

CASE REPORT

Death Due to Artvin Viper Bite: A Case Report

Artvin Engereği Isırığına Bağlı Gelişen Ölüm: Olgu Sunumu

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How to cite ?

Sancı A, Kaya B. Death Due to Artvin Viper Bite: A Case Report. Genel Tıp Derg. 2025;35 (2): 393-397

ABSTRACT

It is estimated that approximately 5.4 million people worldwide are heated each year, and 1.8 to 2.7 million of these suffer from poisoning. In Turkey, most snakes belong to the Viperidae family, and species such as the Artvin viper (*Vipera kaznakovi*) can pose serious health risks, especially in rural and forest areas. This can be found, the case of a 36-year-old foreign male who was bitten by a snake on his left lower extremity while picking tea and died the next day was examined and reported with autopsy ability. Laboratory test results of our case showed hemodynamic deterioration and changes in renal function. Autopsy findings confirmed that multiple organ damage and complications due to snakebite were the cause of death. In such cases, it is thought that simple preventive measures, as well as rapid access to health services, can be effective in reducing injury and mortality rates.

Keywords: Autopsy; snake bite; internal organ damage

ÖZ

Dünya genelinde her yıl yaklaşık 5,4 milyon insanın yılanlar tarafından ısırıldığı ve bunların 1,8 ila 2,7 milyonunun da zehirlenme vakası olduğu tahmin edilmektedir. Türkiye’de, zehirli yılanların çoğu Viperidae familyasına ait olup, Artvin engereği (*Vipera kaznakovi*) gibi türler, özellikle kırsal ve ormanlık alanlarda bulunarak ciddi sağlık riskleri oluşturabilmektedir. Bu çalışmada, çay toplarken sol alt ekstremitesinde yılan ısırığına maruz kalan ve ertesi gün hayatını kaybeden 36 yaşındaki yabancı uyruklu erkek olgu, otopsi bulgularıyla birlikte incelenerek sunulmuştur. Olgumuza ait laboratuvar test sonuçları, hemodinamik bozulma ve böbrek fonksiyonlarında değişiklikler olduğunu göstermektedir. Otopsi bulguları ise çoklu organ hasarı ile yılan ısırığına bağlı komplikasyonların ölüm sebebi olduğunu doğrulamaktadır. Bu tür vakalarda, sağlık hizmeti erine hızlı erişim kadar, koruyucu basit tedbirlerin de yaralanma ve ölüm oranlarının azaltılmasında etkili olabileceği düşünülmektedir.

Anahtar Kelimeler: Otopsi; yılan ısırığı; iç organ hasarı

Introduction

Snakebite is recognised as a major health problem worldwide. It is estimated that about 5.4 million people are bitten by snakes worldwide each year, and 1.8 to 2.7 million of these are poisoned by snakebites. Although snakebites affect people from almost every geographical region, the majority of deaths occur in rural areas, relatively far from health facilities (1). Approximately 50 snake species are known to live in Turkey. Among these, snakes belonging to the Viperidae (viper) and Elapidea families are the venomous ones (2). Almost all of the venomous snake bites in our country are from the Viperidae (viper) family and the subtypes vary regionally (3). Artvin viper, also known as Caucasian viper (*Vipera kaznakovi*), is a venomous snake species living in the Black Sea region of Turkey, especially in Artvin and its

neighboring provinces (Figure 1). This snake is usually 60-90 cm in length, has a brown and yellow pattern, and has a high camouflage ability thanks to its ability to match the colour of its natural environment. Artvin's viper is usually seen in rural and forested areas and its bites can lead to serious health problems and death if left untreated (4).

Venomous snake bites can cause various toxic effects on the human body. These effects vary depending on the type of snake, venom content and the health status of the person. Snake bite causes various symptoms with local and systemic effects. Local effects include intense pain at the site of the bite, rapidly developing oedema, ecchymosis, hyperaemia and inflammation. Systemic effects include syncope, dyspnoea, nausea, vomiting and shock. Snake venom can affect the

nervous system and cause dizziness, while the venom of some species can affect the respiratory system and cause shortness of breath. Nausea and vomiting occur when the venom affects the digestive system. In snake bites with high venom toxicity and quantity, the body may go into a state of shock and this situation requires emergency intervention. Rapid recognition of symptoms after a snake bite is critical for treatment. Therefore, individuals exposed to snake bites should receive urgent medical treatment. Without timely medical intervention, the possibility of death is high. Death usually occurs within 6-48 hours (5).



