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Lonomia Obliqua Caterpillar Encounter in Guyana: 29-Year-Old European Tourist Who Develops Coagulopathy

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ABSTRACT

Background: Envenomation cases in Guyana are primarily from snake bite wounds and result in haemorrhagic syndromes developing. Although Guyana shares borders with Brazil there haven't been published cases of *Lonomia obliqua* caterpillar encounters.
Case Presentation: Here we present the case of a 29-year-old, previously healthy European male tourist who developed haematuria and ecchymosis after stepping on a *Lonomia obliqua* caterpillar. He had abnormal prothrombin and partial thromboplastin times with no progression to renal failure or intracranial haemorrhage. The venom from these caterpillars affects both the inflammatory and coagulation systems. Treatment with antilonomic serum is recommended and due to pro-thrombotic effects of cryoprecipitate and fresh plasma these are not recommended.
Outcome: The patient was admitted and on day two received antilonomic serum which was sourced from Brazil as it was not readily available locally. After a ten-day hospital stay, he was discharged with normalization of his prothrombin and partial thromboplastin times.

Keywords: [*Lonomia obliqua*, Caterpillar, Coagulopathy, Guyana]

INTRODUCTION

Guyana is filled with a wide range of biodiversity. The number one cause of envenomation that presents to the ED comprises of labaria snake bite (*Bothrops atrox*). We rarely think of a seemingly harmless caterpillar being the cause of massive haemorrhage due to coagulopathy, however the *Lonomia obliqua* may be the deadliest yet. In this paper we present a patient who suffered an encounter with this insect.

LITERATURE REVIEW

Envenomation in Guyana is most associated with snake bites from the labaria snake (*Bothrops atrox*) which causes a haemorrhagic syndrome secondary to damage to the vascular endothelium and associated venom-induced consumption coagulopathy.[1] However, there is another culprit species that may go under the radar, the *Lonomia obliqua* caterpillar (Figure 1). Its presence is primarily in the southern, southeastern regions of Brazil, which shares borders with Guyana to the South.[2] These caterpillars are known to be found in Brazil, Venezuela, Argentina, and French Guyana primarily and likely in other regions as many cases of envenomation may have gone unreported or not suspected at all.[3] The venom of these caterpillars is delivered through the numerous spines that cover their bodies which at the skin causes pain, redness, swelling and burning sensations at the site. There are both coagulant and anticoagulant effects as well as fibrinolytic activities that lead to a severe haemorrhagic syndrome causing diffuse haemorrhages (hematomas and significant haematuria), renal failure, intracranial bleeds and in

severe cases death. [4-7] There are increases in the clotting time, coagulation factor levels decrease, and fibrin degradation products increase. The absence of thrombocytopenia is what may differentiate envenomation by *Lonomia obliqua* poisoning and other coagulopathies. [5,7-8]

Figure 1. Lonomia *obliqua* caterpiillar captured by patient.

CASE PRESENTATION

This is a case of a 29-year-old Caucasian male tourist JG with no past medical history nor any relevant family medical history. The patient was referred on the 23rd of March 2023 to the Georgetown Public Hospital Corporation (GPHC) from Bartica Regional Hospital (BRH) with a preliminary diagnosis of haematuria for investigation and to rule out retroperitoneal haemorrhage.

He arrived at GPHC with stable vital signs and was fully conscious and oriented. Upon interrogation, he referred nine days prior he slipped and fell from ground level, hitting his right hemi-abdomen on a wooden plank resulting in mild discomfort but didn't seek medical attention. Two days after the fall he accidentally stepped on a caterpillar with the right foot. Two days later he began experiencing pains, swellings, and discoloration to both lower limbs, but being more severe in the right. He reported also that these areas coincided with regions of minor traumas suffered during a recent football match.

As a result of this he sought medical care at BRH where he was evaluated and discharged with oral antibiotics. Nevertheless, the following day he noted very dark bloody urine accompanied with extensive bruising to both lower limbs and to right flank and therefore revisited BRH where he was transferred to GPHC for further evaluation and management.

