

ENVENOMATION BY SCORPION IN DOG – CASE REPORT

CARDOSO M. J. L.¹, SAKATE M.², CIAMPOLINI P.², MOUTINHO F. Q.²,
CHERUBINI A. L.³

¹ Department of Animal Reproduction and Veterinary Radiology - College of Veterinary Medicine and Animal Science (FMVZ), Universidade Estadual Paulista (UNESP), Botucatu, São Paulo, Brazil; ² Department of Veterinary Clinics, FMVZ, UNESP, Botucatu, São Paulo, Brazil; ³ Center for the Study of Venoms and Venomous Animals (CEVAP), UNESP, Botucatu, São Paulo, Brazil.

ABSTRACT. A case admitted at the Small Animals Clinics Service, Veterinary Hospital, FMVZ - UNESP, in May, 1999 is described. A Brazilian Terrier dog, 3 years and 3 months old, weighing 1.7 kg was brought after 2 hours and a half from contact with a scorpion (*Tityus bahiensis*). The dog showed vocalization inserted with drowsiness. Physical examination showed slightly hyperemic mucous, pain, aggressiveness, tachypnea, tachycardia, and discrete erythema on the right forelimb palmar face. An anesthetic block was performed around the stung area using 2% lidocaine hydrochloride without vasoconstrictor (10mL). The animal was asymptomatic, after 24 h treatment.

KEYWORDS: scorpion, dog, envenomation, poisoning, *Tityus bahiensis*.

CORRESPONDENCE TO:

M. J. L. CARDOSO - R. Dr. Yves Ribeiro, 38, Vila Maria Alice, 86360-000, Bandeirantes, Paraná, Brasil. E-mail: maurolahm@hotmail.com.br

INTRODUCTION

Despite the significant number of cases involving scorpionisms in humans, in certain regions, their descriptions are rare in Brazilian pet animals or international literature. The scorpion cases in Brazil and in other parts of the world are extremely important not only due to its high incidence in specific regions but also due to its likelihood to induce severe or lethal cases, especially in children (1,3,14,15,16).

Scorpions belong to Arachnida class, Scorpionidae order. There are more than 650 species around the world; in Brazil, three scorpion species of the *Tityus* (T) genders are responsible for severe accidents in humans and they are: *T. serrulatus*, *T. bahiensis* and *T. stigmurus* (3,7). *T. serrulatus* is found in the southeast region, Parana state, south of Goias and Bahia states; *T. bahiensis* occurs in the south and southeast regions, south of Minas Gerais state and north of Argentina; *T. stigmurus* is predominant in the northeast regions, mainly in Pernambuco and Paraiba states.

Scorpions are nocturnal creatures and the places where they stay are wood, piles of bricks, slits, walls or basements, and they are also hidden in clothes and shoes.

Scorpions are not aggressive to humans or animals, they only sting when touched or threatened and they are virtually blind; they feel their preys through soil vibrations in short distance. In the last tail segment there are glands that secrete venom (4). *T. bahiensis* or black-scorpion is 6 to 7 cm of length, and it has dark brownish with stained paws and tongues.

Most of physiopharmacological effects induced by scorpion toxin are due to actions in specific sodium channel places, followed by depolarization of excitable cells membrane in the organism. Consequently, there are massive catecholamines and acetylcholines released by post ganglial nerve ends of sympathetic and parasympathetic systems and adrenal medullar zone. This way, this substance (scorpion toxin), acting in different organism sites, is responsible for many signs observed in scorpion cases (8).

Death due to scorpion accidents occurs by cardiocirculatory failure and it also could be by pulmonary edema. It's known that lethal dosage in dogs is 0.1 to 0.5 mg/kg. Clinical picture presented will depend upon acethylcholine, adrenaline or noradrenaline effects prevalence. Clinical occurrence is divided in local and systemic.

