

## Increasing Awareness about Snake Bite in Resource Limited Settings: Two Case Reports from Ethiopia

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### Abstract

**Introduction:** Snake bites can cause significant morbidity and mortality.

**Case Report:** This paper reports two cases of snake bite to the lower extremity. The first case involved a 35 year-old male who had a bite to the leg that was complicated by gangrene and led to above-knee amputation. The second case involved a 16 year-old male who required debridement of pyomyositis nine days after the snake bite.

**Discussion:** We report these cases to raise awareness among the public and medical services of the potential dangers of significant morbidity after snake bite and to urge early medical care and intervention. Recommendations for the provision of antivenom for such cases are also provided.

**Keywords:** Snake Bite; Emergency Medicine; Antivenom; Envenomation

### Introduction

Snake bites can cause significant morbidity and mortality especially when there is envenomation [1,2]. Early intervention action in adequate health facilities can decrease both morbidity and mortality which will result from delay. Despite changes in their habitat with destructions, venomous snakes are still present in most parts of African continent [1,3]. Snakes bite humans mainly when they feel threatened and also inadvertently [1,3]. All countries in Africa are not free from the danger of venomous snakebite particularly in some rural areas where they are still major cause of morbidity and mortality among human being [1,2].

### Case Presentation

#### Case 1

A 35 year-old farmer from the Amhara region of Ethiopia presented to the Emergency Department with darkish discoloration of his left leg below knee associated with foul-smelling discharge. He sustained a snake bite to his left leg a month before the ED visit while he was working in his farm at night time. The initial site of the bite was to his left leg on medial aspect of his foot. He had not applied a tourniquet after the snake bite. Following the bite he had swelling extending from the foot to the leg associated with severe pain. After the time of the bite he underwent traditional treatment in which goat intestine was applied, which is believed by the local community to be an effective remedy. He stated that no improvement was seen. After a month, he went to a nearby hospital and was then referred to the Tikur Anbessa Specialized Hospital with wet gangrene of his left leg. On physical examination at the ED, his vital signs were BP = 110/70 mmHg, heart rate of 100 per minute, RR = 20 per minute, SatO<sub>2</sub> = 96% at room air. The patient had marked gangrene of his left leg with black discoloration extending from his foot to the knee with foul-smelling discharge. His popliteal pulse was palpable

The patient's white cell count was 10,870, hemoglobin 12.6 g/dl, hematocrit 36.6%, platelet count was 363,000, MCV of 81.5 fL. The patient was resuscitated with IV fluids and IV antibiotics were administered (ceftriaxone and metronidazole). Tetanus Anti-Toxoid 3000 IU SC was also administered. Because of his infected wet gangrene, the patient underwent above-knee amputation of left leg in the operating room. Postoperatively, IV antibiotics were continued (ceftriaxone 1g IV BID and metronidazole 500 mg IV TID) and analgesics (tramadol 50 mg IV TID) were administered. Flap revision was done on 10th postoperative day and the patient was subsequently discharged and advised to have prosthesis.

## Case 2

A 16 year-old male patient from Afar region of Ethiopia and later referred from the Adama Regional Hospital to the ED of Tikur Anbessa Specialized Hospital presented with left thigh vascular injury after debridement of pyomyositis. This patient initially sustained a snake bite 9 days before his presentation to the hospital. He reported the site of the bite gradually started to form a purulent discharge. At Adama Regional Hospital, he had pyomyositis of the medial aspect of his left thigh. Debridement of the site was attempted with blunt dissection and later he started to have active bleeding from the site. Crepe bandage was immediately applied just below the inguinal area and the bleeding site was dressed with gauze. Upon presentation to the Tikur Anbessa Specialized Hospital, 2 hours after the crepe bandage was applied, the gauze dressing was blood-soaked and the extremity was cold. The patient's left popliteal, posterior tibialis and dorsalis pedis pulses were minimally palpable. The patient's vital signs were BP of 100/70 mmHg, heart rate of 96 per minute, RR of 20/minute and  $\text{satO}_2 = 97\%$  at room air. His complete blood count was in normal range and blood group determined. Immediate vascular surgery consultation was obtained and the patient was taken to the operation theatre. Under general anesthesia, the vascular injury site was explored and a minimal tear of the left femoral artery and its popliteal branch was found and repaired. Postoperatively, the patient's extremity perfusion normalized and he had palpable pulses. He was transfused with 2 units of blood postoperatively and treated with IV antibiotics (ceftriaxone 1g IV BID).

