



CASE REPORT

Fatal Boomslang bite in the Northern Cape

Hendrik Johannes Krüger^a, Franz Gustav Lemke^{a,b,*}^a Department of Emergency Medicine, Robert Mangaliso Sobukwe Hospital, Kimberley, South Africa^b University of Cape Town, Division of Emergency Medicine, Cape Town, South Africa

A B S T R A C T

Introduction: The authors describe an atypical presentation after a Boomslang bite with rapid progression of symptoms and death.

Case report: A young gentleman was bitten and rapidly decompensated before monovalent antivenom could be administered, with fatal results.

Conclusion: This case highlights the importance of having monovalent Boomslang antivenom rapidly available in all referral centres that may be involved in the management of Boomslang bite victims.

African relevance

- Boomslang bites are relatively uncommon in South Africa; furthermore, there is little literature on the management of these potentially-fatal bites.
- This case study stresses the importance of early access to monovalent antivenom.
- The authors postulate that Boomslang venom toxicity may be dose dependant, and therefore symptoms may progress more rapidly than previously thought.

Introduction

A healthy 25-year-old gentleman was referred to the Robert Mangaliso Sobukwe Hospital Emergency Centre (RMS EC) in Kimberley from a local facility after a snake bite.

Case report

The patient, who arrived at RMS EC from a referral institution at 20h00, stated that he had been bitten on his right hand between 17h00 and 18h00. Initial symptoms included numbness and pain local to the bite. A tourniquet was applied to the right upper arm prior to arrival at the institution. Information obtained later noted that the patient had been bitten twice.

Vital signs were within normal range. Examination revealed two fang marks on the base of the index finger and the first web space, gingival bleeding with bilateral necrotic fingertips, and a necrotic area on the palm of the right hand. The patient oozed from all puncture sites,

which stemmed with difficulty.

At 20h30, the severed head of the snake was identified by a snake expert as a juvenile female Boomslang (*Dispholidus typus*) – Fig. 1. Various experts were consulted and concurred that the presentation was atypical, and that, if the symptoms were due to Boomslang envenomation, the rapid onset was a poor prognostic sign.

The following treatment was recommended until monovalent antivenom could be emergently procured; the plan was initiated within 1 hour of presentation at RMS EC:

- 500 mL of fresh frozen plasma (FFP) administered over 90 minutes,
- Vitamin K 10 mg IVI STAT, and
- Tranexamic acid 1 g IVI over 20 minutes.

At 22h00, an episode of hematemesis was witnessed with blood oozing from mucosal membranes and puncture sites. The patient remained hemodynamically stable and the following were administered:

- Pantoprazole 80 mg IVI administered, and
- 200 ml of freeze dried plasma after FFP.

SAVP (South African Vaccine Producers) had been contacted but, as the antivenom would only be available from SAVP the following day, an interfacility exchange of antivenom was proposed with a tertiary hospital in Gauteng, 550 kilometres away. The patient was also accepted at the tertiary hospital if the antivenom was not able to reach the patient within a reasonable time frame. Attempts were initiated to transfer either the patient or the antivenom.

Relevant special investigations were conducted at this time, with

Peer review under responsibility of African Federation for Emergency Medicine.

* Corresponding author.

E-mail address: glemke@ncpg.gov.za (F.G. Lemke).

<https://doi.org/10.1016/j.afjem.2018.12.006>

Received 15 June 2018; Received in revised form 18 September 2018; Accepted 20 December 2018

Available online 04 February 2019

2211-419X/ 2019 African Federation for Emergency Medicine. Publishing services provided by Elsevier. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).



Fig. 1. Severed head of juvenile female Boomslang (*Dispholidus typus*).

results as follow:

- INR > 6 (unable to clot)
- aPTT: unable to clot
- Platelets: $260 \times 10^9/L$
- Haemoglobin: 14.8 g/dL

At approximately 23h00, the patient became confused (GCS: M5 V4 E4); he was sedated and placed in the recovery position. A differential of intracranial bleed vs. stroke due to microvessel thrombosis was considered.

At 00h00, the patient experienced another episode of hematemesis (GCS unchanged) and was intubated (rapid sequence intubation using suxamethonium and etomidate) for airway protection. Sedation was maintained with a propofol infusion and low dose adrenaline was initiated to maintain an acceptable mean arterial pressure.

As the patient now required ventilation, he was no longer a candidate for transfer to the tertiary facility due to a lack of available critical care beds. The decision was made to transfer the antivenom via road utilizing provincial emergency medical services.

