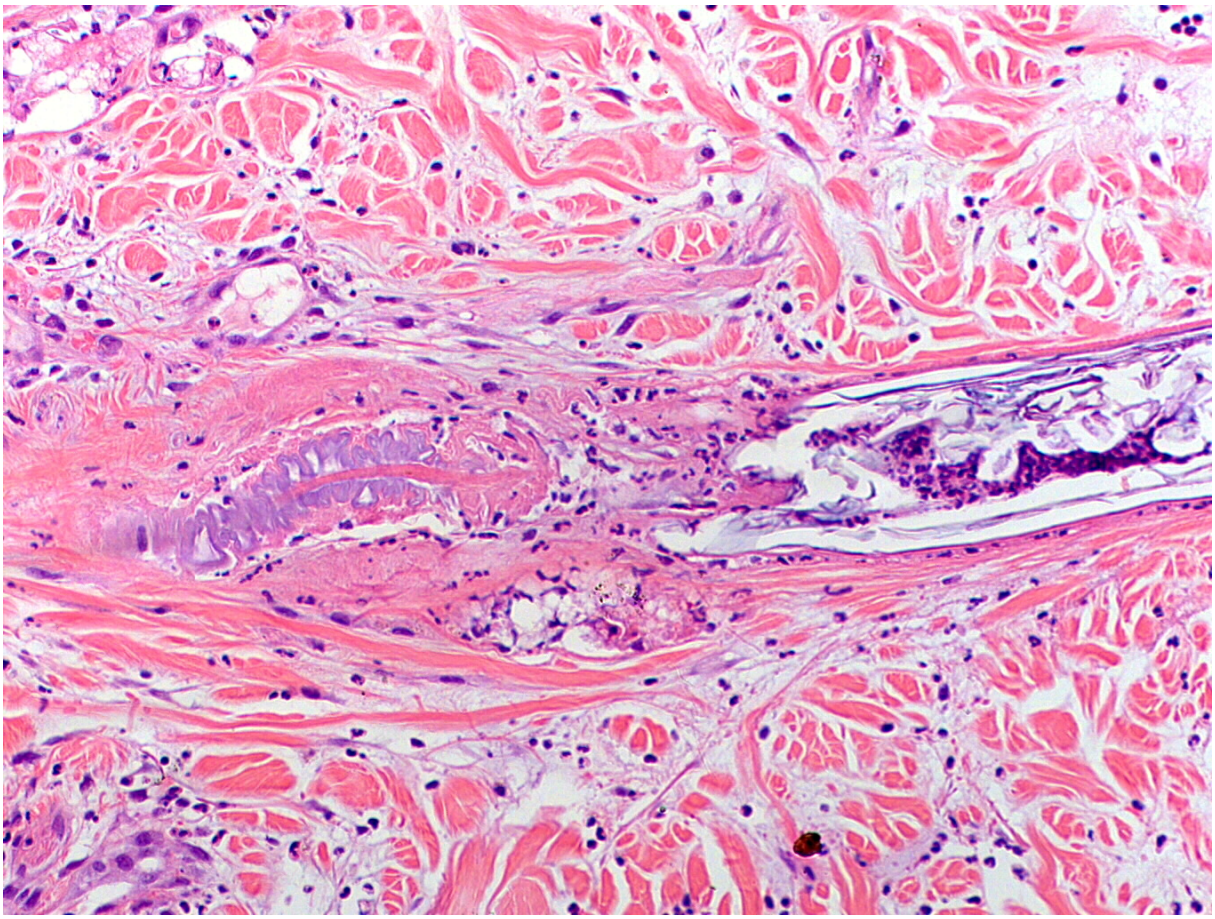

Figure 3. Effects of loxoscelism on skin. Coagulation necrosis affecting the follicles at and below the level of the isthmus. Hematoxylin-eosin stain, 100x.

DISCUSSION

Several epidemiologic advise about the prevalence of *Loxosceles* spiders in south and southeast regions of Brazil, including São Paulo (where this case occurred), Paraná (especially near the capital, Curitiba), Santa Catarina and Rio Grande do Sul (13, 20-22).

