

## CASE REPORT

# ENVENOMATION BY NEOTROPICAL OPISTHGLYPHOUS COLUBRID *Thamnodynastes cf. pallidus* LINNÉ, 1758 (SERPENTES:COLUBRIDAE) IN VENEZUELA

Fresnel DIAZ(1), Luis F. NAVARRETE(2) Jaime PEFAUR(1) & Alexis RODRIGUEZ-ACOSTA(2)

---

### SUMMARY

This is a case report of a “non-venomous” snake bite in a herpetologist observed at the Sciences Faculty of the Universidad de los Andes (Mérida, Venezuela). The patient was bitten on the middle finger of the left hand, and shows signs of pronounced local manifestations of envenomation such as bleeding from the tooth imprint, swelling and warmth. He was treated with local care, analgesics, and steroids. He was dismissed from the hospital and observed at home during five days with marked improvement of envenomation. The snake was brought to the medical consult and identified as a *Thamnodynastes cf. pallidus* specimen. This report represents the first *T. pallidus* accident described in a human.

**KEYWORDS:** Envenomation; Opisthoglyphous; Rear-fanged; *Thamnodynastes pallidus*; Venom.

---

### INTRODUCTION

Colubrids constitute the ophidians family that involves the higher number of “non-venomous” snakes species<sup>4,13,14,20,30</sup>. Nevertheless, envenomation by colubrids has already been reported<sup>10-12,15,17-23,26-28,31,34-37</sup>. *Thamnodynastes cf. pallidus* Linné, 1758 known as “saperas”, “candelillas” or “candelitas”<sup>16,33</sup> is an opisthoglyphous (rear-fanged) snake belonging to the Colubridae family, found in South America from Peru, Brazil, Guayanas, Uruguay, Paraguay, Argentina, Ecuador, Bolivia, Trinidad and Venezuela<sup>8,24,25</sup>.

This genus is taxonomically complex, therefore in Venezuela is not totally clarified. Nowadays, seven species have been reported in the country.

This species is aggressive at the moment of capturing them, habitually feeds on amphibians, gekonids, lizards and occasionally nursing mice. Predominantly inhabit in areas of chaparral vegetation, with semi-arboreal habits, very active in crepuscular hours. It is found from the sea level to 2,000 m of altitude.

This paper represents the first record in the literature of a human snakebite caused by a *Thamnodynastes pallidus* specimen.

### CASE REPORT

On March 21st 2003, during the collection activities carried out by the Animal Ecology of the Universidad de los Andes project (Envenomation in humans), leading a tour at the 20.00 hours by the “Santa Cruz del Zulia (Venezuela) route toward “Santa Bárbara del Zulia”, Zulia state, Venezuela, two specimens of *Thamnodynastes pallidus* were located on the borders of the highway in a pasture and marshy environment (08° 54' 10" North latitude; 72° 08' 40" West longitude). At the moment of the capture, one of the researchers was bitten in the middle finger of the left hand by a male specimen of 57 cm and 25 g (Fig. 1), being accomplishing an effective attach during nearly 40 seconds, requiring help to detach the animal from the finger. The snake was take over and thereafter it was moved to the laboratory located in Mérida city, for its maintenance, registered as sample No. ZUJP1053RE257V483, Animal Ecology Collection No. 0654 (Science Faculty of the Universidad de los Andes), and confirmed its identification.

After the arrival at the Hospital, fang marks were evident in the middle finger of the left hand as well as bleeding (Fig. 2) from the tooth imprint, swelling and warmth. The patient had pronounced oedema and pain irradiated in few minutes to the entire extremity, ecchymotic lesions, and high local temperature of the bitten finger. The oedema reached its

---

(1) Sciences Faculty, Animal Ecology, Proyecto Emponzoñamiento en Humanos. Apartado 5101, Mérida, Venezuela.

(2) Tropical Medicine Institute of the Universidad Central de Venezuela, Caracas, Venezuela.

**Correspondence to:** Alexis Rodriguez-Acosta, E-mail: rodriguf@ucv.ve



Fig. 1 - Specimen of *Thamnodynastes cf. pallidus*.