At this time, the patient was critically ill, with ongoing oozing from puncture sites and growing hematomas where blood samples were drawn.

At 01h00, the patient was admitted to intensive care unit (ICU) to await the antivenom. Treatment plan was:

- Administer 500 ml of FFP,
- Administer 200 ml cryoprecipitate, and
- Continue organ support.

Whilst receiving the treatment the patient suffered cardiac arrest in ICU and demised at 01h50. The decision had been made prior to transfer not to initiate CPR due to futility. No post mortem was requested.

Discussion

It should be noted that the treatments described in this case report were intended as temporising measures until the definitive treatment, monovalent antivenom, could be administered. In the absence of timely monovalent antivenom, other additional measures may be undertaken, including:

- Prothrombin complex concentrate administration,
- Fibrinogen administration,
- Faster administration of FFP (15–20 mL/kg at a rate of 20 mL/kg/

hour), and

- Tests for fibrinogen levels and fibrinogen degradation products.

Boomslang bites are much less common than other snakes [1]. Traditionally, it has been taught that there is a window period of 24–48 h after a Boomslang bite to administer antivenom. There is anecdotal evidence that Boomslang venom may be dose-dependent and that symptom onset may be related to the amount of envenomation [2]. The authors hypothesise that this may explain the rapid deterioration seen in this case, due to the second bite. Only eight deaths due to Boomslang envenomation have been recorded since 1957 [3]. Furthermore, in a five year retrospective review done in KwaZulu-Natal [1], there were only four hemotoxic envenomations attributed to the Boomslang requiring monovalent antivenom (4/879). Even so, tertiary and referral centres have a responsibility to effectively treat all patients within reason, and victims of a Boomslang bite should be no exception.

The authors were under the impression that monovalent antivenom is expensive and could be procured with ease when required; this has proven false. A vial of monovalent antivenom costs R2055 [4] when ordered on a non-emergent basis, compared to polyvalent antivenom, which costs R1247. Since eight to twenty vials of polyvalent antivenom is required to treat a patient with a symptomatic snake bite and only one or two vials of monovalent antivenom are required to treat a Boomslang bite, treating a patient for a Boomslang bite is actually more cost-effective. The cost of the monovalent anti-venom rises to R6500 per vial when it has to be dispatched emergently.

Furthermore, the SAVP is not an emergency service and whilst someone is on standby to dispatch the antivenom, delays in communication may occur. The availability and type of transport should also be taken into consideration.

Boomslang bites produce a consumptive coagulopathy [5] and symptoms are usually described between 6 to 36 hours [6], though abnormal clotting profiles within two hours after envenomation have been reported [7]. Although the patient's initial platelet count was normal, signs of peripheral thrombosis associated bleeding would support the diagnosis of haemotoxic envenomation, as would the abnormal coagulation screen.

This case report serves as strong evidence for referral facilities in Boomslang-endemic areas to consider stocking at least two vials of monovalent antivenom. Contrary to the general belief, it is cost-effective, easily procurable, and lifesaving.

Conflicts of interest

The authors declare no conflicts of interest.

Authors' contributions

Authors contributed as follows to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: FGL and HJK both contributed 50% each. All authors agree to be accountable for all aspects of the work in ensuring that any questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References

- [1] Wood D, Sartorius B, Hift R. Snakebite in north-eastern South Africa: clinical characteristics and risks for severity. *S Afr Fam Pract* 2016;58(2):62–7.
- [2] James T, Town C, Isaacson M. Boomslang bite – time of onset of clinical envenomation. *S Afr Med J* 1989;76(1):39–40.
- [3] Snake Facts. Boomslang [Internet] South Africa. Cited 2018 Aug 27. Available from: <https://snake-facts.weebly.com/boomslang.html>.
- [4] South African Vaccine Producers, Pricelist. Accessed on the 2 Feb 2018. Available from: www.savp.co.za.
- [5] Blaylock RS. The identification and syndromic management of snakebite in South Africa. *Fam Pract* 2005;47(9):48–53.

- [6] Wagener M. Haemotoxic snakebite in rural KwaZulu-Natal, South Africa: a case presenting with haematemesis. *S Afr Med J* 2016;106(5):459–60.
- [7] Gomperts ED, Demetriou D. Laboratory studies and clinical features in a case of boomslang envenomation. *S Afr Med J* 1976;1977:3–5.