

**CASE REPORT**


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**FATAL ANAPHYLAXIS TO *Jaguajir rochae*  
(BORELLI, 1910) (SCORPIONES, BUTHIDAE)  
IN BRAZIL: A CASE REPORT**

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*Iva Maria Lima Araújo Melo<sup>1</sup>, Relrison Dias Ramalho<sup>2</sup>, Maria Mercedes Vieira Bezerra<sup>1</sup>, Ivan Eduardo de Oliveira Filho<sup>2</sup>, Carlos Roberto Medeiros<sup>3</sup>, Maria Apolônia da Costa Gadelha<sup>4</sup> and Pedro Pereira de Oliveira Pardal<sup>4</sup>*

**ABSTRACT**

A 44-year-old healthy farmer, was stung by a scorpion on his right hand while preparing soil for planting in the Caatinga area (a large area in the north-east of Brazil characterized by semi-arid scrub forest), in the Catarina Municipality countryside, Ceará State, Brazil. According to the reports of carers and family members, the patient initially reported mild pain at the site of the sting, but within a few minutes he developed malaise, pruritus in the body and throat, edema in the nostrils, and a dry mouth which led to looking for water to drink. It rapidly evolved into sphincter, urinary and fecal release, salivation and a convulsive episode with loss of the senses. He was dead on arrival at Catarina Municipality Hospital emergency department. The necroscopic report indicated suffocation due to glottal edema and acute lung edema as the “cause of death”. The animal which caused the accident was under a rock that the patient was manipulating at the time of the incident, and has been identified by experts as *Jaguajir rochae* (Borelli, 1910) scorpion species, formerly synonymized *Rhopalurus rochae*. This is the first report of a fatality due to an allergic reaction to the venom of this species. This leads to the possibility that deaths caused by stings from other scorpion species may be due to anaphylaxis, whose symptoms in some situations may be confused with severe envenomation.

**KEY WORDS:** *Jaguajir rochae*; scorpionism; anaphylaxis; allergy

**INTRODUCTION**

Scorpionism is a major public health problem in many parts of the world, whether due to incidence, envenomation severity or difficulties in health service delivery (Chippaux & Goyffon, 2008).

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1. Núcleo de Epidemiologia da Coordenadoria de Vigilância em Saúde, SESA/CE, Fortaleza, CE, Brazil.

2. Núcleo de Controle de Vetores, SESA/CE, Fortaleza, CE, Brazil.

3. Hospital Vital Brazil, Instituto Butantan, São Paulo, Brazil.

4. Centro de Informações Toxicológicas de Belém/Hospital Universitário João de Barros Barreto da Universidade Federal do Pará, Belém, Pará, Brazil.

Corresponding author: Pedro Pereira de Oliveira Pardal. Centro de Informações Toxicológicas de Belém/Hospital Universitário João de Barros Barreto da Universidade Federal do Pará. Rua dos Mundurucus, 4487, Guamá, CEP 66073-000 Belém, Pará, Brasil. E-mail: pepardal@ufpa.br.

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Although there are more than 2,433 known species of scorpions worldwide (Rein, 2017), only about 30 are considered dangerous due to serious accidents and death in humans (Chippaux & Goyffon, 2008). In Brazil, the number of these accidents has increased progressively over recent years, reaching 156,833 accidents with 94 deaths in 2018 (Brasil, 2018), where the species of the *Buthidae* family, *Tityus* genus, are considered the most important (Brasil, 2001, Reckziegel & Pinto, 2014, Santos et al., 2010, Pardal et al., 2014). However, little is known about accidents involving species from other genera of *Buthidae* and their possible impact on public health (Lourenço & Eickstedt, 2003), as is the case with the *Rhopalurus* gender.

