

Bothrops envenomation and liver hematoma

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Abstract. – OBJECTIVE: To describe a young patient who had a Bothrops envenomation (BE) and evolved with shock and subcapsular liver hematoma. Moreover, a review on BE and liver hematoma was also performed.

PATIENTS AND METHODS: A systematic screening of articles was conducted and all articles on the association between BE and liver hematoma were included. A new case report is added to the published list. The following terms were used: “Bothrops” and “liver hematoma” or “liver hemorrhage.”

RESULTS: This literature search found only one article describing one patient with BE and liver hematoma. We performed our analysis by adding our present case, with a total of 2 cases. Both patients came from Brazil. One of them needed blood transfusions. They both had a good outcome.

CONCLUSIONS: We systematically reviewed all published cases of BE and liver hematoma. It is a rare manifestation of ophidism. Physicians should be alert for patients with shock or abdominal pain after BE; they need to perform an ultrasound to exclude liver hematoma.

Key Words:

Bothrops, Snake envenomation, Liver hematoma, Coagulopathy.

addition, different toxins can act synergistically to induce an effect. Pathophysiological activities of bothropic venom are described: proteolytic, better defined as “acute local inflammatory” coagulant and hemorrhagic⁶.

The systemic manifestations described in bothropic envenoming (BE) occur with “consumption coagulopathy” with or without hemorrhagic manifestations (gingivorrhagia, epistaxis, microscopic hematuria, and ecchymosis). Severe cases are related to systemic phenomena such as severe hemorrhage, including noble organs, shock and/or acute kidney failure^{6,7}.

It should be noted that the diagnosis is clinical and is made immediately after the patient is admitted to the health service; this will determine the number of antivenom vials to be administered to that patient^{6,7}.

Regarding bleeding disorders after a Bothrops accident, local hemorrhage at the inoculation point is expected. However, in severe cases, visceral or central nervous system bleeding may appear. Concerning liver hematoma, there is only one previous description of this severe manifestation⁸.

The purpose of this article is to perform a case report and a literature review on this rare association between BE and liver hematoma.

Introduction

Snakebites are very common worldwide, especially in tropical countries¹. In Latin America, lance-headed vipers (*Bothrops spp*) are responsible for almost 90% of accidents caused by venomous snakes². In Brazil, in 2018, 28,906 cases of snakebites were reported with 106 deaths, an average incidence rate of 14 cases per 100,000 inhabitants³.

Bothropic snake venoms have highly complex action mechanisms, and many toxins, such as metalloproteinase, have multiple activities^{4,5}. In

Patients and Methods

Patient Selection

This is a descriptive case-based review study with retrospective analysis of the medical records of a patient diagnosed with both BE and liver hematoma. Informed consent to publish this case was obtained from the relatives of the patient.

Literature Review

Systematic screening was performed of published articles in PubMed/MEDLINE, LILACS,

SciELO, Scopus, Web of Science, and Cochrane dating from 1940 to February 2021. The following terms were used: “*Bothrops*” and “liver hematoma” or “liver hematoma”. No language restrictions were used. Also, a new case report with the association mentioned above is described in detail. Two authors independently reviewed the articles. In addition, the following information was collected: demographic characteristics (gender, age), clinical and laboratory features (clinical presentation, autoantibodies, symptom onset, and progress), therapy provided, and response to reported therapy. Duplicate, insufficiently detailed, or not sufficiently informative articles were excluded.

Case Report

A snake bit the right finger of a 49-year-old female with a previous history of systemic hypertension. The victim took a photograph of the snake (Figure 1), and the snake was identified as *Bothrops erythromelas* by herpetologists from a



Figure 1. *In situ* photo of the snake causing the accident. It was identified by herpetologists as *Bothrops erythromelas*.

specialized Brazilian WhatsApp envenomation group. She was admitted to the hospital 2 hours after the accident with local pain and edema in the hand and forearm (2 segments), local ecchymosis, and hematemesis. In the Emergency Department, she had a blood pressure of 200x120 mmHg, heart rate (HR) of 95 bpm, respiratory rate (RR) of 20 rpm, an axillary temperature of 36.6°C, and peripheral oxygen saturation of 91% (ambient air). The accident was initially classified as moderate, and she received 8 vials of intravenous antiothropic antivenom (ABAV). After a few hours, she evolved with abdominal pain and decreased hemoglobin to 7.0 g/dL (normal range: 12-16 g/dL) and hematocrit to 21% (nr: 35-47%). Four more intravenous ABAV vials were injected (12 vials are recommended for severe cases in Brazil). Abdominal computed tomography revealed a subcapsular liver hematoma and free liquid in the peritoneum, with a size of 15x10 cm. The patient evolved with cardiovascular shock (blood pressure of 80x60 mmHg, tachycardia (120 bpm)). She received a crystalloid expansion, blood cell concentrate (9 vials), fresh frozen plasma, and 10 mg of vitamin K1 (phytomenadione) intramuscularly. Her prothrombin time (INR) was 3.88 (normal range: 0.9-1.00) (hemoglobin of 4.99 g/dL, and platelets 152,000/mcL).

