

Case Report

# Immunological Skin Reaction and Compartment Syndrome Due to Snake Bite: A Case Report

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## ABSTRACT

Toxicity of snake envenomation depends on many parameters such as type and the size of the snake, the amount of venom injection, the number of bites, the age of bitten person, the bite area and sensitivity to the venom. The presence of systemic diseases in bitten individuals and age factor may affect the clinical picture. The majority of snake bites occur in the extremities and compartment syndrome may develop in some patients. Such patients should be monitored carefully because delays in the diagnosis of compartment syndrome may lead to ischemic contractures or extremity amputations at various levels. In our case compartment syndrome was treated with conventional methods without doing fasciotomy.

**Key words:** *Immunological reaction, compartment syndrome, snake bite*

## INTRODUCTION

Death from snake bite is quite common all over the world. The majority of these occur in the countries close to the equator belt. [1] Ten per cent of 3500 snake species known around the world are toxic. [2] Snake bites are often encountered in Turkey especially in the South and Southeast regions due to climate and geographical features. Species most frequently causing bite are Vipers (*Viperidae*). [3] Snake venom is composed of a combination of many toxic proteins and enzymes and has a complex structure. Characteristics of venom can be cardiotoxic, neurotoxic, myotoxic, nephrotoxic and hemotoxic. Depending on the toxin severity Local and systemic symptoms are observed in patients bitten by a snake including pain, warmth, haemorrhagic oedema, ecchymosis, lymphangitis and tissue necrosis as local symptoms and fever, nausea, vomiting, circulatory collapse, jaundice, delirium,

convulsions and coma as systemic complications. [4]

## CASE REPORT

A 37 years old male patient was referred to Isparta state hospital emergency clinic due to the snake bite of hands and with the complaints of pain, swelling and sensitivity in the bitten area. The patient's vital signs were normal. Appropriate antivenom support was provided to the patient and prophylactic antibiotic therapy was started with making tetanus immunization. Bullous necrotic areas were present the patient's right hand third fingers (Figure 1). Because of generalized swelling in the same extremity, the patient was monitored against the risk for developing compartment syndrome (Figure 2). Patient's extremity was taken to elevation. Medical treatments were performed. Patient's extremity was treated without fasciotomy. Repeated laboratory test results revealed no pathology except increase in WBC (White

Blood Cells). The patient was discharged with recommendations.



FIGURE 1-Cyanotic bullous lesions in the fingers (6hours after snake bite)



FIGURE 2-A comparative image. (After 12 hours)

## DISCUSSION

In snake bite cases determination of the type of snake may not be always possible. Due to the complications leading up to death, all snake bites are considered as poisonous snake bites. Blood pressure must be controlled; blood count, blood fibrinogen levels, platelet count, serum electrolytes, blood glucose, BUN, creatinine, liver function, amylase, CPK, PT, PTT, TIT, and arterial blood gases tests should be performed. ECG should be obtained and views should be repeated in every 8-12 hours. [5] In our case no pathology was found except WBC increase. Snake venom

consists of %70 water and %30 protein [enzyme component and toxin component] substances. Enzyme component which disrupts the clot is a rich component consisting mainly of hyaluronidase and phospholipase, oxidase, esterase, peptidase and protease. Toxin component includes neurotoxins and haematoxins. Neurotoxins may lead to sudden respiratory distress influencing diaphragm muscle with curare like effect in postsynaptic membrane; haematoxins may lead to extravasation, haemolysis, fibrinolysis or disseminated intravascular coagulation. The toxins of poisonous snakes that exist in our country are more haemolytic property. The risk of bites increases in upper chest and head and neck region. Poison toxicity and morbidity increase when the bite coincides to the vessel. [6] In spite of local symptom, compartment syndrome that is seen as a result of snake bite and which occurs within 30 to 60 minutes, may develop within a week. [7] For this reason snake bites in the extremities should be strictly followed for possible compartment syndrome if clinically suspected, fasciotomy could be performed for functional full recovery. [8] In our case after an hour from snake bite oedema appeared spreading from bite region to the arm. Poison increased the efficacy of mediators by increasing mediators like histamine, bradykinin, serotonin released from damaged tissue. [9] The process that began after the bite is actually a vicious cycle. As you increase the effectiveness of poison, mediators increase for vasodilatation and when vasodilatation and vascular permeability increase, pressure inside and outside of the compartment increase too. Also in snake bites venom usually does not reach into the muscles and usually remains in the subcutaneous tissue. Oedema induced by an inflammation starting in the subcutaneous tissue and increased by a vicious cycle primarily affects the extra compartment pitch. Local tissue damage results from the poison's myotoxic and cytolytic effects. [9] Furthermore venom-induced tissue necrosis

results from zinc-dependent metalloproteinase and myotoxic phospholipase A2 effect. [10] In our case bullous necrotic area with ecchymosis was observed inside of the right hand's third finger region.

## CONCLUSION

A majority of snake bites occurs in the extremities and compartment syndrome are developed in some of them. In the literature there is no consensus on the treatment of compartment syndrome induced by snake or insect bites or trauma. [11] For surgical treatment different opinions are regarded for the threshold of compartment pressure. [12] Some studies emphasized that fasciotomy lead to more complications and should be waited until the last stage for it. [13] Therefore until the clinical signs were fully appeared waiting is recommended with medical treatments application such as elevation, mannitol treatment in compartment syndrome. [14] On the contrary, other studies emphasized that bites in the extremities strictly should be followed; fasciotomy should be performed if clinical suspects occur and early fasciotomy accelerates the clinical improvement and reduces the progressive tissue damaging. [15] In our case patient treated with conservative treatment without developing the clinical signs were not fully appeared in compartment syndrome .Delay in the diagnosis of the compartment syndrome may lead to ischemic contractures and amputations at various levels in extremity. Patients should be followed carefully, emergency patients should be admitted even if no clinical signs of toxicity develop and they should be kept under observation in the emergency department.

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