

# An Unusual Localization of Snakebite Treated without Antivenin:

## Case Report

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### Abstract

Snakebite is one of the commonest causes of morbidity and mortality in tropical regions. This paper focuses on the medical treatment of a patient who had been bitten by a snake on the vertex of his head. It was a severe envenomation with ensuing marked edema associated with coagulation abnormalities. Although the antivenin was extensively sought in various medical centers, it was unavailable. We observed and treated the patient, with special regard to his hematological findings and potential complications. Specifically, tetanus prophylaxis and intravenous fluids were administered, and the wound was cleaned and dressed. Fresh frozen plasma was also administered. The patient responded well, and was discharged on the fourth day of his admission, without any sequelae.

**Key Words:** Antivenom, antivenin, envenomation, snake, snakebite, treatment.

### Introduction

TREATMENT WITH ANTIVENIN derived from polyvalent snake venom is considered the standard of care in Turkey for the treatment of moderate or severe snake envenomation. A number of reports indicate that most poisonous snakes living in Turkey belong to the *Viperidea* and *Elapidea* families, and that venoms of these snakes can affect the blood coagulation mechanism of their prey (1). Viper venom antivenin is prepared from the purified plasma of healthy horses that have been immunized against the most dangerous vipers. The efficacy of polyvalent antivenin has been demonstrated in animal studies, but there is still controversy regarding its appropriate use in humans (2). Many authors have published antivenin-dosing regimens for the treatment of snake envenomation (3). Nevertheless, many physicians delay giving

treatment, or they give too small a dose of antivenin, for fear of the dangerous side effects (2).

In this article we report a severe envenomation in a patient who was treated successfully without antivenin in an emergency department.

### Case

A fifteen-year-old male patient was admitted to the emergency department three hours after he had been bitten on the vertex of his head by a snake while he was drinking water from a stream. Physical examination revealed remarkable nonpitting edema on his face and two adjacent fang marks on the vertex of his head. His relatives also had produced a laceration with a sharp knife near the fang marks while giving him "traditional" first aid. The laceration was only on the surface of his scalp.

His vital signs were: blood pressure 100/60 mm Hg, pulse rate 112bpm, respiratory rate 22, and temperature 36.3°C. He was lethargic. There was a marked edema including partial ecchymotic areas from his face through his neck (Fig. 1). His laboratory findings were as follows: blood urea nitrogen 18 mg/dL, creatinine 0.7 mg/dL, glucose 192 mg/dL, sodium 137 mmol/L, potassium 4.5 mmol/L, chloride 105 mmol/L, total bilirubin 0.9

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**Fig. 1.** Photograph of the patient on admission.

mg/dL, indirect bilirubin 0.2 mg/dL, aspartate aminotransferase 48 u/L, alanine aminotransferase 34 u/L, lactic dehydrogenase 965 u/L, amylase 48 u/L, hemoglobin 14.9 g/dL, hematocrit 44.3%, white blood cells 20,400 u/L, erythrocytes 5,500,000 u/L, and platelets 94,000 u/L. Coagulation studies disclosed prothrombin time as 20 sec, international normalized ratio 2.8, fibrinogen 130 mg/dL, and fibrin-degrading products > 500 ng/dL. The patient's arterial blood gas analyses were normal. Urinalysis revealed minimal hematuria. Chest x-ray and electrocardiogram revealed no pathology. With these findings, he was hospitalized and diagnosed as having a grade three snakebite. Although we decided to administer antivenin, the agent was not available locally. Tetanus prophylaxis and intravenous fluids were administered, and the wound was treated with local cleansing and dressing. We administered fresh frozen plasma because of his coagulation abnormalities. His hematological parameters were closely observed. After 12 hours, coagulation tests



**Fig. 2.** Photograph of the patient after treatment.

were normal. On the second day, his edema subsided; on the third day, local wound findings and edema were completely healed (Fig. 2). He was discharged on the fourth day of hospitalization.

### Discussion

Although uncommon, venomous snakebites are potentially lethal emergencies. Venomous snakes can be classified as having either hematoxic or neurotoxic venom (4). Clinical effects of snakebites range from mild local reactions to life-threatening systemic reactions, depending on the species and size of snake involved; the location of the bite; the volume of venom injected; and the age, size and health of the victim (5). Patients with snakebites must be admitted and treated as true emergency cases, and the mainstay of hospital treatment for venomous snakebite is antivenin (6). The general indications for the administration of

antivenin are progression of the injury, worsening local injury, and clinically important coagulation abnormalities or systemic effects (7). Of the 53 species of snakes native to Turkey, 2 species are dangerous. These species belong to the *Viperidea* and *Elapidea* families, which are also called pit vipers (1, 8). Pit viper snake venoms are hematoxic. Biochemically, the venom consists of proteins, polypeptides and enzymes that cause necrosis and hemolysis. Most pit viper bites induce pain within five minutes, and local swelling is marked soon after. Symptoms of hematologic involvement and systemic reactions (including a syndrome similar to disseminated intravascular coagulation, acute renal failure, hypovolemic shock and death) may recur (7). These patients must receive antivenin, because no other treatment can reverse the venom's effect (9).