The animal involved in the present study was bitten in June (winter), which does not agree with the literature reports that affirm that *Loxosceles* accidents are more frequent during warm seasons (13).

The diagnosis of loxoscelism is not often based on spider identification, as patients and owners do not always bring the animal. Instead, it is frequently based on epidemiology, anamnesis and symptoms or clinical signs (23). Additionally, nocturnal habits of *Loxosceles* spiders and painless bites hinder the recognition of the cause (21). In the current case, the dog owner reported the presence of a brown spider in

the animal environment and also brought the spider, which allowed the confirmation that it was a *Loxosceles*. However, it was not possible to identify the species, because the specimen was not well preserved.

The presence of ulcerative, necrotic, sensible and hemorrhagic-purulent exudative lesions – observed in the present case – agrees with clinical signs described in the literature, which include pain, erythematous halo around the bite, edema and, after 36 to 48 hours, vesicles, necrosis and ulceration (10).

In the present report, dermonecrotic lesions extended from lumbosacral to interscapullar dorsa, which is not frequently reported, since the presence of hair hampers venom inoculation. Most of reported accidents involve abdomen and ventral portions of the thorax, given that animals usually are bitten while laying over the spider (19).

Laboratory exams may demonstrate neutrophilic leukocytosis, anemia and platelet depletion, which were also observed in the present case (19). It is suggested that only 22.9% of *Loxosceles* envenomation cases present visceral skin lesions, while 71% present cutaneous lesions, as reported in the current report (23). Renal function monitoring is extremely important since acute renal failure is a common complication (19). Hemolytic disturbances are considered rare and were not observed in the present case (13). The occurrence of hemoglobinuria, which is also unusual, was not verified in this case either (11).

Skin histopathology of rats experimentally inoculated with *Loxosceles* venom revelaed edema of dermal endothelial cells together with intravascular fibrin deposition, vasodilatation and inflammatory cell infiltrate, specially polymorphonuclear (24, 25). Moreover, other studies report the occurrence of nodular to diffuse necrotizing dermatitis and paniculitis (15, 26, 27). In the current work, skin biopsy demonstrated necrotic process along with edema and inflammatory infiltrate, essentially neutrophilic, and such necrosis was described as dermoepidermal compatible with loxoscelism. Similar findings were reported five days after experimental inoculation of the venom in rabbits (28).

The literature reports indicate that, in humans, the time between the spider bite and medical support is about 1 to 6 hours (6). The animal analyzed in this study presented a four-day evolution, thus the lack of some characteristic macroscopic and microscopic findings was expected. This aspect may explain why microscopic

examinations presented more granulation tissue, less eosinophilia and less vasculitis than habitually described.

Specific treatment is based on antivenom, which is indicated up to 36 hours after the bite, but this serum is not available in veterinary medicine (11, 19). Dapsone, a leukocyte inhibitor, may be useful to reduce local inflammation; corticosteroids may reduce systemic effects while fluid therapy and sodium bicarbonate help reducing hemoglobin precipitation in renal tubules (11). Since the dog in the present case was in good general condition and did not present systemic alterations, topic treatment was associated to systemic antibiotic therapy. In some situations, chronic ulcers may take months to heal and may require surgical removal (15, 18). In this case, skin ulcers healed by second intention in two months.

In order to avoid new envenomation cases in humans and animals from the same environment, control methods as natural predators (such as geckos) or vacuum cleaners may be used (29).

Most of the time, diagnoses of spider accidents are presumptive, as there are not always evidences of the bite and the spider is rarely taken to identification or is in bad condition. The knowledge of the prevalence of venomous spiders, leading to the initial suspicion, combined to anamnesis, clinical findings and histological characterization of dermonecrosis is essential to establish clinical suspicion and diagnosis. Even if this information does not alter treatment, it is useful to adequate the environment in order to prevent other envenomations involving animals or humans living at the same place.

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