SEVEN publicações acadêmicas
EM PARCERIA COM: IEMS UNIASSELVI

Literature review: *Sansevieria trifasciata* poisoning in dogs and cats

Simone Tateishi[1], Werner Peter Marcon[2], Maria José Calegari[3], Beatriz Pereira Espadin[4], Emmanuel Zullo Godinho[5], Aluisia Budin Fodra[6], Caetano Dartiere Zulian Fermino[7], Inácio Zapparoli Bardini[8], Matheus Augusto Santos Antoniazzi[9].

ABSTRACT

Toxic plant poisoning in domestic animals such as dogs and cats is a common problem in domestic environments due to the presence of ornamental plants. Sansevieria trifasciata, known as St. George's sword, is one of the most popular ornamental plants, but also potentially dangerous due to the presence of toxic substances such as calcium oxalate, alkaloids and saponins. These compounds can cause anything from oral and gastrointestinal irritation to severe liver and kidney damage, and can lead to the animal's death if not treated early.

Keywords: Plant poisoning, Sansevieria trifasciata, Plant toxicity, Clinical signs, Veterinary treatment.

INTRODUCTION

Although poisoning by toxic plants in production animals is considerably common, especially cattle raised with access to pasture, many toxic plants affect companion animals, especially dogs and cats, in the domestic environment, due to the presence of ornamental plants, as well as some herbs and spices. For this reason, the veterinarian is made to guide and make tutors aware of the plants they should avoid having at home and/or in places to which dogs and cats have easy access, whether in pots or gardens.

In addition, in cases of poisoning by ornamental plants, it is extremely important that owners know how to identify which toxic plant the animal may have ingested, so that a specific protocol for treatment and support for these animals can be instituted, allowing the veterinarian to adopt corrective actions effectively and early, minimizing and even avoiding the appearance of clinical signs and consequent systemic conditions that poisoning by toxic plants can cause (Poppenga, 2013).

However, even with the identification of the ingested plant and the search for veterinary medical care, it is important to emphasize that the severity of poisoning by ingestion of toxic plants by animals depends on the species affected, the substance and the amount ingested (Tateishi, 2024).

[1] Gennari and Peartree College – São Paulo
[2] Gennari and Peartree College – São Paulo
[3] Gennari and Peartree College – São Paulo
[4] Gennari and Peartree College – São Paulo
[5] Sacred Heart University Center – São Paulo
[6] Sacred Heart University Center – São Paulo
[7] Sacred Heart University Center – São Paulo
[8] Sacred Heart University Center – São Paulo
[9] Sacred Heart University Center – São Paulo

OBJECTIVE

Among the various ornamental plants considered toxic to pets, the present study focused on a literature review on poisoning by *Sansevieria trifasciata*, popularly called snake plant or snake plant.

METHODOLOGY

As a methodology for this study, literature on toxicology in Veterinary Medicine, poisoning by ornamental plants and proper notes in the classroom were used.

DEVELOPMENT

The snake plant, scientifically called *Sansevieria trifasciata*, is a plant of African origin that is very popular for its resistance and ease of cultivation, being extremely tolerant to excess and lack of sun and water, which increases the durability of its leaves. It is a herbaceous, cespitous, acaule and rhizomatous plant that can reach up to 90 cm in height, with its foliage arranged vertically, erect and in the shape of a rosette, with a pointed, leathery and very fibrous apex (Marques, Rocha and Cordeiro, 2020).

Because it is quite popular, it is an easily identifiable plant, having a coloration with transverse and irregular spots, with its coloration in shades of dark green and light green as a characteristic. Its leaves and rhizomes have calcium oxalate crystals that, when in contact with the animals' mouths, cause irritation, which can evolve to obstruction of the throat and glottis, and can also lead to dermatitis, as it also contains alkaloids and saponins, potentially toxic principles that cause difficulty in movement and breathing, due to irritation of the mucosa and intense salivation (Botelho et al, 2022).