Figure 1. Artvin (Caucasian) Viper (*Vipera kaznakovi*) (4)

In this study, it was aimed to discuss the findings obtained from toxicological and histopathological examination of the samples taken during the autopsy of a 36-year-old male case who was autopsied in Artvin Forensic Medicine Branch Directorate with the claim that he died as a result of snake bite while collecting tea, in the light of the findings obtained from toxicological and histopathological examination of the samples taken during the autopsy and to contribute to the forensic medicine practice and to contribute to the literature.

This study was approved by the Artvin Coruh University ethics committee (decision number: E-18457941-050.99-152219; decision date: November 21, 2024).

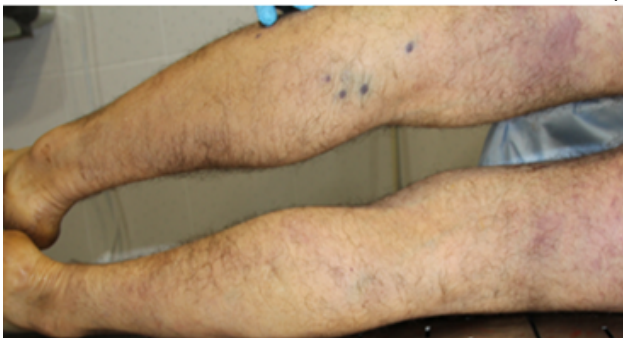


Figure 2. Snake bite lesions

The study was conducted in accordance with the Declaration of Helsinki and permission was obtained from the Council of Forensic Medicine, Education and Scientific Research Commission (decision number:21589509,72024/1448; decision date: December 03, 2024).

Case

According to the forensic and medical documents prepared for the 36-year-old case, who has dual citizenship of Afghanistan and Turkey; the patient was collecting tea as an agricultural worker in the district, after a while (One day later) he fell ill and fainted, then he was first taken to the district state hospital by 112 Emergency Health Services, the patient with tachycardia, hyperthermia, hypotension and Glasgow Coma Score 5 was intubated and transferred to a further health institution in the provincial centre, The diagnosis of 'Contact with Poisonous Snakes and Lizards (X20)' was made and the patient was admitted to the intensive care unit with the examination findings of 'poor general condition, intubated, unstable haemodynamics, bleeding oral structures, active bleeding in the nasogastric catheter': 11,5, Creatinine: 3,67 mg/dl, Amylase: 3046 u/L, snake antiserum (antivenom) and drug treatment was given, and despite all treatments, the patient was accepted as excitus during the day.

In the autopsy report; 'On external examination, there were two 0.3 cm diameter ecchymosis on the posterior aspect of the left knee with a distance of 1.5 cm between them, a total of 4 ecchymoses of similar size with a distance of 1.5 cm between them on the lateral side of this lesion and on the upper 1/3 of the left knee (Figure 2), bloody content in the form of plaster coming from the mouth, edema on the tongue, bleeding in the upper and lower gingiva, internal examination; 'On internal examination, it was reported that there were widespread haemorrhage areas on the heart surface, haemorrhage areas on the heart valve



structures, widespread intramuscular haemorrhage in the ventricular myocardium, haemorrhage in the clavicle attachment sites of the left neck muscles, haemorrhage areas in the thyroid and surrounding muscles, lung, trachea and oesophageal lumen, oedema and haemorrhage in the left epiglottis, multiple petechiae in the fundus of the stomach, haemorrhage foci in the corticomedullary areas of both kidneys' (Figure 3).