Genus *Rhopalurus* (Thorell, 1876), consisting of 17 species and two subspecies, is found in northern South America and Central America (Souza, 2009), with most records in areas of open vegetation, such as the Cerrado (scrubland) and the Caatinga (Lourenço, 2002; Lourenço & Pinto-da-Rocha, 1997). In Brazil, it is widely distributed geographically, being present in the north and north-eastern regions. *Jaguajir rochae* (Borelli, 1910), formerly referred to as *Rhopalurus rochae*, has as morphological characteristic: large scorpions up to 60 to 72 mm in total length. General coloration of a very pale yellow. Metasomal segments of 10-10-10-8-5 keels, covered by blackish pigment. Dentate margins of pedipalp-tibia fingers composed of 8 oblique rows of granules. Telson with a very long aculeus, subaculear tooth absent (Lourenço, 2002), it is endemic in the north-eastern region of Brazil, and is found in Bahia, Ceará, Paraíba, Piauí, Rio Grande do Norte and Sergipe States (Esposito et al., 2017). The only records of cases in the envenomation literature caused by the genus *Rhopalurus* were described by Brandão and Françoso (2010) in Bahia, caused by *R. agamemnon* (*Jaguajir agamemnon*), and Fuentes-Silva et al. (2014) in Santarém, Pará State, caused by *R. amazonicus*, neither being serious incidents. On the other hand, it is known that stings by venomous animals are also causes of allergic reactions, including anaphylaxis, since their venoms are complex mixtures of heterologous proteins and other components capable of causing hypersensitivity processes (Leynadier et al., 1997; Ryan & Caravati, 1994; Medeiros et al., 2008, Pitchon et al., 2014). Allergic reactions from contact with scorpion poisons have been reported in the literature (Leynadier et al., 1997; Demain & Goetz, 1995), including anaphylaxis (Naseem et al., 2016). Our purpose is to describe the first fatal case of anaphylaxis caused by *J. rochae* in Ceará State, Brazil.

## CASE REPORT

A 44-year-old male farm worker was stung by a scorpion on his right hand when he was preparing the soil for planting in a rural area in the Catarina Municipality (06°07'51 "S, 39°52'39 " O) in the Caatinga area, Ceará State (Figure 1). According to reports from carers and family members, the patient initially presented mild pain at the sting site, but within a few minutes began to present malaise, itching on the body and throat, swelling in the nose, and a dry feeling in the mouth which led to looking for water to drink. It rapidly evolved into sphincter, urinary and fecal release, salivation and a convulsive episode with loss of the senses. He was dead on arrival at the emergency department of Catarina Municipality Hospital, having died before receiving medical treatment. The necroscopic report indicated suffocation due to glottal edema and acute lung edema as the "cause of death". The animal that caused the accident, which was under a rock being manipulated by the patient, was identified by experts from the Entomology Laboratory of the Vector Control Nucleus, Health Secretary of Ceará State, and the Arthropod Laboratory, Butantan Institute, São Paulo, as a scorpion of the *J. rochae* (Borelli, 1910) species (Figure 2). The patient had no relevant morbid antecedents except a history of allergic reactions attributed to bee stings, and contact with beetles and spider crabs.



Figure 1. Map of Brazil, highlighting Ceará State and Catarina Municipality, where the accident caused by *Jaguajir rochae* occurred.

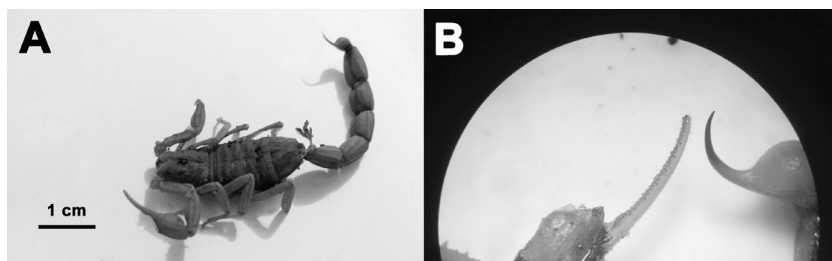


Figure 2. (A) *Jaguajir rochae* scorpion (Borelli, 1910) cause of the accident. (B) Details of chela (pedipalp's claw) and telson with very long aculeus, absence of subaculear tooth (sting) and granulations on the moving finger.

## DISCUSSION

In Brazil there are about 131 described species of scorpions, distributed across 23 genera and four families (Brazil & Porto, 2011), recognized for their medical importance, including the *Tityus* genus with the species *T. serrulatus*, *T. stigmurus*, *T. bahiensis* and *T. obscurus* (Brasil, 2001). Most benign course envenomations and deaths are most frequently associated with *T. serrulatus* (Brasil, 2001; Reckziegel & Pinto, 2014). As for the *Ropalurus* genus, there are only two confirmed accidents in the literature, associated with *R. agamemnon* (*J. agamemnon*) and *R. amazonicus* (Brandão & Françoso, 2010; Fuentes-Silva et al., 2014), both considered mild, presenting no systemic symptoms and of no medical significance.

