

**CASE REPORT**

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# Probable chronic renal failure caused by *Lonomia* caterpillar envenomation

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## Abstract

Erucism is a skin reaction to envenomation from certain poisonous caterpillar bristles. In Brazil, most reports of erucism provoked by *Lonomia* caterpillars are from the southern region. Most manifestations of erucism are local and include burning pain, itching, local hyperthermia and, rarely, blisters (benign symptoms with spontaneous regression in a few hours). General symptoms such as nausea and vomiting, headache, fever, myalgia, abdominal pain and conjunctivitis may also occur. Uncommon symptoms include arthritis, coagulation disorders (manifested as bruising and bleeding), intracerebral hemorrhage and acute renal failure, which comprise serious complications. The present study reports the case of 60-year-old patient from Rio de Janeiro state, Brazil, who came into contact with a caterpillar and developed, a few days later, chronic renal disease.

## Background

Recently lepidopterans of the species *Lonomia obliqua* (order: *Lepidoptera*; family: *Saturniidae*) have been extensively studied due to the severe manifestations provoked by contact with their larval forms (caterpillars), such symptoms are known as erucism. These stinging caterpillars have bristles filled with toxins, which are able to cause lesions, blood and kidney disorders [1,2]. Two species are directly involved and may cause serious or fatal harm to humans, *Lonomia obliqua* and *Lonomia achelous* [2-6].

This article reports the case of patient who came into contact with a caterpillar and developed, a few days later, chronic renal disease.

## Case presentation and discussion

A 60-year-old black man – born in the Rio de Janeiro city and living in Teresópolis, RJ, Brazil – reported that when he was taking the mail from his mailbox, he accidentally put his left arm on six specimens of light green and brown caterpillars, which had about 5 cm length. The animals were crushed by the arm of the man, who,

immediately, withdrawn it. He washed the arm using soap and water, applied alcohol to the affected area and also took an anti-allergy drug (could not say which).

The site affected by the caterpillars became swollen and after 20 minutes a burning sensation started. The victim also noticed a painful lymph node in the ipsilateral axilla, which disappeared spontaneously shortly after. In the same night, after dinner, he had abdominal distension associated with discomfort and vomiting. He did not take medicines to relieve the symptoms. As there was improvement, he laid down to sleep. After that, the man woke up at dawn feeling an intense abdominal pain (flank region) and arthralgia (upper and lower limbs), which became worse when he attempted to move.

Subsequently, the patient looked for medical assistance and went to a local hospital. His clinical picture was described as pain associated with sudden anuria. He was admitted to the hospital to treatment. The man reported a previous history of nephrolithiasis and received treatment with saline solution, analgesics and urinary catheter to provide relief. He also received treatment for arterial hypertension with atenolol, 50 mg/day; until this time there was no evidence of kidney injury.

During the hospitalization, the patient had developed diffuse edema, flank pain and the anuria remained, despite of use of intravenous hydration and furosemide

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**Table 1 Report of laboratory tests**