The emergency management of snakebites in our department consists of cleaning the wounds, administering tetanus toxoid or immunoglobulin for under- or non-immunized patients, marking the leading edge of the swelling and recording the time of observation, and measuring the circumference of the affected extremity every 30 minutes. If there is no proximal progression of local injury on the extremity and no coagulopathy after 12 hours of clinical observation and serial laboratory examination, the patient can be discharged home with follow-up instructions. These instructions strictly stress that the patient must return to the physician if there is any increase in pain, redness or swelling; faintness; shortness of breath; or diaphoresis. Antivenin is administered to patients with moderate or severe envenomation, unstable patients (i.e., those with hypotension, severe coagulopathy, respiratory distress), and when there is a progression in the wound or hematological parameter during observation. We use horse-derived antivenin in our department. The dosage is 2–4 vials for mild envenomation, 5–9 vials for moderate cases and 10–15 vials for severe ones. If new manifestations appear, we administer an additional 1–5 vials titrated to effect.

The presumption of efficacy for antivenin is based on animal studies, several retrospective studies, and numerous case reports (10). However, the use of antivenins has been questioned because of a hypothetical unfavorable risk/benefit ratio (11). The primary risks associated with the use of antivenin are anaphylaxis and serum sickness (10). In retrospective studies, rates for acute allergic reactions (including hypotension and anaphylaxis) from antivenin administration range from 23–56%, with even higher rates for delayed serum sickness (10). However, neither the risks nor the benefits have been studied prospectively (10).

The efficacy and relative safety of antivenins have been demonstrated in randomized trials (12), but most physicians believe it is dangerous to treat snakebites using polyvalent antivenin because of the high risk of anaphylaxis (2, 13). Although the actual incidence of side effects of snake antivenin is unknown, in one review of 26 patients receiving antivenin, type 1 hypersensitivity occurred in 6 patients (23%) and type 3 hypersensitivity occurred in 13 (50%). This study suggested that the incidence of serum sickness was related to dose in 83% of patients given more than 8 vials of antivenin (14). The findings of that study, together with other reports, have understandably led to concern about using polyvalent antivenin therapy and a reluctance by clinicians to administer this potentially beneficial treatment (14, 15). In another study, Dart et al. summarized eight studies designed to monitor acute and delayed reactions to the antivenin (10). In this study, 78% of 592 patients were treated with antivenin. In the treatment group, 79 patients experienced acute reactions to the antivenin (mostly urticaria) and 13 of these experienced hypotension; no deaths attributed to anaphylaxis were reported. Even though the authors themselves were aware of three deaths from anaphylaxis, they noted that no such deaths had actually been published in the medical literature (10). The study by Offerman et al., however, suggests that fears about the antivenin are unfounded (2). In this retrospective study of 73 patients, of the 12 patients who experienced acute reactions to the antivenin, the reactions of 11 consisted solely of urticaria; only one patient developed hypotension, which required a short course of epinephrine. They noted that anaphylactic shock is extremely rare in the treatment of snakebites with antivenin (2).

Our patient did not receive antivenin because it was not available in our emergency department at the moment it was needed. The management of the patient consisted of close monitoring and supportive care. Coagulation abnormalities were treated with fresh frozen plasma. Monitoring trends in the coagulation profile is one objective way of assessing the seriousness of envenomation and the response to antivenin therapy (7). The decision to administer blood products should be based primarily on clinical condition, trend of clotting parameters and other standardized criteria for the treatment of coagulopathies (16). Criteria for the use of blood products appear to be quite arbitrary in clinical practice. It is recommended that blood products be used only if antivenin fails to take effect and that component therapy be used for specific conditions (7).

In conclusion, the omission of antivenin treatment did not lead to adverse consequences in the

present case with moderate hematological abnormalities associated with deliberate snake envenoming. Although this finding could be attributed to “regional” variations, the general belief that the mainstay of treatment of snake envenoming should include antivenin deserves to be reconsidered. There still remain many questions about the treatment of envenoming. Finally, the role of close patient monitoring and good supportive care cannot be overemphasized.

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