Fig. 2 - Bleeding from the tooth imprint, swelling of a patient bitten by *Thamnodynastes cf. pallidus* specimen.

maximum extension 35 minutes later (Fig. 3), be associated with excessive salivation with metallic flavour, and strong headache. The patient was moved to the Santa Barbara General Hospital, entering in adult's emergency at the 21:00 hours. The physical evaluation showed the following characteristic: age: 29 years, height 1.80 m, weight 71 kg. Vital signs: corporal temperature: 37 °C, Arterial pressure: 110/90 mm Hg, cardiac frequency 70 ppm, respiratory frequency: 22 rpm.

The patient was treated with an ampoule of hydrocortisone (Solucortef®) by endovenous route and local ice. A 500 mg tablet TID of acetaminophen was administered as analgesic. He was maintained in clinical observation for one hour and then dismissed. The hand oedema disappeared 36 hours after the accident.

## DISCUSSION

These symptoms showed that *Thamnodynastes pallidus* Duvernoy's



Fig. 3 - Intense swelling of the patient left hand bitten by *Thamnodynastes cf. pallidus* specimen.

gland secretion possesses toxic activities. It is thought from the observed effect that the bite by this colubrid snake produces haemorrhagic and proteolytic consequences on the victims, as it has been reported on other accidents caused by snakes from the same genus<sup>5,12,18,35</sup>. In an experimental mice inoculation of a *Thamnodynastes strigilis* venom, the animals presented oedema and necrosis, prominent neurotoxic symptoms and local and systemic haemorrhages<sup>18</sup>. The suspected enzymes responsible of this activity could be metalloproteases such as ASSAKURA *et al.* (1992)<sup>3</sup> and LEMOINE *et al.* (2003)<sup>18</sup> described for *P. olfersii* and *Thamnodynastes strigilis* venoms respectively, in accordance with the widely accepted concept about the proteolytic degradation of basement membrane components of capillary vessels by haemorrhagic metalloproteases as the key step in their pathologic effect<sup>1,6,7,19</sup>.

Several workers<sup>1,6,29,37,38</sup> have established that these enzymes are the responsible of altering the vascular wall producing haemorrhages and oedema.

Different authors<sup>9,35</sup> indicated that the serious cases of opisthophous envenoming are related to a continuous attach (bite extended by more than 30 seconds) or repeated (multiple bites), permitting greater release and breakthrough of the toxin in the tissues, being the cases more severe in children less than 10 years.

Most of the reports on ophitoxemia generally move towards the accidents caused by venomous snakes, while an important percentage of the snake bite should be caused by "not venomous" snakes. These accidents represent a Public Health problem since involves the health of the workers, given that the patients loose work hours by seeking medical assistance for the local manifestations. Usually, the animal is not carried for its identification, or if it is carried, generally the physician is not trained for its recognition, and by the presence of the local manifestations could be induced to use the antivenom, that it is not lacking of risks (referee comment) .

For a long time opisthophous snakes had been derelicted for most of the toxinologist, since were thought that its secretions did not had

much importance for its little effectiveness on humans. The medical evidence, in this case of the toxic potential that these species possess represents an alert for medical toxicologist. Here it is proposed that the term Duvernoy's gland secretion does not apply any longer to the colubrid families as the gland is the precise same venom gland found in Elapidae and Viperidae<sup>13</sup>.

## RESUMEN

### Envenenamiento por la colubrida opistoglifa *Thamnodynastes cf. pallidus* Linné, 1758 (Serpentes:Colubridae) en Venezuela

Se reporta un caso de una mordedura de serpiente "no venenosa", en un herpetólogo observado en la Facultad de Ciencias de la Universidad de los Andes (Mérida, Venezuela). El paciente fue mordido en el dedo medio de la mano izquierda, mostrando pronunciados signos locales de sangramiento por la impronta ocasionada por los dientes de la serpiente, edema y calor local. El paciente fue tratado con cuidados locales, analgésicos y esteroides. Fue dado de alta del hospital y observado en el hogar durante 5 días, con marcada mejoría del envenenamiento. La serpiente fue traída a la consulta médica e identificada como un espécimen de *Thamnodynastes cf. pallidus*. Este es el primer caso humano descrito, ocasionado por un *T. pallidus*.

## ACKNOWLEDGEMENTS

We thank Dr. Alba Díaz and Lic. Marisela Angelino from the Animal Ecology Group to give us information and taking the patient's pictures. Sócrates Pérez for the snake pictures. Medical personnel of Santa Barbara General Hospital for their excellent medical attention.