The Emergency Department staff contacted the Center for toxicological information, and we suggested resuscitation (we advised local antiseptics, tetanus prophylaxis, ICU support, hemodynamic stabilization, resuscitation with crystalloids, we recommended increasing the antivenom dose by 4 vials of ABAV due to severity). She needed norepinephrine for stability but no need for endotracheal intubation. She stopped bleeding. The patient evolved with hemodynamic stabilization, resolution of the hepatic hematoma and was discharged from the hospital 14 days after hospitalization.

Table I summarizes the patients reported with this rare association between *Bothrops* envenomation and liver hematoma.

Discussion

Bothrops is the main genus involved in snake bites in Brazil. Systemic bleeding is a rare complication in snake bites; it is variable but can even cause death. In this sense, we must continually evaluate this possibility in envenomations caused

Table I. All published cases of liver hematoma after *Bothrops* envenomation.

Cases	Age	Gender	Comorbidities	Antivenom therapy	Identification of the agents	Blood transfusion	*Laboratory result	Discharged
1	66	Male	None	7 vials*	Not identified presumable <i>Bothrops</i>	No	INR 3.5 TTPA r = 3,4 Hb 4.5 g/dL Platelets 93.000/cm ³	Discharged 16 days after admission
2	49	Female	Systemic arterial hypertension	16 vials*	<i>Bothrops</i> <i>erythromelas</i>	Yes	TTPa 44 sec Hb 10 g/dL	Discharge 14 days after admission

*Anti-Bothrops antivenom; INR: international normalized ratio; PTT: partial thromboplastin time.

by animals whose venoms affect hemostasis. Although visceral hemorrhage in the abdomen is rare after snakebites⁸, it may not be detected when the bleeding is mild, as it may only cause nonspecific manifestations, such as pain.

The patient initially presented edema in hand up to the elbow (2 segments); the accident was classified as moderate. However, after a few hours, the patient evolved with shock and liver hematoma needing a shock approach with crystalloids, continuous norepinephrine infusion, and persistent severe bleeding requiring blood transfusion.

The time between bite and the start of antivenom treatment is one of the essential factors in severity prognosis and a challenge to be met in remote areas with difficult access where most deaths occur. It is therefore recommended that antivenom treatment is started early to neutralize circulating venom.

One critical aspect of these interventions is the early diagnosis of any local or systemic complication. Our search of the literature found only one previous article⁸ reporting liver hemorrhage. Others^{9,10} were reported in Korea. We performed our analysis by adding our present case, making a total of 2 cases, both from Brazil. One patient was a 66-year-old male, and the other a 49-year-old female. One patient had no comorbidity⁹, and no data were available for the other. One received 7 vials and the other 16 vials of anti-*Bothrops* antivenom. Both patients are alive. One needed nine blood transfusions (Table I).

On admission, our patient was classified as moderate but developed abdominal pain and signs of shock that were quickly suspected as bleeding in the abdominal cavity, and the presence of liver hematoma, which can be fatal if not appropriately treated, was confirmed.

The only previous accident reporting hepatic hematoma was also reported as abdominal pain confirmed by imaging with conservative treatment but without signs of shock, confirming a clotting disorder.

After clinical suspicion, the diagnosis of hepatic hematoma is essential for a definitive diagnosis using sonography, tomography, or magnetic resonance¹¹. In health units that do not have an ultrasonographer, if Focused Assessment with Sonography for Trauma (FAST) is available, its practicality and ease of use in places with restricted diagnostic methods mean that an experienced doctor will be able to detect if there is bleeding in cavities or noble organs that facilitate diagnosis. However, if not available, the patient should be referred to a center with more significant support for diagnosis and management.

Conclusions

The present study reports a rare manifestation of liver hematoma in a patient with BE. It reinforces the necessity for physicians who take care of ophidism victims to consider that patients in shock or with abdominal pain should undergo abdominal imaging. In this case, antivenom therapy was established immediately as well as treatment for shock.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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