Local signs: local pain is present in almost every case and the intensity varies according to the amount of venom inoculated and animal's individual sensitiveness. The stung place is in most cases difficult to be found because it is characterized by a discrete edema and hyperemia, followed or not by sudoresis and local piloerection or in the whole limb. In severe cases, pain may be unbearable, present as burning, sting or prick spreading on the whole limb and becomes intense when palpation is performed. Pain may remain for several hours followed by hyperesthesia or paresthesia, local or radiated which may remain for some days (11).

Systemic signs: dogs may show agitation, shivering, sudoresis, visual alterations, erythema and priapism and may also show drowsiness and coma (19).

Severe hemorrhagic pancreatitis is one of the most severe consequences of scorpion accidents in men, which shows sialism, nausea, vomiting, diarrhea and abdominal pain (18). Some scorpion species may stimulate pancreatitis in dogs (2,17,20,22).

The respiratory alterations described are tachypnea and dyspnea with or without pulmonary edema. They are attributed, at least experimentally, to toxin reflex effect on parasympathetic system (21). Physical examination showed pulmonary rales and wheezes (19). Cardiovascular physical findings are alternated tachycardia and bradycardia, arrhythmias, congestive cardiac failure, severe edema and shock (1,5,13,18). In humans, there are suggestive myocarditis alterations on echocardiogram and electrocardiogram (10) and /or myocardium acute infarct (1,9,12,14,15). Cardiac alterations are reverted most of the time within the first week after the accident (12).

Central nervous system alterations in scorpion accidents are various; most of them do not show a clear physiopathology. In men, high adrenaline concentration in the brain, released by the toxin, may cause shivers, seizure and anxiety. In animals, high dosages of adrenaline may cause lethargy, spasticity and convulsion (21). Hypoxia provoked by cardiovascular complications is responsible for the appearance of neurological signs (6). Shivers, muscle contractions, agitation, myoclonies, hemiplegies, convulsions and coma are physical findings observed in severe cases of scorpion accidents.

The clinical picture of scorpion accident is rich in signs derived from neurotransmitter released in almost all tissues. In relation to diagnosis, therapeutic orientation and prognosis, the scorpion accidents may be classified as mild, moderate and severe accidents. Besides

clinical manifestations, the factor “time” is also an auxiliary element to establish criteria of the poisoning severity. In mild cases, only local manifestations and some systemic signs are shown. In severe cases, there are local and systemic manifestations, involving almost all organs.

The main findings on complementary examinations are hyperglycaemia, hyperamylasaemia, hypokalaemia and leucocytosis with neutrophilia, increase in Creatine Kinase (CK) and Lactate dehydrogenase (LDH). In the presence of cardio-respiratory failure there may occur acid-base disturbances. Besides, in some dogs, glycosuria, ketonuria, proteinuria and myoglobinuria are present. The most frequent findings in electrocardiogram are: sinus tachycardia, migratory pacemaker, ventricular extra systoles and ST segment depression (10). The main findings in echocardiography are left ventricular diffuse hypokinesia and interventricular septum, ejection fraction decrease, light to moderate degree of mitral regurgitation (1,6,14,15). Cardiomegaly and pulmonary edema in breast radiological examination may be found.

Patients involved in scorpion accidents should remain in observation for 4 to 6 hours after the sting even in mild cases. Severe cases, or with cardiopulmonary alterations, need an intensive care. Therapy is aimed to combat poisoning signs, to maintain vital functions and to neutralize the circulating venom.

CASE REPORT

A Brazilian Terrier dog, 3 years and 3 months old, 1.7kg weight, was admitted at the Service of Small Animals Clinics, Veterinary Hospital - UNESP - Botucatu. The dog did not show morbid antecedents, it was immunized against canine distemper, leptospirosis, hepatitis and rabies.