We thank two anonymous referees for their helpful collaboration improving the manuscript.

## REFERENCES

1. AIRD, W.C. - Endothelial cell dynamics and complexity theory. **Crit. Care Med.**, 30 (suppl. 5): S180-S185, 2002.
2. ALBOLEA, A.B.P.; SALOMÃO, M.G.; ALMEIDA-SANTOS, S.M. & JORDÃO, R.S. - Epidemiologia dos acidentes causados por serpentes não peçonhentas no Estado de São Paulo, Brasil. **Rev. Univ. Guarulhos Cien. biol. Saúde**, 4: 99-108, 1999.
3. ASSAKURA, M.T.; SALOMÃO, M.G.; PUORTO, G. & MANDELBAUM, F.R. - Hemorrhagic, fibrinolytic and edema forming activities of venom of the colubrid snake *Phylodryas olfersi* (green snake). **Toxicon**, 30: 427-438, 1992.
4. BERNARDE, P.S. & ANJOS, L. - Distribuição espacial e temporal da anurofauna no parque estadual Mata Dos Godoy, Londrina, Paraná, Brasil. **Com. Mus. Ciênc. Tecnol. Sér. Zool. Porto Alegre**, 12: 127-140, 1999.
5. BERNARDE, P.S.; KOKUBAN, M.C & MARQUES, O.A. - Utilização de hábitat e atividade em *Thamnodynastes strigatus* (Günther, 1858) no Sul do Brasil (serpentes, Colubridae). **Bol. Mus. nac.**, 428: 1-8, 2000.
6. BJARNASON, J.B.; HAMILTON, D. & FOX, J.W. - Studies on the mechanism of hemorrhage production by five proteolytic hemorrhagic toxins from *Crotalus atrox* venom. **Biol. Chem. Hoppe. Seyler**, 369 (suppl.): 121-129, 1988.
7. BJARNASON, J.B. & FOX, J.W. - Hemorrhagic metalloproteinases from snake venoms. **Pharmacol. Therap.**, 62: 325-372, 1994.
8. DULLMAN, W. - **The South American herpetofauna: its origin, evolution, and dispersal**. Kansas, Museum of Natural History of the University of Kansas, 1979. (Monograph No. 7).
9. ELLENHORN, M.J. & BARCELOUX, D.G. - **Medical Toxicology: diagnosis and treatment of human poisoning**. New York, Elsevier, 1988.
10. FITZSIMONS, D.C. & SMIT, H.M. - Another rear-fanged South African snake lethal to humans. **Herpetologica**, 14: 198-202, 1958.
11. HEATWOLE, H. & BANUCHI, M.B. - Envenomation by the colubrid snake, *Alsophis portoricensis*. **Herpetologica**, 22: 132-134, 1966.
12. HOGE, A.R. - Notas herpetológicas. Revalidação de *Thamnodynastes strigatus* (Günther, 1858). **Mem. Inst. Butantan**, 24: 157-172, 1952.
13. KARDONG, K. - The evolution of venom apparatus in snakes from colubrids to vipers and elapids. **Mem. Inst. Butantan**, 46: 105-118, 1982.
14. KORNACKER, P. M. - **Lista sistemática y clave para las serpientes de Venezuela**. Germany, Pako Verlag, 1999.
15. KUCH, U. & JESBERGER, U. - Human envenomation from the bite of the South American colubrid snake species *Phylodryas baroni*, Berg, 1895. **Snake**, 25: 63-65, 1993.
16. LANCINI, A.R. - **Serpientes de Venezuela**. Caracas, Ernesto Armitano, 1986.
17. LEMOINE, K. & RODRÍGUEZ-ACOSTA, A. - Hemorrhagic, proteolytic and neurotoxic activities produced by the false coral snake (*Erythrolamprus Bizona* Jan 1863) (Serpentes:Colubridae) Duvernoy's gland secretion. **Rev. Cient. FCV-LUZ**, 13: 371-377, 2003.
18. LEMOINE, K.; SALGUEIRO, L.M.; RODRÍGUEZ-ACOSTA, A. & ACOSTA, J. - Neurotoxic, haemorrhagic and proteolytic activities of Duvernoy's gland secretion from Venezuelan opisthophous colubrid snakes in mice. **Vet. hum. Toxicol.**, 46: 10-14, 2004.
19. LEONARDI, A.; GUBENSEK, F. & KRIZAI, I. - Purification and characterisation of two hemorrhagic metalloproteinases from the venom of the long-nosed viper, *Vipera ammodytes ammodytes*. **Toxicon**, 40: 55-62, 2002.
20. MACHADO, A. & RODRIGUEZ-ACOSTA, A. - **Animales venenosos y ponzoñosos de Venezuela**. Caracas, Universidad Central de Venezuela; Consejo de Desarrollo Científico y Humanístico, 1997.
21. MEBS, D. - Analysis of *Leptodeira annulata* venom. **Herpetologica**, 24: 338, 1968.
22. MINTON Jr., S.A. - Beware: nonpoisonous snakes. **Clin. Toxicol.**, 15: 259-265, 1979.
23. MITTLEMAN, M.B. & GORIS, R.C. - Envenomation from the bite of the Japanese colubrid snake, *Rhabdophis tigrinus*. **Herpetologica**, 30: 113-119, 1974.
24. MIYATA, K. - **A check list of the amphibians and reptiles of Ecuador with a bibliography of Ecuadorian Herpetology**. Washington, Smithsonian Herpetological Information Service, 1982. (No. 54).
25. MURPHY, J. - **Amphibians and reptiles of Trinidad and Tobago**. London, Krieger Publishing Company, 1997.
26. NAVARRETE, L.F.; LEMOINE, K. & RODRIGUEZ-ACOSTA, A. - Is the opisthophous *Clelia clelia* Duvernoy's gland secretion haemorrhagic in humans? **Acta biol. venez.**, 19: 19-23, 1999.
27. NEILL, W.T. - Evidence of venom in snakes of the genera *Alsophis* and *Rhadinaea*. **Copeia**, 1954: 59-60, 1954.
28. NICKERSON, M.A. & HENDERSON, R.W. - A case of envenomation by the South American colubrid snake species *Phylodryas olfersi*. **Herpetologica**, 32: 197-198, 1976.

