

## STEWARDSHIP IN SNAKE BITE: AN ETHNIC REVIEW

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### ABSTRACT

Envenomation from snake bites continues to be an underreported threat to human health worldwide. When antivenom is not readily available, envenomation can result in both local and systemic problems. There are established standards for managing snake bites in the acute setting, but there is a dearth of information about surgical intervention and the plastic surgeon's role in caring for this particular patient population.

A common occupational risk for farmers, plantation workers, and other outdoor workers, snake bite causes significant morbidity and mortality globally. This occupational hazard is no longer only a problem in one region of the world; it now affects the entire planet.

There are no reliable figures on the prevalence of snakebites, their morbidity, or their death worldwide, but they are undoubtedly higher than what is recorded. This is due to the fact that many victims today still seek treatment from traditional healers and that many are not even listed as hospital patients. Therefore, if we want to have correct statistics and lower the morbidity and death from snakebite, registering such cases is a crucial objective.

Inequality in care for patients with snake bites is a result of global health inequities and inadequate provision of antivenom. In order to enhance patient outcomes, plastic surgeons play a critical role in addressing the acute and long-term effects of snake bite envenomation.

**Keywords:** Snake Bite, Anti- Venom, Snake Bite Management

## **INTRODUCTION**

Envenomation from snakebite still poses a threat to global health. According to the World Health Organization, 2.7 million of the 5.4 million snake bites that happen each year are poisonous, with a 5% fatality rate (or 137,880 deaths annually). Despite the low death rate after envenomation, subsequent sequelae are frequent and can range from 10% to 44%. Local tissue discomfort, edema, cellulitis, infection, skin necrosis, coagulopathy, compartment syndrome, muscle contracture, and other physical abnormalities are only a few of these. The vast spectrum of problems is mostly linked to the scarcity of antivenom, the infrastructure of the hospital system, and the socioeconomic position of the patients.

The initial stage of management is in the field when a snake bite occurs. In order to lessen the local and systemic effects of envenomation, triage, and urgent care are then provided in a hospital setting. Despite the fact that envenomation is thoroughly studied in terms of field therapy and management of acute symptoms, there is a dearth of literature covering the care of secondary sequelae in this specific patient population, leaving treatment recommendations uncertain. Muscle and tendon contracture, gangrenous and necrotic tissue, osteomyelitis, and chronic wound infection are examples of wound complications that can have long-lasting and crippling effects. Some of these conditions may call for reconstruction. Plastic surgeons must be knowledgeable about the acute treatment for snake bites in order to provide patients with suitable care.

## **SNAKEBITE CLINICAL HALLMARKS**

Even when no venom has been injected, some persons who are bitten by snakes (or fear that they have been bitten) may experience fairly dramatic symptoms and indicators. This is a direct result of a reasonable dread of the negative effects of an actual venomous bite. People who are anxious may hyperventilate, which causes dizziness, pins-and-needles sensation in the extremities, and muscle spasms in the hands and feet. After the bite or suspected biting, some people may experience vasovagal shock, which causes fainting, collapse, and significant heart slowing. Others might experience extreme agitation and irrationality as well as a variety of deceptive symptoms. The degree of morbidity and death is influenced by the victim's age, size (children are more severely envenomated compared to adults), and concomitant illnesses (elderly patients are more susceptible to snake venom). The snake's size and the time of the bite (day or night) are not influencing factors. The size, age, snake species, number, and location of bites, as well as the amount and toxicity of the venom, all affect the clinical presentation of a snakebite victim.

Symptomatology that is common to all snake species can be determined. Any envenomation might show symptoms such as widespread weakness, numbness, paresthesia, and pain. A mixture of enzymes and proteins make up a snake's venom, which causes both local tissue damage and systemic symptoms. Different levels of gene expression within each species affect which proteins and enzymes are expressed. For instance, the venom of some species largely produces metalloproteinases, which can lyse cell adhesions and membranes to cause inflammation, heat, tumors, and tissue necrosis. Tachycardia, petechia, disorientation, vomiting, disseminated intravascular coagulation, acute renal failure, shock, and compartment syndrome are among clinical manifestations of this. Anemia (intravascular hemolysis), thrombocytopenia, depleted fibrin levels, high BUN, creatinine, and prothrombin time/partial thromboplastin times are among the common abnormalities seen in laboratory tests.

Alternately, the venom can have a neurotoxic impact in which presynaptic or postsynaptic blockage hinders signal transmission by causing gene production of either alpha protein or phospholipase A2. Ptosis and diplopia, dysphagia, diaphoresis, peripheral nerve palsy, weakened reflexes, and in extreme instances, respiratory depression and paralysis, can all result from this.

### **ON FIELD INTERVENTIONS**

Since there are no early signs that distinguish a snake bite from one that has been envenomated, proper wound assessment in the field is challenging. First aid now emphasizes prompt evacuation to the closest medical center rather than on-site care. After arriving at the hospital, more evaluation, resources, and treatment options might be provided.