In the examination of the samples taken for toxicological analysis, it was stated that; 'drug active ingredients were found in the therapeutic dose used in allergy treatment and resuscitation procedures, there were widespread fresh bleeding areas in the heart, intraparenchymal bleeding in the lung, bleeding in the aortic adventitia in the samples taken for histopathological analysis, and bleeding findings were observed in the dermis and fatty tissue in three skin samples',

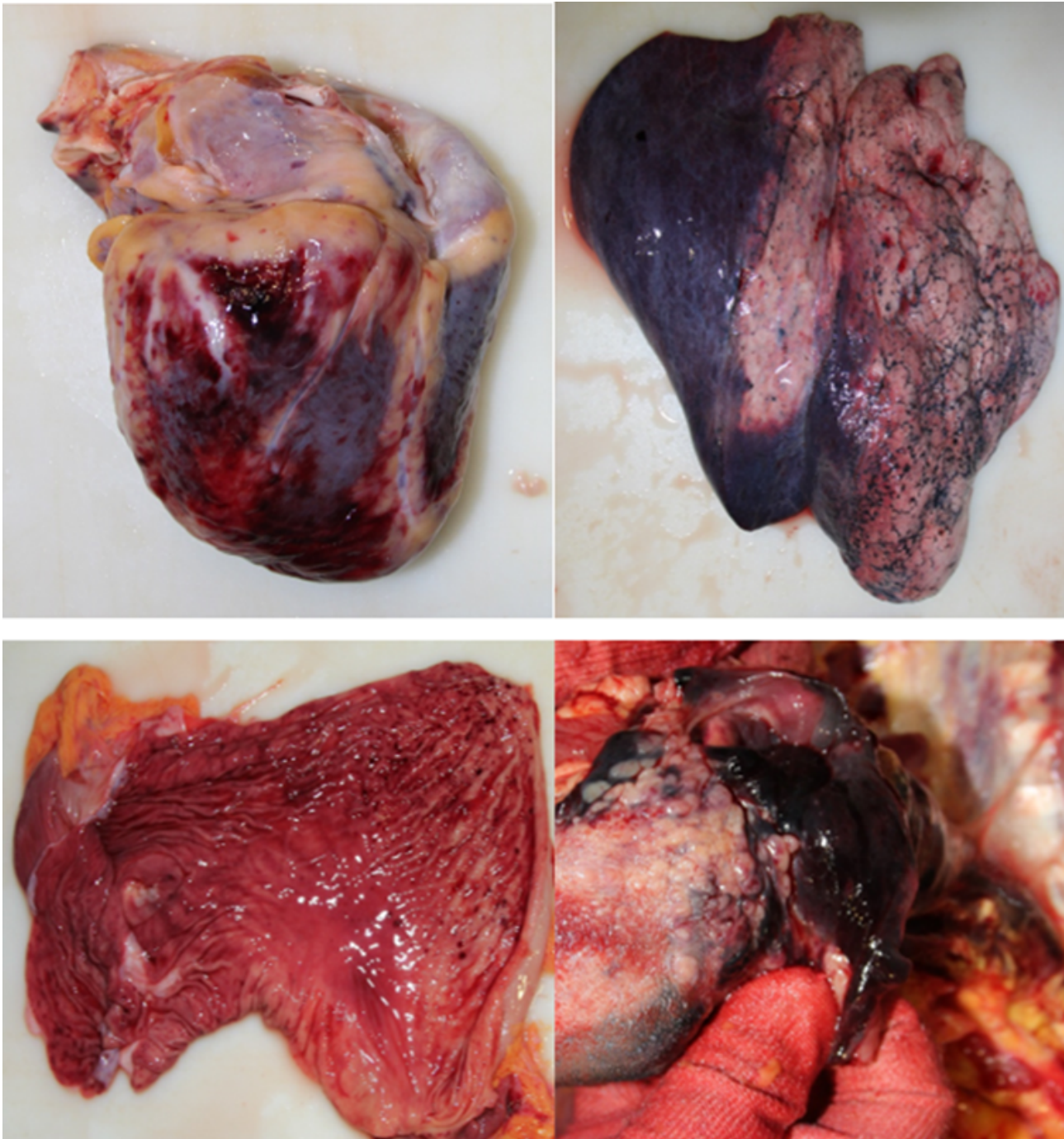


Figure 3. Haemorrhage areas and oedema around the heart, lung, stomach and epiglottis due to snake bite

As a result of the autopsy, it was stated that 'it was concluded that the death of the person occurred as a result of anaphylaxis and complications due to snake bite'.

Discussion

Snake bites are a major health problem affecting millions of people worldwide every year. The incidence of snakebites is particularly high in tropical and subtropical regions, where they are commonly encountered among agricultural workers and local people. The most common species causing bites is the viper (viperidae) snake. Snake venom has cardiotoxic, neurotoxic, myotoxic, nephrotoxic and haematotoxic properties (6,7).

