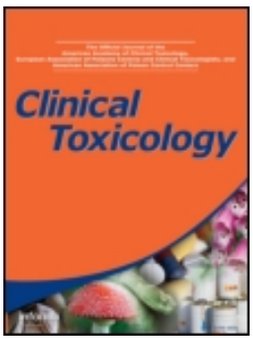

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SHORT COMMUNICATION

Clinical presentation and management of an Aruban rattlesnake bite in the Netherlands

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ABSTRACT

Bites by Aruban Rattlesnake (*Crotalus durissus unicolor*) are rare and not known to induce severe envenomations. Here, we present a case of a 57 year-old man bitten by his pet Aruban Rattlesnake (*Crotalus durissus unicolor*). He was admitted to hospital within 15 min. Three and a half hours later his fibrinogen concentration decreased to 0.6 g/L (normal: 2.0–4.0). Nine hours post-bite, he was treated with polyvalent snake antivenom covering *Crotalus durissus*. Three hours later his fibrinogen became undetectable while at that time clotting times were prolonged (PT 38.7 s (normal: 12.5–14.5) and aPTT 40 s (normal: 25–35)). His platelet count remained within normal limits. Creatine kinase (CK) concentrations reached a maximum of 1868 U/L (normal: <200) 16 h post-bite. After a second antivenom dose, 10.5 h after the first antivenom administration, clotting times returned to normal. Fibrinogen was restored to normal within three days. He was discharged from hospital on day five. In conclusion, administration of polyvalent snake antivenom covering *Crotalus durissus* snakebites shows cross-neutralization and is effective in the treatment of patients bitten by *Crotalus durissus unicolor*.

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Introduction

Admission of an exotic venomous snakebite victim at an Emergency Department (ED) is a rare event. In the Netherlands, it is allowed to keep venomous animals, provided they are kept in a non-dangerous manner. However, accidental bites, mostly involving the owners of these animals, do occur. Each year, the Dutch Poisons Information Center (DPIC) is consulted about 4–6 venomous exotic snakebites.[1] The DPIC offers information on the clinical presentation of envenomations and treatment, including the choice of and criteria for antivenom treatment. The DPIC assists in ordering the antivenom from the Dutch National Serum Depot, part of the National Institute for Public Health and the Environment.[1] Here, we present a case of an amateur herpetologist bitten by an Aruban rattlesnake.

Case report

A 57-year-old man was bitten in his right index finger while feeding his 1.5-year old Aruban rattlesnake. Paramedics reported that he fainted a few times during transport to the hospital. However, upon arrival at the ED 15 min post-bite, his blood pressure was 151/84 mmHg, pulse 95/min, respiration 23 breaths/min, with a saturation of 99% on room air. He complained about nausea and pain in his finger. Physical examination revealed two bite marks, and mild swelling and erythema of the proximal phalanx. The DPIC was consulted to discuss this envenomation, as well as criteria for antivenom treatment.[2] The DPIC advised and assisted in ordering antivenom (Antivipmyn TRI, Institute Bioclon, Mexico), a polyvalent antivenom containing equine derived lyophilized antibody fragments (Fab2) against *Crotalus durissus* venom. Meanwhile, the patient was transferred to the intensive care unit (ICU) for observation. Three and a half hours post-bite his leukocyte count was 14.1×10^9/L (normal: 4.0–10.0), thrombocyte count 288×10^9/L (normal: 150–400), fibrinogen 0.6 g/L (normal: 2.0–4.0), prothrombin time (PT) 10.8 s (normal: 12.5–14.5), and activated partial thromboplastin time (aPTT) 28 s (normal: 25–35). He still experienced nausea and local pain; the swelling had progressed to his entire hand. Twelve vials Antivipmyn TRI were diluted and administered intravenously 9h post-bite. Three hours later, fibrinogen was undetectable (<0.6 g/L), PT 38.7 s, aPTT 40 s (Table 1). Additional antivenom was ordered. Meanwhile, 4 h later, his creatine kinase (CK) reached a maximum of 1,868 U/L. Edema had progressed to the underarm, but the overall condition of the patient did not deteriorate any further. Another six vials of antivenom were administered 10.5 h after the first antivenom dose. Thereafter, clotting times recovered completely. Fibrinogen was within normal limits three days post-bite. He was discharged five days post-bite with some remaining paresthesia and hyperesthesia at the bite site. Soon after discharge, he developed a local infection at the bite site which was treated with antibiotics (type unknown). Six months later, local hyperesthesia at the bite site still persisted.

Discussion

Following the bite of an Aruban Rattlesnake, this patient developed snake venom induced coagulopathy consisting of

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Table 1. Laboratory features in relation to time post-bite and after antivenom administration.

