

## Special Article – Surgery Case Reports

# Snake Antivenom, Anaphylaxis and Afterwards: Case Report

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## Abstract

**Introduction:** It is estimated that more than 2.5 million people are bitten by snakes each year, resulting in about 100,000 deaths and 400,000 amputations worldwide. Only about 15% of more than 3000 species of snakes are dangerous for human body.

**Case Presentation:** A 27-year old female patient was admitted in a local hospital after having been bitten on inner side of the thigh by a snake. This report describes a case of anaphylaxis resulting in necrosis after antivenom administration. The development of grade II and III envenomation needs a few hours. It has 10% risk of anaphylaxis with snake antivenom which is performed only for grade II or III envenomations.

**Conclusion:** Therefore snake antivenom treatment should be performed only in a well-equipped hospital and under specialist physician supervision. Otherwise the antivenom administration may lead to worse clinical complications than snake venom alone.

**Keywords:** Snake bite; Antivenom; Anaphylaxis

## Introduction

It is estimated that more than 2.5 million people are bitten by snakes each year, resulting in about 100,000 deaths and 400,000 amputations [1]. Worldwide, only about 15 % of the more than 3000 species of snakes are dangerous to human life [2]. In Turkey, 46 species of snake are present and 16 of them are considered venomous. *Vipera ammodytes meridionalis* and *Vipera lebetina obtusa* are the most common venomous snakes inflicting bites in the southern part of Turkey [3]. Snakebites can lead to different levels of toxicity, depending on several factors; snake species and size, amount of venom injected, location of bite, type and timing of medication and previous medical history of patient [2]. Envenomation due to snakebites may presented with different clinical manifestations including puncture wounds, pain, ecchymosis, lymphangitis, hemorrhagic bullae, necrosis, multiple organ failure and hemostatic disturbances [4]. Traditional management of snakebites consists of aggressive supportive care including analgesia, fluid replacement, antibiotic administration and extremity elevation. Antivenom therapy is the mainstay of this treatment. However, it has been previously reported that antivenom administration, a polyvalent immune FabAV, may lead to acute allergic reactions, with an incidence of approximately < 10% [5]. Anaphylaxis is a medical emergency requiring immediate diagnosis and treatment. It can be manifested by relatively minor signs and symptoms and may progress to a life-threatening respiratory and cardiovascular collapse. This report describes a case of anaphylaxis resulting in necrosis after antivenom administration.

## Case Presentation

A 27-year old female patient was admitted in a local hospital after having been bitten on inner side of the thigh by a snake. Initially, the patient had normal vital signs except local swelling, tenderness

and puncture marks on the bite region. After 1flacon antivenom (viper venom antiserum, European (equine) Institute of immunology, Zagreb, Croatia) was administered intramuscularly into the right gluteal muscles, then the patient was referred to our hospital since the local hospital was not well-equipped.

Seventy minutes after antivenom administration, the patient was admitted to our emergency department. Clinical examination revealed a lethargic patient with cool skin, blood pressure 60/40 mmHg, heart rate 113/min, and respiratory rate 24/min. There was a hematoma measuring 8x10 cm on inner side of the thigh with extensive soft tissue edema.

Laboratory investigation results were; blood glucose, 106 mg/dL; HCO<sub>3</sub><sup>-</sup>, 11.9 mEq/L; pCO<sub>2</sub>, 26 mmHg; pO<sub>2</sub>, 103 mmHg; oxygen saturation (saO<sub>2</sub>), 87%. Other biochemical, hemogram and coagulation parameters were normal. In blood gas analyses, there was a lactic acidosis with high anion gap (pH, 7.16; lactate, 6mmol/L; anion gap, 16.9).

Based on all these clinic and laboratory parameters, we considered that patient had an anaphylactic reaction to antivenom with grade I envenomation. The following treatment was given: oxygen through oronasal mask, 6L/min; epinephrine 0.5 mg was given intramuscularly and then 1 mg epinephrine plus 100 cc isotonic sodium clorur infused over one hour; fluid replacement therapy, isotonic sodium clorur 1000 cc was given in 30 min. 1 ampoule antihistaminic (phenyramine maleate), 1 ampoule raniytidine and 80 mg methylprednisolone were administered intravenously.

The patient was re-evaluated after first hour of treatment; blood pressure 90/60 mmHg, heart rate 123/min, respiratory rate 20/min and saO<sub>2</sub> 93%.