His physical examination was normal except for notable diffuse ecchymosis to right flank and bilateral lower limbs extending to the thighs (Figure 2 and Figure 3). Also, he had a Foley's catheter with 800mls of bloody urine. Vital signs were unremarkable (Bp-128/70mmhg, P: 61 bpm, R: 20 bpm, T: 97.3° F, SpO2: 98% on room air)

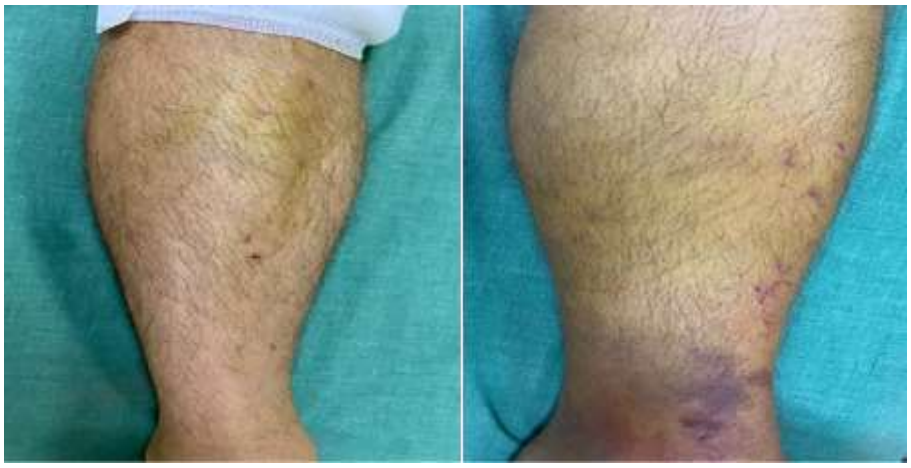

Figure 2: Bilateral lower extremities of the patient (Published with patient permission)

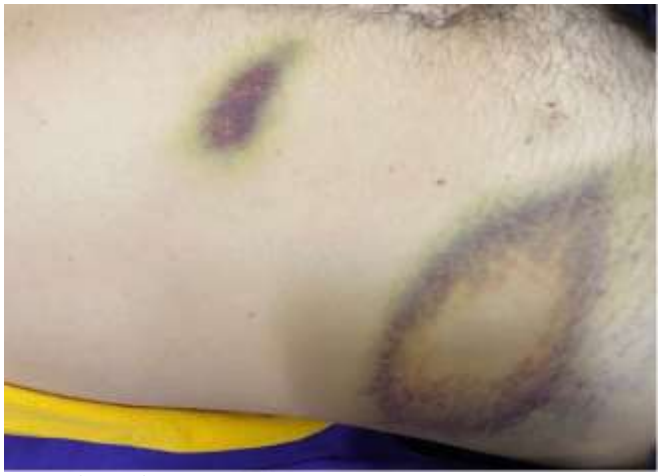

Figure 3: Right flank of patient showing ecchymosis (Published with patient permission)

Extensive laboratory studies were done showing major abnormalities in the haemoglobin, urine analysis, platelets, coagulation studies and fibrinogen test. (Table 1). No abnormal findings were noted on his abdominal Ct scan nor chest x-ray.

Table 1: Laboratory Results

Date	**30-03-2023**	**31-03-2023**	**02-04-2023**	**06-04-2023**
Prothrombin time (s)		20.5	19.8	
INR		1.5	1.42	
PTT		28.2	25.8	
Hemoglobin. g/dL	12.7	11.5	8.8	13.4
Leukocytes ($\times10^3$/uL) D.Dimer	5.5	7.47 1.22	6.85	7.62
Platelets ($\times10^3$/uL)	165	41	62	168
BUN (mg/dL)	6.9	11.95		
Creatinine (mg/dL)	0.9	0.9		0.9
Sodium (mEq/L)	142.3	144		
Potassium (mEq/L)	4.02	4.18		
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***INR- International Normalized Ratio, PTT- Partial Thromboplastin Time**

He was admitted to the High Dependency Unit for ten days. There was no availability initially of antilonomic serum and this patient was transfused with packed cells, fresh frozen plasma, and cryoprecipitate. On day three of admission, he received antilonomic serum sourced from neighbouring Brazil. Afterwards there was significant clinical improvement, and this patient was discharged on day ten.