Snake bites are medical emergencies that can have serious consequences with both local and systemic complications. Enzymes such as serine protease and arginine ester hydrolase in snake venom can activate the coagulation system and lead to the development of DIC. This may result in prolonged PT and aPTT, decreased fibrinogen levels, increased fibrin degradation products and decreased protein C levels. Although haematological disorders are usually mild, they may rarely lead to fatal complications such as intracranial, pulmonary and intra-abdominal haemorrhages. In a study conducted in India, 38 cases of death due to snake bite were investigated and it was reported that 65.8% of the cases had haemorrhage in the corticomedullary region of the kidney, 55.3% had acute tubular necrosis, 18.4% had haemorrhage in the adrenal gland and 52.6% had haemorrhage in the pituitary gland (8). In a study in which death cases due to various animal bites were evaluated, it was reported that toxicity developed in kidney and liver in cases of death due to snake bite and multiple organ damage developed in these cases (9). In studies conducted in our country, it has been reported that similar findings such as haemorrhage in subcutaneous fat and muscle tissue, haemorrhage in serous membranes, oedema and haemorrhage in internal organs were obtained in cases of death due to snake bite (8,9). The results obtained from the medical documents of our case showed that haemodynamics became unstable and renal function tests deteriorated. In our study, the findings on the left lower extremity at autopsy consisted of ecchymoses frequently seen in snake bites as reported in the literature. Multiple organ damage was found in the form of haemorrhage and oedema areas in the heart, myocardium, lung, stomach, kidney and neck. The findings obtained are

similar to the studies in which snake bite injuries were analysed. The findings obtained in our study reinforce the severity of the clinical picture in snakebite-related deaths and the need for detailed examination of all organs by forensic medicine specialists.

The treatment of a snake bite varies depending on the type, toxicity and amount of venom. As first aid, it is recommended to immobilise the bitten area and seek emergency medical attention. The World Health Organisation (WHO) recommends that antivenom should be administered according to the symptoms of systemic and local envenomation in the treatment of snakebite cases, taking into account potential side effects and taking necessary precautions. Antivenom is used to prevent local swelling from increasing and to alleviate blood disorders and general intoxication (10). Antivenom is the most effective treatment for snake bites and should be administered as soon as possible. Studies have shown that there is a significant correlation between cases where antivenom treatment is delayed and deaths due to snake envenomation (11,12). In a similar study, it was reported that antivenom given early and in adequate dosage is life-saving in snakebite injuries. Considering the information that the first application to the health institution of our case was made one day after the snake bite, that he was taken to the district state hospital and then referred to the state hospital in the provincial centre, although the first medical intervention and antivenom treatment was performed, considering the elapsed time and literature information, it increases the possibility that the snake bite may result in death. In such cases, all procedures performed during the preparation of medical documents should be recorded in order to respond to future allegations. In addition, an autopsy is important for the evaluation of allegations in this parallel.

In conclusion, snake bites pose a serious risk, especially for those working in agricultural activities. In such cases, rapid transport of the patient to the health institution is of great importance for the effectiveness of the treatment process. It is of vital importance to have antivenoms used in treatment in the emergency departments of hospitals in the region where venomous snake bites are common. It is important to provide on-the-job training on snake bites to physicians working in hospital emergency departments and primary health care services in order to treat patients correctly and quickly. Raising awareness of individuals living or working in areas with venomous snakes about snake

bites, as well as wearing appropriate protective footwear such as boots or boots, is an effective prevention method. It should not be overlooked that suspicious deaths, especially in rural areas, may have developed due to snake bites. Histopathological and toxicological analyses of samples taken during autopsy reveal the damage caused by the venom in the body due to snake bite and help to understand the exact cause of death.

Author contributions

Conception: A.S., B.K., Design: A.S., B.K., Supervision: A.S., B.K., Resource: A.S., B.K., Materials: A.S., B.K., Data Collection and/or Processing: A.S., B.K., Analysis and/or Interpretation: A.S., B.K., Literature Review: A.S., B.K., Writer: A.S., B.K., Critical

Review

A.S., B.K.

Acknowledgments

We would like to thank the Council of Forensic Medicine for their work permit and contributions.

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