**Figure 1:** A necrotic lesion.

Subsequent maintenance therapy was given as follows: intravenous fluid replacement therapy at a dose of 40cc/kg, nasal oxygen 4L/min, epinephrine infusion 1 µg/min, 3x1 ampoules of 20 mg phenyraminemaleate, 4x1 ampoules of 50 mg ranytidine, 1 ampoule of 80 mg methylprednisolone, 2x1 ampoules of 1.2 g amoxicilline-clavulanic acid for antibiotherapy and tramadol hydrochloride for pain control were administered intravenously and the patient was transferred to the intensive care unit. The patient's general condition and vital signs were remarkably improved within 24 hours. On the third day of hospitalization, a necrotic lesion measuring 20x15 cm was occurred at the bite region and the patient was transferred to the plastic surgery department for surgical operation (Figure 1). Before operation, 2 units of erythrocyte suspension because of a hemoglobin level of 7.8 gr/dl. After three surgical debridements with an interval of three weeks and tissue grafting, the patient was discharged home in a good general condition on the 42<sup>th</sup> day of admission.

## Discussion

Snakebites are rarely seen in emergency departments but its prevalence is relatively higher in rural areas, particularly during the hot summer season, when snakes and victims are most active [6]. Venomous effects are the main determining factor and vary between snake species [7]. Venoms of Crotalidae and Viperidae snakes have more hemotoxic and necrotoxic properties [3]. In this case study, the snake was identified as a member of the viperidae family.

Snake venom has various toxic effects on the bitten region and on the whole body [8] including local pain and swelling at the bitten site, life-threatening disorders such as bleeding and coagulation disturbances, renal failure, and shock [9]. Applying an appropriate first aid and an effective treatment can decrease the mortality ratios. Therefore, the grade of the disease should be determined at first, and abnormal vital signs should be treated rapidly and the patient should be monitored for at least 12 hours at the emergency department [10].

Envenomation severity was clinically divided into four grade taking into consideration clinical symptoms and/or laboratory data as follows; grade 0, dry bite with no envenomation and no symptoms or signs; grade 1, inflammatory edema within a few minutes, immediate pain at the bite site. Most envenomation stabilizes at grade 1 then regress spontaneously within 24–72 h.; grade 2, symptoms can develop either rapidly (early grade 2) with the appearance of hypotension in the first 30 min after snake biting or over a period of 6–16 h (classic

grade 2) with extensive swelling, minimal systemic envenomation and laboratory findings and sometimes general symptoms and hemostatic disturbances; grade 3, symptoms can develop from progressive swelling including trunk to systemic symptoms, coagulopathy after grade 2 symptoms lasting for several hours [11,12].

The most effective treatment of snakebites is the administration of antivenom promptly to the patient who has evidence of progressive signs and symptoms (grade 2 and 3). The antivenom binds and neutralizes the venom [6]. Removal of those toxins through the use of antivenom may facilitate a return to normal hemostasis. Of course, antivenom cannot repair injuries due to coagulopathy.

Antivenom contains heterologous proteins that monovalent horse antivenom is generally used to treat snake bite in Turkey and may cause acute allergic reactions with an incidence of approximately < 10% [5]. Therefore, antivenom must be carefully administered under medical supervision [5]. A delay in clinical diagnosis and treatment of anaphylaxis may result in death by airway obstruction or vascular collapse. In literature, the mortality rate of 1% for anaphylaxis has been reported previously [13].

Similar snake species are encountered in southern part of our country. No mortality was reported in four study from this part of our country done by Zengin et al. (204 patients), Karakuş et al. (125 patients), Al et al. (79 patients) and Açıkalın et al. (45 patients) and all patients were followed at the hospital in these studies [14-16].

Antivenom administration may lead to serious anaphylactic reactions. Ayça et al reported that 34 patients out of 45 were treated with antivenom therapy and anaphylactic shock occurred in 8.9 percent of the patients [11]. In another study from Turkey, Karakuş et al. reported that anaphylactic shock incidence in patients receiving antivenom therapy was 1.6 percent of all subjects (n=125) [14]. All patients were treated in the hospital and no mortality was observed due to anaphylaxis in both studies. In the present case, based on all these clinic and laboratory parameters, we considered that patient had an anaphylactic reaction to antivenom with grade I envenomation.

As a conclusion, because of envenomation grade II and III take several hours to progress after snakebite, antivenom administration should be avoided in snake bites before although it has hemotoxic and necrotoxic properties. Antivenom treatment should be performed only in a well-equipped hospital and under specialist physician supervision. Otherwise the antivenom administration may lead to worse clinical complications than snake venom.

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