The scorpion venom is a mixture of several active substances that include a variety of biologically active components such as enzymes, peptides and nucleotides, among others (Possani et al., 2000). Venoms can vary in toxicity according to their species. In Brazil, the most toxic are *T. serrulatus*, *T. bahiensis*, *T. stigmurus* and *T. obscurus*. According to Nishikawa et al. (1994), the venom of *J. agamemnon* is devoid of toxicity, however, there are no records in the literature on the venom of *J. rochae*.

Pain at the site is common in scorpion stings and is present in almost all cases of accidents caused by the scorpion genus *Tityus* (Pardal et al., 2014; Cupo, 2015), with varying intensity and degrees of radiation. In the report studied, the patient presented mild pain, compatible with the cases described by Brandão and Françoso (2010) and Fuentes-Silva et al. (2014) in accidents caused by *R. agamemnon* (*J. agamemnon*) and *R. amazonicus*. In both cases, there were no systemic manifestations. In addition, in Brazil this genus is less relevant for public health (Brasil, 2009).

Serious cases of scorpion stings are related to cardiorespiratory manifestations that may lead to death (Khattabi et al., 2011). These causes are due to the action of the venom in ionic channels for sodium and potassium of excitable fibres, with the release of cholinergic and adrenergic chemical mediators (Petricevich, 2010). Cupo et al. (1994) showed that cardiac failure and pulmonary edema are causes of death. Other systemic manifestations such as body tingling, salivation, malaise, fainting and convulsions are also described in human envenomations caused by scorpions (Santos et al., 2010; Pardal et al., 2014; Cupo., 2015). In the present case, some of these manifestations were noted in the patient, but it would be unwise to attribute these exclusively to the envenomation. The salivation could have been a consequence of upper airway obstruction, loss of consciousness and a convulsive episode due to hypoxemia. As the patient presented generalized pruritus and edema of the nostrils, an allergic reaction to the venom may be suggested (Lieberman et al., 2015; Fischer et al., 2018), while the necroscopic finding of glottal edema reinforces the diagnosis of anaphylaxis (Bury et al., 2012).

Animal poisons, especially from hymenoptera, are frequent causes of anaphylactic allergic reactions (Lieberman et al., 2015; Fischer et al., 2018). However, in the case of scorpions, there are rare reports in the literature of IgE-mediated hypersensitivity. Nonetheless, the venom of some species of scorpions has already been documented *in vitro*, by means of skin allergy tests or the detection of antibodies specific for IgE. Demain and Goetz (1995) and More et al. (2004) demonstrated the presence of IgE-specific antibodies to *Centruroides vittatus* venom, a common scorpion in the southern United States, in patients with a history of allergic reaction to its sting. Chase et al. (2002) demonstrated, in sensitized patients, the presence of IgE-specific venom of *Centruroides sculpturatus*, endemic in the southern United States, while Leynadier et al. (1997) did the same for the venom of the *Androctonus australis* scorpion from North Africa. Boyer et al. (2011) reported the death of a woman from anaphylaxis due to a sting from *Centruroides exilacauda*, a scorpion found in Arizona, United States.

Sensitization to scorpion venom does not necessarily occur as a result of prior contact with the venom. Sensitization to scorpion venom has been reported in individuals without a prior history of stinging, which may be due to cross-sensitivity to other allergens. Nugent et al. (2004) demonstrated a cross-reaction between allergens of the *Centruroides vittatus* scorpion venom and the fire ant (*Solenopsis* sp). The history of the victim is suggestive of allergic reactions to bees, beetles and spider crabs. Unfortunately, blood samples could not be obtained, these would have lead to IgE-specific screening for scorpion venom and other allergens.

This is the first report in the literature of a fatal case of *Jaguajir rochae* scorpion sting, whose poison is considered non-toxic, yet led to death due to an allergic reaction to the poison. Therefore, it is possible that deaths from other species of scorpions may be due to anaphylaxis, the symptomatology of which in some situations may be confused with severe envenomation.

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