

Case Report

A case of envenomation caused by *Oxybelis fulgidus* (Serpentes, Colubridae) in Brazilian Amazon

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Abstract

A case of a bite inflicted by *Oxybelis fulgidus* in the wilds of Amazon is reported. The patient was a 67-year-old man who presented with dizziness, tachycardia and local pain, with erythema and bleeding in his left arm. The venom of *Oxybelis fulgidus*, a neotropical rear-fanged snake, contains one of the four three-finger toxins already isolated from colubrid snakes, called fulgimotoxin. He was treated with oral analgesics and returned to the ambulatory in 48 hours, with good evolution. We report first authenticated case of adult *Oxybelis fulgidus* with signs of mild local envenoming without evidence of systemic envenoming.

Keywords: Snakebite. Colubridae. *Oxybelis fulgidus*.

INTRODUCTION

Approximately 27,000 snakebites, including colubrid and dipsadid, are reported annually in Brazil¹. Rear-fanged species are responsible for most colubrid and dipsadid envenomings in Brazil; the main genera involved are: *Clelia* (Dipsadidae), *Helicops* (Dipsadidae), *Liophis* (*Erythrolamprus*), *Philodryas* (Dipsadidae), and *Thamnodynastes* (Dipsadidae). The majority of envenomations are not serious; they are mainly characterized by local pain, edema, and ecchymosis. Systemic manifestations are unusual². The monophyletic genus *Oxybelis* comprises four species, namely *O. aeneus*, *O. brevirostris*, *O. wilsoni*, and *O. fulgidus*. The Green Vine Snake, *Oxybelis fulgidus* (Serpentes, Colubridae), is an arboreal diurnal colubrid widely distributed in the Americas and found in Southern Mexico and Central, North and Tropical South America³. This species has an increased head and body size to accommodate larger prey but has retained snout attenuation to increase visual acuity and

facilitate predation on active lizards (mainly Iguanians) and birds (mainly Passeriformes), with accumulating well-recorded field observations in Mexico, El Salvador, Panama, Costa Rica, Guiana, and Brazil³. The oral secretions of this species are stored in high volume and contain fulgimotoxin, a monomeric three-finger toxin (3FTxs) highly neurotoxic to lizards and birds, although mice are unaffected⁴.

This is the first report, to our knowledge, of a bite inflicted by *O. fulgidus* (green vine snake) on a human in the wilds of the Brazilian Amazon.

CASE REPORT

A 67-year-old man was bitten in Santa Rosa, Eixo Forte, Santarém, PA, Brazil. He reported that at 8:00 a.m. on June 7, 2017, he was holding and pruning a tree when he was bitten by a snake that had attached itself to his left arm. The patient was immediately admitted to the Alter do Chão Healthcare Unit at about 9:00 a.m.

The snake is known locally as the "Parrot Snake" because it is found in plants and trees and is green like a parrot. He reported that the snake is relatively common in the community where he lives. After being bitten, he grabbed the snake with his other hand, pulled it off and threw it to the ground. At the moment of the bite he was very nervous. He felt dizziness, tachycardia with

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local bleeding, and moderate pain with erythema. He denied paresthesia and other associated symptoms. He washed the lesion with water because there was considerable local bleeding and applied jucá with alcohol (a type a balm) but did not use oral medication. He was in a good general condition, with no systemic manifestations. The left forearm lesion presented with an excoriated area and local edema, erythema, and ecchymosis (**Figure 1**). Coagulation time was normal. The patient was observed for 1 hour and the local lesion cleaned with soap and water and saline solution. Oral analgesia with dipyron and paracetamol was prescribed. He was discharged with return-for-revaluation guidance in 48 hours. When he returned, the local inflammation had disappeared. He said that local pain had progressively reduced over the 2 days. The victim had brought a 140 mm body section of the offending snake and it was identified as a specimen of *Oxybelis fulgidus*, without possibility of identification of the sex, by the junior author (MRD) (**Figure 2**). The specimen was deposited in the Coleção Herpetológica Alphonse Richard Hoge of Instituto Butantan, São Paulo, SP, Brazil: IBSP 090470.

DISCUSSION

To our knowledge, this is the first case report of a bite inflicted by *Oxybelis fulgidus* occurring in the wild. Authenticated reports of accidents caused by Colubridae are uncommon, although incidents are likely frequent in Brazil. A study carried out at Hospital Vital Brazil, which analyzed snakebites between 1959 and 1999, reported 6,048 cases where the snake was identified; Viperids were the most common (4,050; 66.96%) and Colubridae and Dipsadidae were second most common (1,923; 31.80 %). Accidents from other snake families were unusual: Elapidae (33; 0.55%), Anomalepididae (28; 0.46%), Boidae (13; 0.21%), and Leptotyphlopidae (01; 0.02%)⁵.

Ribeiro et al, (1999) reviewed data from 43 patients admitted to the Butantan Institute, São Paulo, Brazil between 1982 and 1990 with a diagnosis of *Philodryas olfersii* bite. These patients presented local pain (37.2%), swelling (34.9%), erythema, (18.6%) and ecchymosis (9.3%). Only one presented systemic manifestations: A 2-year-old child presented transient bleeding from the bite site punctures. He also had abdominal pain and vomited three times⁶.

