A RARE CASE OF MULTIPLE RATTLESNAKE BITES

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Abstract
The rattlesnake (Crotalus adamanteus) is a venomous viper inhabiting the southeastern parts of the United States. It is not found in the Balkans and Europe habitats. Subjects of the species are grown and seen in museums, exhibitions and terrariums, and sometimes in private collections. This may generate potentially toxic exposures to the venom in accidental contact. Acute poisoning with rattlesnake poison in Bulgaria is exotic, rare and even casuistic.
The venom of the rattlesnake exhibits neuropathic, proteolytic and hemolytic activities. Antivenom is not currently easily available in Bulgaria – it is not usually stored in hospitals because it is very rarely used and therefore rather expensive.
We present a case of multiple envenomation (two different occasions) of one and the same person who kept rattlesnakes in a private terrarium.
Local toxic syndrome was observed with burning and stinging pain at bite site combined with limited hemorrhage and necrosis. The hemolytic reaction and the local toxic results were successfully managed without resorting to any specific antidotal therapy.

Key words: Crotalus adamanteus, rattlesnake envenomation, favourable outcome

Introduction
The rattlesnake (Crotalus adamanteus) is a venomous viper inhabiting the southeastern parts of the United States. This species has the reputation of being the most dangerous venomous snake in North America.¹ Europe is not the natural habitat of the snake. Until a few years ago rattlesnake bites were virtually unknown in Europe. But the biodiversity of European household fauna has changed: cats and dogs are increasingly replaced by stingrays, tarantulas, fire fish and rattlesnakes.² Subjects of the rattlesnake species are grown and seen in museums, exhibitions and terrariums and sometimes in private collections. This may generate potentially possible toxic exposures to the venom in accidental contact. All in all rattlesnake poisoning is an exotic and rare casuistic event in Bulgaria.

We present two episodes of envenomation of one and the same person – a qualified herpetologist who bred a rattlesnake (Crotalus adamanteus) in a private terrarium for 18 months.

Case Study
The first envenomation
A 29-year-old Caucasian male (I. ZH. K., History of disease № 60000/480, Oct. 30, 2011) was admitted to the Clinic of Toxicology on an emergency basis about an hour after he had sustained accidentally rattlesnake bite and subsequent envenomation. According to the patient’s medical records he had a history of congenital bladder anomaly; the man presented with bilateral hydronephrotic kidney, chronic pyelonephritis, meningocele, postoperative lower limbs grade II paresis and cephalosporin allergy. The man complained of severe pain at the bite site and of strong general weakness.
The bite wound bled and a local toxic syndrome was observed: haematoma and edema of the right 3rd finger, lymphangitis and enlargement of the axillary lymph nodules. The edema progressed quite rapidly.
The physical examination showed the man to be alert, his skin was pale in colour, he had normal...
pupils, vesicular breathing without wheezes and additional sounds, regular pulse, heart rate of 85 bpm, and normal blood pressure of 115/85. Heart sounds were normal, the abdominal walls were soft and painless; we found no hepatosplenomegaly, the abdominal sounds were normal. There was a suprapubic fistula and old postoperative scar in the lumbar region and compensated paraparesis of the lower limbs.

Laboratory studies: EKG, normal; arterial blood gasses, normal; \( \mathrm{O}_2 \) saturation, 95%; glucose, 4.5 mmol/l; creatinine, 7.4 μmol/l; proteins, 67 g/l; AST, 44 U/l; ALT, 25 U/l; K, 3.8 mmol/l; Na, 145 mmol/l; Cl, 108 mmol/l; Ca, 2.01 mmol/l (Table 1).

<table>
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<tr>
<th>Parameter</th>
<th>Days</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<td>132</td>
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<td>138</td>
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<tr>
<td>Er</td>
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<td>Leuc</td>
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<tr>
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<td>6</td>
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<td>-</td>
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<td>-</td>
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<td>-</td>
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* International normalized ratio.

**TREATMENT AND PROGRESS OF THE CONDITION**

The blood hematoma was surgically excised to achieve decompression, then the wound was aseptically dressed and local cryotherapy was administered. Tetanus antitoxin, plasma volume expanders and crystalloid solutions were infused. Endothelial and coagulation protective therapies were administered with methylprednisolone, vitamin K, and dicynone; the patient received calcium preparations.