29. OMORI-SATOH, T. & OHSAKA, A. - Purification and some properties of hemorrhagic principle I in the venom of *Trimeresurus flavoviridis*. **Biochim. Biophys. Acta**, 207: 432-444, 1970.
30. PÉFAUR, J.E. & RIVERO, J.A. - Distribution, species-richness, endemism, and conservation of Venezuelan amphibians and reptiles. **Amph. Rept. Conserv.**, 2: 42-70, 2000.
31. PINTO, R.N.L.; SILVA Jr., N.J. & AIRD, S.O. - Human envenomation by South American opistoglyph *Clelia clelia plumbea* Wied. **Toxicon**, 29: 1512-1516, 1991.
32. POPE, C. - Fatal bite of a captive African rear-fanged snake (*Dispholidus*). **Copeia**, 1958: 280-282, 1958.
33. ROZE, J. - **La taxonomía y zoogeografía de los ofidios de Venezuela**. Caracas, Biblioteca Central, Ciencias Biológicas; Universidad Central de Venezuela, 1966.
34. SILVA, M.V. & BUONONATO, M.A. - Relato clínico de envenenamiento humano por *Phyalodryas olfersii*. **Mem. Inst. Butantan**, 47/48: 121-126, 1983/1984.
35. SILVA Jr., M. - **Ofidismo no Brasil**. Rio de Janeiro, Serviço Nacional de Educação Sanitária do Ministerio da Saúde, 1956.
36. TAKEYA, H.; MIYATA, T.; NISHINO, N.; OMORI-SATOH, T. & IWANAGA, S. - Snake venom hemorrhagic and nonhemorrhagic metalloendopeptidases. **Meth. Enzymol.**, 223: 365-378, 1993.
37. YAMAKAWA, Y.; OMORI-SATOH, T. & MEBS, D. - Hemorrhagic principles in the venom of *Bitis arietans*, a viperous snake. II. Enzymatic properties with special reference to substrate specificity. **Biochim. Biophys. Acta**, 1247: 17-23, 1995.
38. YAMAKAWA, Y. & OMORI-SATOH, T. - The sites of cleavage in oxidized insulin-B chain by a hemorrhagic protease derived from the venom of the habu (*Trimeresurus flavoviridis*). **Toxicon**, 26: 227-233, 1988.

Received: 6 May 2004

Accepted: 17 August 2004