After getting bitten by a snake, victims and onlookers should get away from it and, if at all possible, snap a photo of it. The victim's airway, breathing, and circulation should be examined since envenomation can have an immediate negative impact on these essential processes. The sufferer should be kept flat and their activities should be limited. The bitten extremities should be kept immobilized at heart level. As long as there are no systemic signs, the afflicted extremity may be lifted if localized erythema, edema, or discomfort is escalating. Since antivenom is not always available, it is crucial to notify the medical institution ahead of time to give them time to prepare or transfer the medication. Antivenom is expensive and unavailable to the majority of low-income people.

There are several widespread myths regarding how to handle snake bites. Thought to lessen the return of venom to the central circulation, the insertion of a tourniquet actually limits vital blood flow to the injured tissue, causing local edema and amplifying the effects of the venom on the

local level. When held below a pressure of 30 mm Hg (2 fingers beneath the band), a venous tourniquet can be helpful in preventing the spread of systemic absorption; however, poor application restricts its usage in the field. It has been demonstrated that wound compression, which entails wrapping the injured extremity from distal to proximal at an ideal pressure of 55 mm Hg, is mistake prone and is not advised. Initial wound incision and suction or suction alone treatments were considered to remove some of the venom burden, hence reducing the amount of venom ingested; however, investigations have revealed that these treatments can worsen patient outcomes and are no longer advised. Additionally not advised are the use of therapeutic herbs, chemicals, and vigorous cleansing of the wound.

### **ROLE OF ANTIVENOM**

The mainstay of medical care is the administration of antivenom. Antivenom is made comprised of purified IgG antibodies from venom delivered to animal hosts. Adverse reactions can range in intensity from mild (rash, diarrhea, diaphoresis, and pain) to severe, in addition to anaphylactic shock, bronchospasm, angioedema, and hypotension. A hospital should be notified of the most common envenomations in order to get the most essential antivenoms. Antivenom can be stored in liquid or lipophilic form and has to be kept cold. If an unfavorable reaction is seen following antivenom injection, antihistamines, corticosteroids, or a combination of the two should be administered next. Epinephrine may be used in severe cases of bronchospasm, angioedema, and hypotension.

When there is a progression of local symptoms, antivenom is recommended. Included in this is swelling that is enlarging quickly, engulfing more than half an extremity, or being present at the fingers or toes. According to studies, earlier treatment (within 4 hours after envenomation) combined with greater antivenom dosages results in better patient outcomes and a lower likelihood of needing surgical intervention. Antivenom can, however, be administered within 24 hours of envenomation and still have a positive impact. Since there is no maximum antivenom dose, the drug should be administered until clinical and laboratory abnormalities are resolved. According to certain research, an envenomation scale is used to help make this choice. Antivenom should be provided as a diluted bolus at a rate of 2 ml/min or at a set rate of 5–10 ml/kg of isotonic saline over the course of one to two hours. Adverse effects are less likely to happen with a slower antivenom infusion rate.

## **HOSPITAL INTERVENTION**

When a patient first arrives at the hospital, intravenous access should be established and fluids should be given; the amount of fluid given depends on the patient and the provider. For adult patients, a 500–1000 ml bolus of lactated ringers or normal saline is commonly infused. Although the most recent research does not advocate using preventive antibiotics, if an infection is suspected, cultures and blood tests should be performed to identify the causative bacterium. The patient should receive a thorough examination, irrigation, and a close examination of the wound. To track development, the edge of the erythema and swelling should be noted and checked every 30 minutes.<sup>3</sup> To assess potential complications, routine clinical symptom monitoring should be combined with serial laboratory draws (CBC, CMP, coagulation studies, and liver function tests) every two to three hours. To guarantee no symptoms develop or worsen, a diagnosed envenomation with mostly haematological consequences and no indications of subsequent problems should be watched for at least 12 hours. A minimum observation time of 24 hours is needed after a snake bite if neurological symptoms are evident, and particular neurological monitoring is needed to make sure the symptoms don't worsen.

## **SURGICAL INTERVENTIONS**

Overall, it is uncertain how often envenomation injuries necessitate formal repair. Plastic surgeons are commonly contacted after envenomation for wounds where form and function restoration is required. For some envenomations, such those from cobras, where the venom is known to cause more tissue necrosis, surgical procedures are more usual. Fasciotomies, wound debridement, tissue grafts, local and free tissue flaps, and occasionally amputations are among these surgical procedures. Following a snake bite, there may be infections, tissue necrosis, compartment syndrome, necrotizing fasciitis, chronic wounds, and ischemia contracture, all of which necessitate surgical intervention.

Delaying wound debridement has previously been advised to avoid removing healthy tissue unnecessarily. However, more modern methods that include topical wound labeling that only targets dead tissue and autolytic and enzymatic debridement may assist avoid the destruction of good tissue. The shape and function of minor defects can be restored using localized tissue transplants and flaps. Free flaps are occasionally necessary when there is not enough soft tissue available for locoregional flaps. It's crucial to match the flap's skin, volume, composition, and vascular size to the recipient defect when choosing a flap.

## CONCLUSION

To prevent a delay in treatment, victims of snake bite envenomation require a multidisciplinary team that is aware of the underlying pathophysiology and potential consequences. In order to assist these patients regain both form and function, it is crucial that plastic surgeons assume responsibility for them. An essential part of treating snake bites and its sequelae is plastic surgery. In an effort to lessen these additional problems and enhance patient outcomes, published research have shown several methods of managing envenomation.

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