Medeiros et al., (2010) retrospectively analyzed 297 proven cases of *Philodryas patagoniensis* bites (a species of Dipsadidae) in patients admitted to Hospital Vital Brazil (HVB), Butantan Institute, São Paulo, Brazil, between 1959 and 2008. The local clinical manifestations were pain observed in 50% of patients, transitory bleeding in 36%, erythema in 16% and edema in 13%. Only 7 (2.4%) patients reported systemic symptoms characterized by mild dizziness, and 88 patients (29.6%) showed no evidence of envenoming⁷.

It is important to note that many snake species and genres found in Brazil also have a greenish color (*Leptophis ahaetulla*, *Corallus caninus*, *Corallus batesii*, *Chironius* sp., *Erythrolamprus viridis*, *Philodryas olfersii*, *Bothrops bilineatus*). The latter species can cause envenomations with local and systemic manifestations.



FIGURE 1: Edema, erythema, and ecchymosis in the left arm.



FIGURE 2: *Oxybelis fulgidus* specimen from Alter do Chão, state of Pará, Brazil that caused the bite.

Envenomations caused by *Oxybelis sp* are extremely rare. One of the authors (MS) of the work cited below reports being bitten by *Oxybelis aeneus* on the thumb and middle finger. There was swelling in the hands and slight pain that lasted for two days⁸.

The first published case was of a patient who was bitten on the right forefinger by a probable specimen of *Oxybelis fulgidus* while transferring it from a container to an exhibition at the Reptile Garden of the Witte Memorial Museum, San Antonio, Texas. A slight redness, a little swelling, and local itching were described. A large blister formed near the deepest fang puncture which lasted more than one day⁹. This envenomation was probably caused by *Oxybelis aeneus*. The author mistakenly identified it to be *O. fulgidus*, but this animal was captured in Coahuila, a state in the north of Mexico. According to Scartozzoni, this species is not found in Northern Mexico^{9,3}.

Weinstein et al, 2011 apud Stebbins (1985) reported transient paresthesia and numbness after a bite from *Oxybelis aeneus*, while Fowlie (1965) described blisters and paresthesia after a bite from *Oxibelis aeneus auratus*¹⁰.

Some of these manifestations could be attributed to nervousness such as tachycardia and dizziness but local manifestations such as pain, erythema, swelling, and blister may have been caused, at least in part, by the *Oxybelis* envenomations and not only by the mechanical action of the serpent's bite.

Although no systemic manifestation has been published that could be unequivocally associated with human envenoming caused by *Oxybelis sp*, this possibility cannot be ruled out, since the snake might not have had enough time to inject a significant amount of venom. Furthermore, *Oxybelis fulgidus* has two large teeth in the back side of the mouth (opisthoglyphous).

In the case reported here the patient applied jucá extract at the site of the bite for pain relief. The jucá (*Libidibia ferrea*), also known as “pau de ferro”, is an Amazonian tree of small size but great therapeutic potential. It is used in folk medicine as a balm to treat various ailments, including painful lesions of the skin.¹¹

In almost all colubrid and dipsadid accidents, the clinical presentation disappears in a few days, with treatment exclusively targeting symptoms using oral analgesics and anti-inflammatory agents. It is always recommended, after a snakebite, that the patient rests, is kept hydrated, seeks the nearest health service, and, if possible, takes the offending animal to be correctly identified. Alcohol, kerosene or any other substance other than water should not be offered to the patient. There is no specific antivenom. General measures such as washing the bite site with soap and water, using antiseptics, and tetanus prophylaxis are recommended.

The venom of *Oxybelis fulgidus*, a neotropical rear-fanged snake, contains fulgimotoin, one of the four three-finger toxins (3FTXs) already isolated from colubrid snakes⁴.

3FTXs are structurally similar but exhibit different pharmacological functions such as neurotoxicity, cardiotoxicity, cytotoxicity, anticoagulant, hypotensive effect, antimicrobial activity, and platelet aggregation. 3FTXs are found in the venoms

of elapids (cobras, kraits and mambas), hydrophiids (sea snakes), colubrids, viperids, and crotalids¹². Fulgimotoin is highly neurotoxic to lizards (ectotherms) and birds (endotherms) but is essentially harmless to mice (also endotherms); it makes up a significant fraction of the crude venom protein (approximately 32%), so even relatively low quantities of this venom are in excess of what is required to quickly kill moderately sized prey⁴.

O. fulgidus (maximum length of 2 m) has a low complexity venom proteome; fulgimotoin is almost certainly the main component. No observable signs of distress, incapacitation, or death were observed in treated mice, the literature reports. Based on behavioral observations, this species produces a venom that is toxic to both endothermic and ectothermic prey. The preserved protein skeleton of these toxins illustrates that a very fine structural variation can confer important functional specificity to these toxins⁴.

The description of this bite by *Oxybelis fulgidus* reinforces the need to evaluate the evolution of human accidents caused by opisthoglyphous colubrids and dipsadids, which are rarely reported.

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Conflict of interest: The authors declare that there is no conflict of interest.

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