The dog was brought to the Veterinary Hospital around 2 hours and 30 minutes after contact with *T. bahiensis* scorpion species; adequately identified by the Center for the Study of Venoms and Venomous Animals (CEVAP) - UNESP-Botucatu. The dog showed vocalization

interpolated with drowsiness periods. Physical examination: normal temperature, hydrated, slightly hyperemic mucous, increased sensitiveness on right fore limb palmar face (MAD), aggressiveness, tachypnea (54 movements/minute) and tachycardia (184 beats/minute). Besides, at the place of stung there was a subtle erythema. The animal underwent blood collection for hemogram, serum biochemical profile and blood gas analysis. Chest radiographic and electrocardiogram exams were performed. Complementary exams were within normal patterns for the species. Before conclusive diagnosis, intravenous fluid therapy was started with Ringer solution (50 mL/kg/h for 24 hours), and also an anesthetic block around the stung spot with 2% lidocaine hydrochloride without vasoconstrictor (10mL). Around 2 hours after anesthetic block the animal was calm and slept peacefully. After 24 hours the animal was asymptomatic.

DISCUSSION

Clinical picture was typically consistent with the issues discussed long before about scorpions. Anamnesis characterized as a severe picture evolution, pain and erythema localized was important to clear morbid picture.

General physical examination showed pain, aggressiveness, erythema, tachypnea and tachycardia, besides vocalization interpolated by drowsiness periods. These findings are totally consistent with mild scorpion accidents described by some authors (6,21).

Conclusive diagnosis was possible by the scorpion species identification, captured by the dog's owner and identified by CEVAP as *T. bahiensis*, one of the three species responsible for severe scorpion accidents in Brazil (6).

Complementary exams showed normal standards for the species, finding which was consistent with those classically referred to mild scorpion accidents (1,6,14,15).

Anesthetic block around the stung using 2% lidocaine hydrochloride without vasoconstrictor was used. When pain is intense, oral or parenteral potent analgesic "painkillers" are recommended (12), which was not to this case.

Specific serotherapy is indicated in severe and mild cases. Anti-scorpion serum should be done intravenously as fast as possible as neutralizing aim for circulating toxin. The Hospital in Ribeirão Preto uses 2-4 ampoules in mild accidents and 5-10 in severe cases (6). Some patients may show hypersensitiveness reactions after the use of anti-scorpion serum (7).

Clinical veterinarians should be alert and suspect scorpion accidents in dogs, especially those living in places where scorpions are expected to be. Scorpion accidents are an emergency, despite the low number of fatal accidents. Prognosis is hopeful when treatment is early started. The biggest problem for emergency care is the lack of veterinary anti-scorpion serum, despite symptomatic treatment is as important as serotherapy. There is a lack of data in literature about scorpion accidents, making the veterinary work difficult. This report aimed to bring clinical data from scorpion accident in dogs, to contribute for further knowledge on the subject.

REFERENCES

- 1 AMARAL CFS., LOPES JA., MAGALHÃES RA., REZENDE NA. Electrocardiographic, enzymatic and echocardiographic evidence of myocardial damage after *T.serrulatus* scorpion poisoning. *Amer. J. Cardiol.*, **1991**, **67**, 655-7.
- 2 BARTHOLOMEW C., McGEENEY KF., MURPHY JJ. Experimental studies on the aetiology of acute scorpion pancreatitis. *Br. J. Surg.*, **1976**, **63**, 807-10.
- 3 BUCHERL W. Escorpionismo no Brasil. *Mem. Inst. Butantan*, **1969**, **34**, 9-24.
- 4 BUCHERL W. Venoms of Tityinae. In: BETTINI S. Ed. *Arthropod venoms*. Berlin: Springer-Verlag, **1978**: 371-94.
- 5 CARVALHO FF., NENCIONI ALA., LEBRUM I., SANDOVAL MR., DORCE VA. Behavioral, electroencephalographic, and histopathologic effects of a neuropeptide isolated from *Tityus serrulatus* scorpion venom in rats. *Pharmacol. Biochem.Behav.*, **1998**, **60**, 7-14.