| Tests          | Hospitalization days |                     |                      |                      |                      | Benchmarks                                   |
|----------------|----------------------|---------------------|----------------------|----------------------|----------------------|--|
|                | 4 <sup>th</sup> day  | 7 <sup>th</sup> day | 10 <sup>th</sup> day | 14 <sup>th</sup> day | 16 <sup>th</sup> day |  |
| Leukocytes     | 18.000               | 10.800              | –                    | 14.800               | –                    | 5.000-11.000/mm <sup>3</sup>                 |
| Basophils      | 0                    | 0                   | –                    | 0                    | –                    | 0-1%   |
| Eosinophils    | 1                    | 0                   | –                    | 0                    | –                    | 1-5%   |
| Myelocytes     | 0                    | 0                   | –                    | 0                    | –                    | 0%   |
| Metamyelocytes | 0                    | 0                   | –                    | 0                    | –                    | 0%   |
| Neutrophil/Ban | 7                    | 3                   | –                    | 7                    | –                    | 1-5%   |
| Neutrophil/Seg | –                    | 74                  | –                    | 71                   | –                    | 45-70%                                       |
| Lymphocytes    | 14                   | 21                  | –                    | 19                   | –                    | 20-45%                                       |
| Monocytes      | 5                    | 2                   | –                    | 3                    | –                    | 4-10%  |
| Erythrocyte    | 3.83                 | 2.79                | –                    | 2.8                  | –                    | 3.80-5.20 × 10 <sup>4</sup> /mm <sup>3</sup> |
| Hematocrit     | 34                   | 24.6                | 24.4                 | 25.9                 | 27.7                 | 36-50%                                       |
| MCV            | 89                   | 88.1                | 89.9                 | –                    | –                    | 80-100 fL                                    |
| MCH            | 30                   | 30.3                | 29.8                 | –                    | –                    | 28-32 pg                                     |
| Platelets      | 154.000              | 111.000             | 148.000              | 278.000              | –                    | 150-400 × 10 <sup>3</sup> /mm <sup>3</sup>   |
| PR             | –                    | –                   | 17.6"                | 15.75"               | –                    | 12.7-15.4"                                   |
| aPTT           | –                    | –                   | 56"                  | 44"                  | –                    | 26.3-39.4"                                   |
| Sodium         | 132                  | 133                 | 135                  | 136                  | –                    | 135-145 mEq/L                                |
| Potassium      | 7.8                  | 4.8                 | 4.2                  | 4.3                  | –                    | 3.5-4.5 mEq/L                                |
| Urea           | 190                  | 145                 | 115                  | 113                  | 184                  | 10-50 mg/dL                                  |
| Creatinine     | 7.8                  | 9.6                 | 7.8                  | 7.6                  | 11.9                 | 0.6-1.2 mg/dL                                |
| ESR            | –                    | 46                  | –                    | –                    | –                    | up to 20 mm/h                                |
| CT             | –                    | 7'                  | –                    | –                    | –                    | 5-10 min                                     |
| BT             | –                    | 1'                  | –                    | –                    | –                    | < 7.1 min                                    |
| c-ANCA         | –                    | Negative            | –                    | –                    | –                    | Negative                                     |
| p-ANCA         | –                    | Negative            | –                    | –                    | –                    | Negative                                     |
| Blood glucose  | –                    | 112                 | –                    | 101                  | –                    | 70-125 mg/dL                                 |

**Source:** patient's records.

CT: coagulation time; BT: bleeding time; ESR: erythrocyte sedimentation rate; PR: prothrombin ratio; aPTT: activated partial thromboplastin time; MCV: mean corpuscular volume; MCH: mean corpuscular hemoglobin; c-ANCA: cytoplasmic antineutrophil cytoplasmic antibodies; p-ANCA: perinuclear antineutrophil cytoplasmic antibodies.

infusion. Laboratory and imaging tests were performed (Tables 1 and 2).

After two more days, the patient was transferred to the Hospital das Clínicas de Teresópolis Costantino Ottaviano (HCTCO), where he remained for forty-five days due to hemodialysis treatment. Four days after the admission to HCTCO, he remembered the episode with

the caterpillars in the morning before the painful crisis and anuria. That was the moment when the suspicion of erucism by *Lonomia* aroused (seven days after the accident).

The use of SALon was not indicated because the patient did not meet the criteria for it, particularly due to the time elapsed since the accident, hospital care for more than 10 hours and less than or equal to 36 hours [1]. During the admission the patient showed bruises scattered on upper and lower limbs and two voluminous cases of melena. After those events, there was no spontaneous recovery of renal function, which progressed to chronic renal disease (CRD), stage V – end-stage renal disease, when the glomerular filtration rate is below 15% of normal and the patient needs, invariably, renal replacement therapy.

**Table 2 Medical imaging tests**

| Test                                      | Changes   |
|---|---|
| Kidney and urinary system ultrasonography | Enlarged kidneys  |
| Computed tomography                       | Inflammatory infiltration of the perinephric fat, uncomplicated renal calculus on the right and a small amount of fluid in the pelvis |

**Source:** patient's records.

*Lonomia* caterpillar has about six to seven centimeters long, and its color ranges from light brownish-green to yellowish-brown with three longitudinal stripes of dark-brown [4]. Its body is covered with bristles that contain toxins. The transformation to an adult moth occurs after a in ten weeks after three to six months of larval life [7,8].