DISCUSSION

In this case report a European male was exposed to the toxins of the *Lonomia obliqua* caterpillar whilst in a far-out region in Guyana, South America. He presented with symptoms that were not initially recognized as directly related to envenomation.

Within 48 hours he had significant haematuria and ecchymosis associated with

prolonged coagulation times including abnormal prothrombin and partial thromboplastin times.

Renal failure and intracranial haemorrhage are the most severe manifestations described with intracranial haemorrhage being the main cause of death. [9]

Of note there was associated thrombocytopenia which is not usually the case in related envenomation. [10-11]

It is well documented that Lonomia obliqua bristle extract (LOBE) has many biological activities and toxic effects that drive the haemorrhagic syndrome and bleeding complications as described. [5] These patients can present with low levels of fibrinogen, plasminogen, α2-antiplasmin and high levels of fibrinogen/fibrin degradation products and D-dimers. Also, elevated amounts of thrombin–anti-thrombin complex and prothrombin fragments 1 + 2 could be noted. These would indicate activation of the fibrinolytic system and generation of large amounts of intravascular thrombin. [10-11]

Transcriptome and biochemical studies were conducted isolating and characterizing these culprit toxins observed in *Lonomia obliqua* envenomation. Identified are factors II and X activators, α-fibrinogenases, hyaluronidases and a phospholipase A. [9, 12-15] Of these the most studied are Losac and Lopap. Losac is a factor X activator that is dependent on venom concentration and the FXa complex formed integrates the prothrombinase complex. [13] Lopap is a protease that has linear kinetics which activates prothrombin without forming the prothrombinase complex. [12] LOBE also has a pro-inflammatory effect mainly due to the metalloproteases and hyaluronidases, with also Losac and Lopap playing a role in the upregulation of pro-inflammatory molecules. [13,16]

This patient presented with thrombocytopenia which although not common isn't abnormal and can be a marker of severe disease. In one study in Santa Catarina, Southern Brazil 105 patients who had contact with *Lonomia obliqua* caterpillar had their blood coagulation and fibrinolytic factors studied and 97% of them had normal platelets values with a small number with thrombocytopenia. [11] A study in rats showed that *Lonomia obliqua* envenomation causes the generation of a platelet aggregator inhibitor leading to hypo aggregation and hence platelet dysfunction. A small percentage of rats in this study also had thrombocytopenia. [17]

Antilonomic Serum (ALS) is the treatment of choice and was made in Brazil by immunizing horses with LOBE. The extracted serum from these immunized horses proved to be rich in anti-LOBE specific antibodies distributed among the horse IgG isotypes. These antibodies could detect multiple LOBE antigens and neutralize their coagulopathy-inducing activity.

However, in this patient he was not initially treated with antilonomic serum due to its unavailability locally. He received as described both cryoprecipitate and fresh frozen plasma which have been proven to be ineffective due to their thrombotic effects and likely hood to accentuate intravascular coagulation. [13,17] His anaemia was corrected with packed red blood cells which is recommended. [18] Through interhospital efforts the patient was able to receive ALS which was administered on day 2 of admission and had a favourable evolution with coagulation markers returning to normal and resolution of haematuria. Epsilon aminocaproic acid (EACA) was a recommended treatment option prior to the development of ALS. However, in experimental studies this did not improve coagulation profile parameters and was found to have no clinical benefits. [9,18]

CONCLUSION

This case report highlights the importance of being familiar with envenomation caused by *Lonomia obliqua* caterpillars and acknowledges its presence in Guyana. Also, it underscores the need for more familiarity with neighbouring countries' disease patterns as this was once a public health

emergency in Brazil that triggered significant research and the development of ALS which has reduced morbidity and mortality.

Declaration by Authors

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