Time post-bite (h)	<0.5	3.5	9.25	10.25	12.25	16.5	18.75	21.25	25.25	27.5	33.5	43.0	70.25
Blood coagulation tests													
PT[c] (RV 12.5–14.5 s)	12,4	10,8		–	38.7	23		16.8	15.5	15.2	14.8	14.3	12.7
aPTT[a] (RV 25–35 s)	31	28		–	40	32		29	28	27	29	29	28
Fibrinogen (RV 2.0–4.0 g/L)	3.6	0.6		–	n.d.[b]	n.d.[b]		n.d.[b]	0.7	–	1.0	1.3	2.1
Platelet count (RV[d] 150–400 × 10^9/L)	303	288		280	272	276		260	264	282	266	280	298
WBC[e] (RV[d] 4.0–10.0 × 10^9/L)	6.5	14.1		13.1	8.3	–		–	–	–	–	7.1	7.2
Creatine kinase (CK) (RV[d] <200 U/L)	118	–		–	1427	1868		1,620	–	–	–	–	–
Antivenom			12 vials				6 vials						

[a]aPTT: activated partial thromboplastin time; [b]n.d.: not detectable; [c]PT: prothrombin time; [d]RV: reference value; [e]WBC: whole blood count.

undetectable fibrinogen concentrations with normal platelet count. He was successfully treated with polyvalent snake antivenom covering *Crotalus durissus*.

In its natural habitat (Aruba), the Aruban Rattlesnake is a critically endangered species. Originally, this snake was considered to be an isolated species (*Crotalus unicolor*) but more recently it is considered a subspecies in the *Crotalus durissus* complex.[3] Clinical presentation of *Crotalus durissus* snakebite (most often the subspecies *C. d. terrificus*) in Brazil is well known. Bites are characterized by mild local injury and frequently severe systemic manifestations. The venom of this (sub)species possesses neurotoxic, myotoxic, and haematotoxic effects. The coagulant activities of the venom triggered by thrombin-like enzymes may lead to undetectable fibrinogen concentrations and blood incoagulability in 40–50% of the cases. These effects develop on average within 12 h after the bite.[4,5] Crotoxin, a major component of *C. d. terrificus* venom is a potent presynaptic neurotoxin that produces neuromuscular blockade and progressive flaccid paralysis, and may also induce severe myotoxic effects, causing rhabdomyolysis, characterized by generalized myalgia and myoglobinuria.[6] Acute kidney injury (AKI) is a major complication in *Crotalus durissus* snakebite victims and is related to a direct nephrotoxic effect of the venom, intensive vasoconstriction of renal vessels leading to hypoperfusion of the kidney, and to rhabdomyolysis. The prevalence of AKI after *Crotalus durissus* bites is reported to be as high as 29% and acute renal failure (ARF) 7%.[5] Early antivenom administration in adequate doses reduces the risk of the development of AKI and its progression to ARF.

Probably due to its docile nature, there is hardly any bite descriptions of the Aruban rattlesnake (*C. d. unicolor*) reported in (medical) literature. Hardy reported four patients bitten by *C. d. unicolor*, one of them bitten nine times at distinct occasions.[7] This particular victim remained at home after all bites and in a few cases blurred vision, muscle weakness, paresthesia, and hyperesthesia were reported. These symptoms are all indicative of neuromyotoxicity, similar to that described for patients bitten by *C. d. terrificus*, but due to the lower content of crototoxin, not as severe.[7,8] We were able to find one bite report in the French medical literature. Except for local pain and edema, this envenomation was dominated by coagulopathy with prolonged clotting times and undetectable fibrinogen. This patient was also effectively treated with Antivipmyn TRI.[9] In general, probably any available polyvalent snake antivenom covering *Crotalus durissus ssp.* may be considered for the treatment of patients with systemic envenomation by *C. d. unicolor*, including the Venezuelan antivenom.[10]

As there is only limited clinical information available concerning bites by this subspecies *C. d. unicolor*, we assessed this case as a *Crotalus durissus* bite. Therefore, in this patient with undetectable fibrinogen concentration, it was decided to treat the patient with Antivipmyn TRI, a polyvalent antivenom produced with *Bothrops asper*, *Crotalus durissus* and *Lachesis muta* venom, before systemic manifestations would become manifest. Due to the prolonged clotting disturbances, the lack of experience with this specific snake species and the absence of adverse reactions after the first antivenom administration, it was decided to provide a second batch of antivenom. Antivenom treatment resulted in recovery of the clotting times. Fibrinogen concentration was within normal limits in three days which is probably unrelated to the additional antivenom dose. Recovery of fibrinogen by endogenous production will be visible >12 h after antivenom administration.[4]

In conclusion, the administration of a polyvalent snake antivenom covering *Crotalus durissus* was useful in the treatment of a patient bitten by *C. d. unicolor* who developed coagulopathy and mild rhabdomyolysis.

Disclosure statement

The authors report no declarations of interest.

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