The clinical signs of poisoning by ingestion of plants that are toxic to animals are conditions primarily related to the digestive system such as nausea, vomiting, abdominal pain, diarrhea and lack of appetite, and other changes such as lethargy, weakness/fatigue, polydipsia (increased water intake), tremors, disorientation, loss of motor coordination (ataxia) and even convulsion (Spinosa, 2008).

Along with the clinical signs mentioned above, the substances of some toxic plants can also cause more specific clinical signs. The snake plant, for example, is also responsible for causing oral irritation, with a burning sensation in the oral cavity and tongue, as well as difficulty swallowing, which makes the provocation of emesis not an option, due to the high potential of making false routes in the animals, leading them to asphyxia and dyspnea (Poppenga, 2013; Tateishi, 2024).

When snake plant is ingested in high doses by domestic animals, this can constitute a risk to animal health, as it causes gastrointestinal damage, liver and kidney damage, including leading to death, due to its toxic principles present in snake plant, which are three, namely: calcium oxalate, alkaloids and saponins. Calcium oxalate is one of the most frequently found toxic substances in plants, being present in most plant families, and can be observed throughout the plant, especially in the leaf of the plant and has, for them, the

function of defense and protection, but has the ability to perforate tissues and mucous membranes, causing inflammation, degeneration and cell death. Calcium oxalate is a product whose calcium ions are derived from the environment itself. In the form of fillets, calcium oxalate can reach the kidneys, leading to the formation of kidney stones, which can obstruct the kidneys and cause kidney damage (Aguiar and Veiga Junior, 2021; Tateishi, 2024).

Alkaloids are basic organic compounds that have nitrogen in their chain, typically in a heterocyclic or aromatic structure. It is believed that the function of alkaloids in the metabolism of a plant is solely protective, acting as a poison or repellent against predators, parasites and competitors. The toxic effects of alkaloids are due to the fact that these compounds are anticholinergic, acting as antagonists of acetylcholine, an essential molecule for muscle activation, for the glands that secrete body fluids, and for many brain functions. In this case, the poisoned animals will have mydriasis and increased heart rate and blood pressure. The most toxic alkaloids are characterized by having a bitter taste, an important factor to prevent the ingestion of the plant, however, there is a need to instruct tutors that this factor does not make pets have the instinct to know how to differentiate which plants are toxic and which are not (Custódio, 2022).

Lastly, saponins are a broad group of specialized metabolites that occur in significant amounts in a variety of plant species. The concentration of saponins in plants is variable and the local climate, seasonal changes, external conditions such as light, temperature, humidity and soil fertility, as well as cultivation techniques, affect both the quantity and the qualitative composition of saponins. Its toxicity is attributed to the difficulty of absorption of this substance by the gastrointestinal tract, causing permeability changes or loss of enzymes linked to the membrane, resulting in intestinal lesions and severe gastroenteritis, causing saponins to be absorbed by the gastrointestinal tract and causing systemic effects in the animals' bodies, such as liver problems, seizures, coma and death (Simões, 2001).

Saponins, in general, obstruct the bile canaliculi, compromising biliary excretion, causing bilirubin to return to the bloodstream, causing jaundice and liver damage in the animal, also having the ability to oxidize red blood cells, rupturing them, leading the animal to have hemoglobinuria, worsening the animal's clinical condition (Botelho, 2022; Tateishi, 2024).

Due to the presence of these three toxic agents, the treatment for poisoning by *Sansevieria trifasciata* will cause various clinical signs in the animals, such as stomatitis, causing the animals to present sialorrhea; emesis and diarrhea, leading the animals to a state of dehydration; jaundice, due to hemolysis and obstruction of bile ducts; renal failure, leading to hemoglobinuria, evolving to death if the animal is not treated quickly.

