

Anaphylactic reaction/angioedema associated with jellyfish sting

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Abstract

The most frequent jellyfish in Southern Brazil causes mainly local pain and skin plaques. A 3-year-old female bather presented an erythematous, irregular plaque on the left forearm after contact with a jellyfish and intense facial angioedema with facial flushing. The lungs had vesicular murmur, wheezes, and snorts, and pink and spumous secretion in the airways with intercostal retraction. She was administered subcutaneous adrenaline (0,01mg/kg) and hydrocortisone intravenous (10mg/kg) with total recovery in a few minutes. The manifestations of anaphylactic reactions are distinct from those of envenomations, and prompt and adequate care is fundamental in these situations.

Keywords: Jellyfish. Anaphylactic reaction. Allergy. Bites and stings.

INTRODUCTION

Although injuries due to cnidarians are observed sporadically on beaches around the world¹⁻³, in the last five years there has been an increase in envenomations in the southern region of Brazil, especially in the States of Paraná and Santa Catarina, which record thousands of cases in the summer months (December, January, February, and March)^{4,5-7}.

Envenomations caused by cnidarians in humans occur because of the presence of defense cells (cnidocytes) that are located predominantly in the tentacles of these animals comprising circular and gelatinous aspects. These cells have organelles (such as nematocysts) that are triggered by osmosis or contact, and inject toxins deeply into the victim through individual microneedles. In their original function, these structures serve to capture prey, but any contact will trigger the mechanism of discharge and inoculation of the venom, which precipitates injuries in bathers¹⁻³.

There is a logical reason for this great number of envenomations, which is the increasing presence of tourists in the waters during the summer, but this does not seem to be the only explanation for the increase; the predominant jellyfish populations seem to increase and even change during the summer. The hydromedusan *Olindias sambaquiensis* was

associated with outbreaks in the State of Santa Catarina with the identification of specimens and confirmation of the etiology⁶, but sample collections from outbreaks in the State of Paraná, which also account for thousands of envenomations each year, pointed to the presence of the scyphozoan *Chrysaora lactea*, already identified and associated with injuries also in the State of São Paulo⁷. Although there are other cnidarians in these regions that are capable of causing serious envenomations, with venoms associated with systemic phenomena and risk of death, they are much more rare and are not involved in severe injuries⁵. Among these, are the Portuguese man-of-war (*Physalia physalis*) and the cubomedusae (*Tamoya haplonema* and *Chiropsalmus quadrumanus*), with reports of deaths in humans after envenomations⁵⁻⁸.

The most frequent cnidarians present in southern Brazil cause mainly local phenomena, manifested by intense local pain and erythematous plaques that are rarely linear (unlike species that cause serious envenomations); and skin lesions that may present as irregular, rounded, or oval erythematous plaques, and more rarely, with small marks of tentacles⁵. Systemic phenomena (respiratory and cardiovascular manifestations) are even rarer and most of the envenomations will be mild in severity, although the local pain is excruciating. A small proportion of victims develop systemic reactions because of the venom, which can cause intense muscular pain, cardiac arrhythmias, low cardiac output, and shock. Children (due to the greater compromised body area) and larger specimens of the species *O. sambaquiensis* and *C. lactea* are factors involved in severe envenomation^{6,7}.

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Finally, like all animal venom, inert proteins and toxins can cause variable allergic conditions, the true frequency of which also needs to be better studied. The development of allergic reactions depends on prior sensitization to antigens and formation of antigen-antibody complexes, whereas envenomations are toxic actions directly in the victim's tissues. Allergic phenomena are not part of the toxic effects and the consequences can be serious. The various spectra of an allergic type I reaction (anaphylaxis) may be triggered, causing acute urticaria, angioedema, and anaphylactic reaction, with extremely serious consequences^{1-3,5,9}.

In this report, we describe a case of anaphylactic reaction with angioedema in a child, after contact with a jellyfish on the Paraná coast, who was promptly medicated and survived.