- 6 CUPO P., MARQUES MMA., HERING SE. Escorpionismo. In: BARRAVIERA B. Ed. *Venenos: aspectos clínicos e terapêuticos dos acidentes por animais peçonhentos*. Rio de Janeiro: EBUP, **1999**: 299-312.
- 7 CUPO P., AZEVEDO-MARQUES MM., MENEZES JB., HERING SE. Reações de hipersensibilidade imediata após uso endovenoso de soros antivenenos: valor prognóstico dos testes de sensibilidade intradérmico. *Rev. Inst. Med. Trop. São Paulo*, **1991**, **33**, 115-22.
- 8 DINIZ CR. Chemical and pharmacological aspects of Tytiinae venoms. In: BETTINI S. Ed. *Arthropod venoms*. Berlin: Spring-Verlag, **1978**: 371-94.
- 9 FREIRE-MAIA L., CAMPOS JA. On the treatment of the cardiovascular manifestations of scorpion envenomation. *Toxicon*, **1987**, **25**, 125-30.
- 10 GAJALAHSMI BS., RAMASWAMY N., THIAGARAJAN C. Certain observations in electrocardiogram and enzyme variation in dogs, following scorpion venom injection. *Indian J. Physiol. Pharmacol.*, **1979**, **22**, 397-400.
- 11 GOMEZ-ORTIZ S., LEAL OLA., OSUNA S. Contribution to the study of scorpions. *Rev. Fac. Med. Vet. Zootec.*, **1972**, **34**, 25-41.
- 12 GUERON M., OVSYHCHER I. What is the for the cardiovascular manifestations of scorpion envenomation? *Toxicon*, **1987**, **25**, 121-4.
- 13 GUERON M., ADOLPH RJ., GRUPP IL., GABEL M., GRUPP G., FOWLER NO. Hemodynamic and myocardial consequences of scorpion venom. *Am. J. Cardiol.*, **1980**, **45**, 979-85.
- 14 HERING SE., VICHI FL., AZEVEDO-MARQUES MM. Evidências bioquímicas, eletrocardiográficas e ecocardiográficas de lesão cardíaca no escorpionismo grave. In: *CONGRESSO DA SOCIEDADE BRASILEIRA DE MEDICINA TROPICAL*, **25**, São Paulo, **1989**. *Anais...*São Paulo: Sociedade Brasileira de Medicina Tropical, **1989**. 243.
- 15 HERING SE., AZEVEDO-MARQUES MM., OLIVEIRA JSM. Escorpionismo grave – relato clínico, laboratorial e anátomo-patológico de 3 casos fatais. *Rev. Bras. Toxicol*, **1990**, **5**, 43.

- 16 HERING SE., JURCA M., VICHI FL., AZEVEDO-MARQUES MM., CUPO P. "Reversible cardiomyopathy" in patients with severe envenoming by *Tityus serrulatus*: evolution of enzymatic, electrocardiographic and echocardiographic alterations. *Ann. Trop. Paediatr.*, 1993, 13, 173-82.
- 17 MACHADO JC., FILHO JFS. Indução de pancreatite hemorrágica aguda no cão por veneno escorpiônico de *T. serrulatus*. *Mem. Inst. Butantan*, 1976/77, 40/41, 1-9.
- 18 MARGULIS G., SOFER S., ZALSTEIN E. Abnormal coronary perfusion in experimental scorpion envenomation. *Toxicon*, 1994, 32, 1675-8.
- 19 MEERDINK GL. Bites and stings of venomous animals. In: KIRK RW. Ed. *Current veterinary therapy VIII: small animal practice*. Philadelphia: W.B. Saunders, 1983: 155.
- 20 PANTOJA JL., RENNER IG., ABRAMSON SB., EDMONDSON HA. Production of acute hemorrhagic pancreatitis in the dog using venom of the scorpion, *Buthus quinquestriatus*. *Dig. Dis. Sci.*, 1983, 28, 429-39.
- 21 SOFER S., GUERON M. Respiratory failure in children following envenomation by the scorpion *L. quinquestriatus*: hemodynamic and neurological aspects. *Toxicon*, 1968, 26, 931-9.
- 22 SOFER S., SHALEV H., WEIZMAN Z., GUERON M. Acute pancreatitis in children following envenomation by the yellow scorpion *L. quinquestriatus*. *Toxicon*, 1991, 29, 125-8.