

## CASE REPORT

### DESCRIPTION OF AN INJURY IN A HUMAN CAUSED BY A FALSE TOCANDIRA (*Dinoponera gigantea*, PERTY, 1833) WITH A REVISION ON FOLKLORIC, PHARMACOLOGICAL AND CLINICAL ASPECTS OF THE GIANT ANTS OF THE GENERA *Paraponera* AND *Dinoponera* (SUB-FAMILY PONERINAE)

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#### SUMMARY

The authors observed an injury caused by the sting of a false tocandira ant in the hand of an amateur fisherman and they describe the clinical findings and the evolution of the envenoming, which presented an acute and violent pain, cold sweating, nausea, a vomiting episode, malaise, tachycardia and left axillary's lymphadenopathy. About three hours after the accident, still feeling intense pain in the place of the sting, he presented an episode of great amount of blood in the feces with no history of digestive, hematological or vascular problems. The intense pain decreased after eight hours, but the place stayed moderately painful for about 24 hours. In that moment, he presented small grade of local edema and erythema. The authors still present the folkloric, pharmacological and clinical aspects related to the tocandiras stings, a very interesting family of ants, which presents the largest and more venomous ants of the world.

**KEYWORDS:** Tocandira; *Paraponera*; *Dinoponera*; Ponerinae; Bullet ants; Venomous ants; Bites and stings.

#### INTRODUCTION

The ants are Hymenoptera of the Formicidae family. The Ponerinae sub-family presents ants of great size (up to 3.0 cm of diameter) with some species of medical importance, like the tocandiras (tucandeiras, cabo-verde ants, vinte e quatro horas ants or bullet ants) which are capable to apply extremely painful stings and potentially to provoke systemic manifestations as fever, trembling, cold sweating, nausea, vomiting, lymphadenopathy and cardiac arrhythmias<sup>4,5</sup>. The pain, however, is the main symptom and characteristic of the sting, being extremely violent and capable of staying for periods of up to 24 hours<sup>4</sup>. The ponerine ants of medical interest belong to the genera *Dinoponera* and *Paraponera*. They are present in the whole country and the most important species are *Paraponera clavata* (the true Tocandira), *Dinoponera australis*, *Dinoponera grandis* and *Dinoponera gigantea* (false tocandiras). They are carnivorous ants that can prey a great amount of animals, including insects, birds and small mammals and they have a poor social organization, living in the basis and cavities of trees.

The venom of the ponerine ants is injected through a venom apparatus constituted of a gland connected to a sting in the abdomen of the ant and it is used during capture of food and for protection<sup>4,5,6,7</sup>.

The bite is the most fearsome of all of the insects<sup>4,5,6,7,8,9</sup>. The venom is neurotoxic<sup>4,5,6,7</sup> and blocks insect central nervous system transmission<sup>6</sup>. They are not aggressive ants, but are vicious when defending the nest, when they do a stridulating sound and sting with ferocity. The most conclusive studies on the venom of the ponerine ants demonstrate a complex proteic mixture, where a small neuropeptide isolated of the venom of *Paraponera clavata* called poneratoxin (PoTX) affects the Na channels and have potential use for application on biological insecticides<sup>2,3,6,10,13,14</sup>.

The tocandiras, especially the Amazonian specie *Paraponera clavata* (Fabricius, 1775) (Fig. 1) are used in rituals of passage for adult age in Sateré-Mawé, a tribe of near 7000 Amazonian Indians that speaks the Mawé language and live in the border between the Pará and Amazonas States. The children starting from the 12 years put the hand in a type of liana glove (Fig. 2) with a great number of tocandiras for a period of near 30 minutes. The young Indian that supports the pain can exercise leadership positions in the tribe. During the life the Indian has to pass for the ritual 25 times to be respected by the oldest<sup>11,12</sup>.

ROQUETTE-PINTO, in his thesis presented in 1915 studied the specie *Dinoponera grandis* and it described the sting: "...in the inoculation point is formed a whitish stain, later with little edema,

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Fig. 1 - *Paraponera clavata* (Fabricius, 1775), the true tocandira. The specimens were captured in the Amazonian forest, close to the village of the Indians Sateré-Mawé.