CASE REPORT

On 05/01/2017, at 1:22pm, one of the authors (JCCP) was alerted by the lifeguard service of the fire department to attend to a 3-year-old female on the Barra do Sai beach in Guaratuba municipality, south of the State of Paraná, Brazil. According to initial information, the child had been *burned* by a jellyfish and she presented manifestations of acute respiratory failure and *vomiting with blood*. The attendant arrived on a helicopter (due to the severity of the signs and symptoms that were manifested) that departed from the Guaratuba base of the Military Police Battalion of Air Operations and arrived in the local area in a few minutes. The child was being attended to by the lifeguards and oxygen was being offered via a face mask at a rate of 15 liters/minute (**Figure 1**).

The initial observation of vital data showed a respiratory rate of 39bpm, heart rate of 142bpm, and SpO₂ of 98%. The patient was never submerged or at risk of drowning. The physical examination showed intense facial angioedema, more pronounced in both eyelids and lips, accompanied by facial flushing. The lungs bilaterally presented vesicular murmur, with snorts and wheezes on the pulmonary bases; pink and spumous secretion in the airways; dyspnea, with intercostal and furcula retraction and use of accessory musculature; psychomotor agitation, alternating with periods of drowsiness; and a Glasgow Coma Scale score of 14. Peripheral capillary perfusion was present in the lower and upper limbs. The left forearm showed an irregular erythematous plaque, about 10x12cm in size (**Figure 2**), compatible with jellyfish envenomation caused by the local species⁵⁻⁷. The skin lesion was medicated with topical acetic acid (vinegar).

The case was interpreted as an anaphylactic reaction caused by contact with a cnidarian of the *Chrysaora lactea* species (identified on the beach in a great number of specimens), manifested as angioedema, acute pulmonary edema, and several episodes of vomiting, with a small amount of bloody contents (**Figure 3**).

The treatment was subcutaneous adrenaline (0,01mg/kg), and intravenous hydrocortisone EV (10mg/kg). There was significant recovery of the patient in a few minutes, with a marked improvement in the systemic condition. The child was transported to the Municipal Emergency Room of the Guaratuba town, where she was observed and after total improvement of symptoms, was discharged without complications.



FIGURE 1: Medical care of the child at the time of the anaphylactic reaction. Note the intense erythema and facial edema of the victim. **Photograph:** João Claudio Campos Pereira.



FIGURE 2: An irregular erythematous plaque on the left forearm was observed in the patient, about 10cm in diameter. The inflammatory process was important and the patient complained of intense local pain after contact with the jellyfish. **Photograph:** João Claudio Campos Pereira.



FIGURE 3: Specimens of *Chrysaora lactea* on the sand of the beach where the envenomation occurred. This jellyfish is common in the region and is associated with serial injuries observed. **Photos:** X. In detail: *Chrysaora lactea* specimen in the marine environment. **Photograph:** João Claudio Campos Pereira and Fábio Lang da Silveira.

DISCUSSION

Injuries caused by cnidarians are very common in the southern region of Brazil in the first months of year^{1,5-7}. According to the local fire department, there were 6,549 cases since December 2016 until January 2017 (unpublished data). Although a great majority of envenomations have extremely favorable evolutions, and can be controlled by iced marine water compresses and vinegar baths, some injuries may be more serious, with influential factors such as the age of the patient and the size of the cnidarian^{6,7}. An important factor not linked *per se* to envenomation is the development of allergic phenomena (anaphylaxis), which can pose risks to patients' lives^{1,9}.

In anaphylactic processes, there are actions of antibodies, histamine, and other inflammatory mediators. Muscle contractions and constriction of the airways can cause dyspnea, snorts and wheeze, abdominal pain, cramps, vomiting, and diarrhea; extreme vasodilatation caused by histamine can cause circulatory shock; and fluid accumulation in the alveolar sacs can lead to acute pulmonary edema. The angioedema can occur in the lips, eyelids, and throat, with possibility of obstruction of the airways¹.

The manifestations of anaphylactic reactions and angioedema were very clear in this case and adequate communication should alert professionals of health teams working in coastal areas to allergic phenomena, since prompt care modified the prognosis of the patient in this case.

Conflict of interest

The authors declare that there is no conflict of interest.

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