A necrotic area developed at the bite site, the adjacent area was pale in colour and cold. Two days later the patient improved and was discharged on day 5.

**THE SECOND ENVENOMATION**

The same patient was admitted to hospital on March 30, 2012 for a snake bite in the left forearm by the same reptile. There was a scratch in the skin and well pronounced swelling, local lymphangitis and axillary lymphadenitis. The patient complained of extreme pain in the arm. There were no other physical pathological findings (Table 2).

**DISCUSSION**

Generally not aggressive, rattlesnakes are large and powerful. The mortality rate of snake bites is in the range of 10 – 30%. JH Brown gives the average dry venom yield from the snake to be 410 mg, LD₅₀ - 1.3–2.4 mg/kg i.v., 1.7–3.0 mg/kg i.p. and 14.5–10 mg/kg s.c. for toxicity. The estimated human lethal dose is 100–150 mg.

The venom contains a thrombin-like enzyme, called crotalase, that is capable of clotting fibrinogen, leading to the secondary activation of plasminogen.
from endothelial cells, a reduced platelet count and hemolysis of red blood cells. Even with this defibrination, however, clinically significant bleeding is uncommon. Nevertheless, the venom does exhibit high hemorrhagic activity. It is believed that the poison contains a low-molecular-weight basic peptide that impedes neuromuscular transmission and can, in theory, lead to cardiac failure. In general, the venom can be described as highly necrotizing, mildly proteolytic and containing a large phosphodiesterase fraction. It stimulates the release of bradykinin that can result in severe pain, as well as profound, transient hypotension.5 LM Klauber describes the symptoms as including instant pain ‘like two hot hypodermic needles’, spontaneous bleeding from the bite site, intense internal pain, bleeding from the mouth, hypotension, a weak pulse, swelling and discoloration of the affected limb and associated severe pain; the symptoms are strongly hemolytic and hemorrhagic.6 The clinical presentation of the envenomation in the two consecutive episodes in one person in our study revealed typical signs and symptoms of the intoxication, but mild to moderate grade of severity. The case presented herein is consistent with the results of an epidemiological study in Germany and France, in which minor pathological changes were found (according to the Poisoning Severity Score in 78.7% and 8 of 23 cases of envenomation).2 There were no other unusual findings – there were angioedema, bronchial spasm7 or recurrent coagulopathy8 as other authors have found. We were not able to follow up the patient due to his refusal. The patient received no antivenom therapy because antivenom was not available. The specific rattlesnake antivenom is not easily obtainable now in Bulgaria, it is not kept in storage due to its high price and the extreme rarity of usage. The hemolytic reaction and the local toxic results were successfully managed without any antidotal therapy mainly because of the small quantity of the injected poison in the episodes. There were no allergic reactions, either.

CONCLUSIONS
Rattlesnake bites are rare in Europe, but the incidence is rising. European doctors should be aware of the increase in these envenomations. Toxic envenomation may occur even in skilled herpetologists.

REFERENCES
РЕДКИЙ СЛУЧАЙ ДВУХ ПОСЛЕДОВАТЕЛЬНЫХ УЖАЛЕНИЙ ГРЕМУЧЕЙ ЗМЕИ - CROTALUS ADAMANTEUS
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РЕЗЮМЕ
Гремучая змея - Crotalus adamanteus, сильно ядовитая змея, живущая в юго-восточных частях США. В Европе, и в частности на Балканском полуострове, она не встречается. Некоторые экземпляры однако откармливаются в музеиных террариумах, а в последнее время и часто в качестве домашних любимцев. Этот факт создает возможность для случайных отправлений. Острая интоксикация ядом гремучей змеи в Болгарии представляет казуистическую редкость. Яд гремучей змеи нейротоксический, протеолитический и гемолитический. В Болгарии нет наличных и легко доступных для получения антитоксинов; таких и не сохраняются из-за исключительной редкости отправления, а также и из-за их высокой цены.
Авторы представляют случай двух последовательных ужалений у одного и того же лица, частно откармливающего змею. Налицо оказался локальный токсический синдром – сжигающая пронизывающая боль в месте ужаления; впрыскивание яда с ограниченной геморрагией и с некрозом. Токсические проявления преодолели успешно без применения противоядия.