Fig. 2 - Ceremonial glove made of arumã palm strings and macaw feathers and used by the Mawé-Sataré Amazonian Indians in the ritual of the tocandira or tucandeira. They are put up to 300 ants in the glove for the pain resistance test to the stings.

extremely painful. The pain, deep, wins the whole member progressively, about 12 hours after it reaches the maximum degree and it stays like this, colossal, for 24 - 48 hours. Adenopathy appear, the victim turns pale, the heart pulsation arises to a hundred beats per minute, and the axillary's temperature always ascends to 37.5 - 38 °C. There are chills and vomits. The pain decreases and disappears in 24 - 48 hours"<sup>11</sup>. Sting reactions in humans had similar description by other authors since the initial manuscript of ROQUETTE-PINTO<sup>1,12</sup>.

#### CASE DESCRIPTION

JR, 64 year-old, male, white, was coming from Ibitinga (São Paulo State).

The patient was injured in the left hand by a great black ant that the local inhabitants identified as a Tocandira, after lifting a fallen trunk in Bonito (Mato Grosso do Sul State). The ant was later identified as a specimen of *Dinoponera gigantea* (Perty, 1833) (Fig. 3). Immediately, he felt an acute and violent pain ("more intense than renal colic") and he presented cold sweating, nausea, a vomiting episode, malaise, tachycardia and left axillary's lymphadenopathy that appeared soon after the sting.

About three hours after the accident, still feeling intense pain in the place of the sting, he presented an episode of great amount of blood in the feces. He made use of analgesics (Tramal® 100 mg/day/PO/8h), hot water in the place, and later, application of ice, without



Fig. 3 - Ponerinae ants captured by the victim in Bonito town (Mato Grosso do Sul State). They were identified as false tocandiras, belonging to the species *Dinoponera gigantea* (Perty, 1833).

improvement of the symptoms. The intense pain decreased after eight hours, but the place stayed moderately painful for about 24 hours. In the moment of the exam, about 48 hours after the bite, the point of the sting showed a small grade of edema and erythema, without other local signs. The patient collected three specimens of the ant in the place of the accident and he brought them for identification.

#### DISCUSSION

Some genera of ants are associated with human lesions<sup>1</sup>. The fire ants (*Solenopsis* genera) are responsible for important skin manifestations in humans, causing pustules and papules in the point of the sting and allergic problems, including anaphylaxy<sup>4,5</sup>. The *Eciton* genera are the “correição” ants, which can move around in great number for the forest and prey small animals. Among all, however, none has the diameter and the toxicity of the giant ants of the sub-family Ponerinae. The tocandiras and false tocandiras provoke excruciating pain and serious envenoming, with systemic manifestations even with just one sting. Our patient presented intense pain, cold sweating, tachycardia, lymphadenopathy and an episode of great amount of fresh blood in the feces with no history of gastrointestinal, hematological or vascular problems, which was probably associated to the sting. For the level of gravity of the symptoms presented, we can imagine the importance of a multiple offence, which occur in the rituals of majority of the Mawé-Sateré Indians<sup>1,11,12</sup>. Few venomous animals present connections with the folklore and are as interesting as the tocandiras, the largest ants of the world. Finally, such an active poison deserves studies on its composition accomplished in Brazil, fact that still does

not happen and motivate this revision and the description of the human envenoming.

#### RESUMO

##### **Descrição de injúria humana causada por falsa tocandira (*Dinoponera gigantea*, Perty, 1833) com revisão dos aspectos folclóricos, farmacológicos e clínicos das formigas gigantes do gênero *Paraponera* e *Dinoponera* (sub-família Ponerinae)**

A partir de um acidente causado pela picada de uma formiga falsa tocandira na mão de um pescador amador, os autores descrevem os achados clínicos locais observados, tais como edema, eritema e dor excruciante e a evolução do envenenamento, que cursou com fenômenos sistêmicos imediatos, como sudorese fria, náuseas, vômitos, mal estar, taquicardia e linfadenopatia axilar à esquerda. Após três horas, a dor intensa persistia e o paciente apresentou um episódio de hematoquesia, sem história anterior de enfermidades do trato digestivo, hematológicas ou vasculares. O uso de analgésicos (Tramal® 300 mg/dia), água quente e gelo não melhorou a dor, que arrefeceu em oito horas, tendo permanecido por cerca de 24 horas. São apresentados ainda os aspectos folclóricos, farmacológicos e clínicos relacionados às picadas de tocandiras.

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