The treatment, in general, will be symptomatic, and the animal will need to be hydrated with crystalloid solutions or saline solution; when there is no obstruction of the oral cavity, no respiratory difficulty or swallowing difficulty, emesis inducers can be used; administration of activated charcoal, to

chelate the toxic principles, reducing their absorption; in cases of injury to the gastrointestinal mucous membranes, the administration of antacids reduces the inflammatory process of these organs; and liver protectors may cause the impediment of bile excretion due to obstruction of the hepatic canaliculi, which lead to liver damage with injectable solutions containing glucose (Górniak, 2008; Tateishi, 2024).

FINAL CONSIDERATIONS

Due to the above, it is essential that the veterinarian carry out a thorough anamnesis, having knowledge of the detailed history on the part of the pet owner, in addition to analyzing the clinical picture that the animal presents, using complementary tests, such as blood count, which will indicate a low hemoglobin count, due to hemolysis, and biochemical, in which an increase in circulating bilirubin and an increase in alkaline phosphatase will be found, due to liver injury, in addition to a considerable increase in creatinine and urea, due to kidney injury.

Ultrasonography is also an exam that will help the veterinarian in the diagnosis, as the intoxication will lead to hepatomegaly, gastritis, colitis, kidney lesions and bile mud, in the case of obstruction of the bile ducts. The X-ray will indicate obstruction of the oral cavity.

However, the best treatment is prevention, and the awareness of owners of the toxic potential of ornamental plants, unknown to many owners, who believe that their pets have the instinct of which plant they can or cannot ingest, is a great ally in this treatment (Custódio, 2022).

REFERENCES

Afrasiabian, H., Hododi, R., Imanieh, M. H., & Salehi, A. (2017). Therapeutic effects of Sansevieria trifasciata ointment in callosities of toes. Global Journal of Health Science, 9(2), 264-268. Retrieved May 22, 2024, from https://www.researchgate.net/publication/305519054_Therapeutic_Effects_of_Sansevieria_Trifasciata_Ointment_in_Callosities_of_Toes

Aguiar, A. T. C., & Veiga Junior, V. F. (2021). O jardim venenoso: A química por trás das intoxicações domésticas por plantas ornamentais. Revista Química Nova, 44(8), 1093-1100. Rio de Janeiro. Retrieved May 24, 2024, from http://dx.doi.org/10.21577/0100-4042.20170746

Botelho, A. F. M., et al. (2022). Plantas tóxicas ornamentais para cães e gatos [E-book]. Jataí, GO: Edição dos Autores. Retrieved May 18, 2024, from https://files.cercomp.ufg.br/weby/up/66/o/PLANTAS_TO%CC%81XICAS_%281%29.pdf

Custódio, J. M. (2022). Projeto da Medicina Veterinária alerta os tutores de cães e gatos para intoxicações por plantas e alimentos. Agência Universitária de Notícias. São Paulo: USP – Faculdade de Zootecnia e Medicina Veterinária.

Górniak, S. L. (2008). Plantas tóxicas ornamentais. In H. S. Spinosa, S. L. Górniak, & J. Palermo-Neto (Eds.), Toxicologia aplicada à Medicina Veterinária (2nd ed., pp. 459-478). Barueri: Manole.

Marques, N. F., Rocha, G. F., & Cordeiro, S. Z. (2020, April 23). Sansevieria trifasciata Prain. Universidade Federal do Estado do Rio de Janeiro. Retrieved May 16, 2024, from http://www.unirio.br/ccbs/ibio/herbariohuni/sansevieria-trifasciataprain

Poppega, R. H. (2013). Emergências toxicológicas. In Manual BSAVA de Emergência e Medicina Intensiva em Cães e Gatos (2nd ed.). São Paulo: MedVet.

Simões, C. M. O. (2001). Farmacognosia, da planta ao medicamento (6th ed.). Curitiba: Editora da Universidade UFPR.

Spinosa, H. S., Górniak, S. L., & Palermo-Neto, J. (2008). Toxicologia aplicada à medicina veterinária (2nd ed.). Barueri: Manole.

Tateishi, S. (2024, May 8). Intoxicação por plantas ornamentais [Class notes]. Pederneiras: Faculdade Gennari & Peartree.