*Lonomia* is found throughout Brazil, however, numerous registered cases of erucism occurred in the southern region, mainly in Rio Grande do Sul and Santa Catarina states, and were attributed to *L. obliqua* [9,10]. In recent years, there have been accidents in Minas Gerais, Goiás, Maranhão and Rio de Janeiro states [1,4,7].

Erucism caused by *Lonomia* is uncommon in the state of Rio de Janeiro. Therefore, the present study is one of the first cases reported in the state. The increased rate of envenomations – especially in areas where they were not previously described – has been attributed to deforestation of indigenous trees, natural habitat of caterpillars, which are forced migrating to fruit trees in urban areas [1,8].

The symptoms of *Lonomia* envenomation range from local cutaneous manifestations to serious and potentially fatal systemic reactions [11]. General symptoms such as headache, unspecific indisposition, fever, nausea, vomit, arthralgia, myalgia, conjunctivitis and abdominal pain vary depending on the species involved, the intensity of the contact and the victim's response [7,8,12,13]. Hemorrhagic syndrome and acute renal failure (ARF) are unusual outcomes, but potentially fatal [7,14-18].

The pathophysiological mechanisms of ARF in *Lonomia* envenomig are not clear yet. Probably, there is a relation between renal ischemia and systemic hypotension and/or fibrin deposition in glomerular capillaries [19-21]. Another hypothesis is that venom components may act directly on the kidneys [22,23].

*Lonomia* spp. venom is rich in several toxins that have procoagulant and fibrinolytic activities, which can significantly affect the blood coagulation process. For example, the enzyme lonofibrase is able to trigger a hemorrhagic syndrome similar to disseminated intravascular coagulation (DIC) by increasing fibrinogen degradation products and decreasing plasminogen, fibrinogen and factor XIII [1,5,17,24-26]. *Lonomia obliqua* venom contains several lipocalins (protein group that transports hydrophobic molecules), among which is the *Lonomia obliqua* prothrombin activator protein (Lopap), involved in the increase of expression of adhesion molecules on cellular surface [27-30].

Erucism is diagnosed based on history of contact with the caterpillar and corroborated by data from laboratory tests. Laboratory abnormalities include slightly low platelet count, high urea and creatinine levels, slight increase of total bilirubin, and augmentation of indirect bilirubin,

free hemoglobin and haptoglobin decrease in cases of hemolysis [11].

Treatment consists of washing the affected area with cold water, cold compresses, local anesthetic infiltration using lidocaine 2% and topical corticosteroids. In case of bleeding, the patient should be kept resting in order to avoid traumatic intervention [5,11]. The antilonomic serum (SALon) is indicated according to the severity of the accident, and its early administration prevents bleeding manifestations that start from one to ten days after the contact depending on its intensity and location [12,17,31-35].

## Conclusion

The present study comprises an important report concerning the occurrence of *Lonomia* accidents in Rio de Janeiro, Brazil, a very uncommon situation in the area. This case also emphasizes the unusual progression of the envenomation to CRD, which, to the best of our knowledge, was not previously reported in the literature.

## Consent

Informed consent was obtained from the patient for publication of this case report. The research project was submitted for analysis and approved by the UNIFESO Ethical Committee for research with human subjects (CEP), in accordance with *Resolução 196/96* and *Resolução 251-97* of the Brazilian National Health Council (*Conselho Nacional de Saúde do Brasil*).

## Abbreviations

CRD: Chronic renal disease; ARF: Acute renal failure; DIC: Disseminated intravascular coagulation; SALon: Antilonomic serum.

## Competing interests

The authors declare that there are no competing interests.

## Authors' contributions

PAS, TCF, RCS and RCA described the case and drafted the first version of the article. APG, PKS, RRV, EGM, MGAO and RS-B made critical revision of the text. All authors read and approved the final manuscript.

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