## Discussion

Gangrene due to snake bite is not common but when it occurs the outcomes are usually dangerous. Some of the reported cases in literatures indicate that morbidity itself is increased mainly due to delay in seeking medical attention [4]. One case report indicated, two patients sustained snake bite to their lower extremity and subsequently developed wet gangrene. This is due to the effects of the venom on the tissues since there were no tourniquet application on the affected limb. Snake venoms has various contents of phosphatidases, neurotoxins, proteases, and in some cases, hyaluronidase [5]. Venom contents can broadly lead to four main types of envenoming. Cytotoxic envenomation, which is very likely of our reported cases, is characterized by progressive swelling which is very painful and with blood-stained tissue fluid leaking from the bite wound. Patients can have blistering, bruising and hypovolemic shock. There will be severe pain over the bite site and on the affected limb with tender enlargement of lymph nodes draining the bite site. Tissue death will follow the initial bite. The other three types are haemorrhagic envenoming characterized by bleeding, neurotoxic envenomation characterized by moderate or absent local swelling, descending type of paralysis which is progressive and starting with drooping eyelids (ptosis) and involving paralysis of eye movements causing diploid, and myotoxic envenomation, characterized by descending muscle paralysis.

There are clinical features of envenomation which include severe pain, local paresthesia, and edematous affected limb, in some cases, and tissue necrosis around the bite site a week or two after sustaining the trauma which are all local manifestations [5]. These features were present in our cases as well. In cases of snake bite with evidence of envenomation, it is indicated that systemic therapy with anti-snake venom and early local excision of the bite site improves the subsequent outcome [5] while delays in seeking medical care worsen prognosis [6]. Anti-snake venom (ASV) is composed of immunoglobulins prepared by immunizing horses with the venom of poisonous snakes and subsequently extracting and purifying the horses' serum. One epidemiological survey in Ethiopia determined that the national coverage of anti-venom is only 5.2% [7]. Unfortunately, in our first case, the progressive gangrene with delay in medical care ultimately led to major limb amputation.

In a case series from Gambia [8] most snake bites were on the lower limbs and occurred near homes, which is similar to the finding in other reports. Similar patterns were also reported among Nigerian adult cases in Benin-City, where 73.5% of snake bites occurred on the lower extremities [9]. Mostly snake bite to the limbs present with hallmark of painful, progressive swelling [10]. The swelling may be due to the edema or increase in the intra-compartment pressure which will subsequently leads to compartment syndrome. Thus, mea-

surement of compartment pressures is a valuable addition for the diagnosis of acute compartment syndrome secondary to snake bite in addition to strong clinical suspicion [11]. Although fasciotomy is still the main stay of treatment for compartment syndrome, care and discretion must be exercised in such cases secondary to snakebite due to significant bleeding risk mainly in hemorrhagic bite. Fasciotomy should not be performed until hemostatic abnormalities have been corrected particularly in hemorrhagic types of envenomation which otherwise the patient may bleed to death [12]. In cases of crotalid snake venom-injected tissue, fasciotomy may even worsens the amount of myonecrosis [13].

In performing lower limb amputation particularly in children, all efforts should be made to preserve the distal femoral growth plate. Thus below-knee amputation should be the goal in such cases. Maintaining the growth plate prevents the discrepancy of limb length that can result. To our knowledge, neither of the patients in our case report was fitted with a prosthesis. This experience is similar to the findings in other countries like Zaria, Nigeria where, out of 118 children with amputation, none had a prosthesis fitted [12]. But this may not be the case in adults for whom prosthesis can easily fit to the amputated limb. Therefore efforts to place a prosthesis should be made after limb amputation in children or adults. The adult patient in our case report was a farmer, and the lack of a prosthesis may create a significant burden for his daily living.

It is good to know deaths from snake bite occur in some countries due to wrong line of treatment and not having updated guidelines [14]. Thus, in general snake bite is a common health problem in many parts of the world and there is further need to have updated guidelines as it is one of neglected diseases [15-17].

### Recommendation

Snake bites are medical emergencies and a serious public health problem in Africa. Recognition of the severity of the bites requires awareness of the issue and adequate provision of anti-snake venom as well as further research. Public education campaigns should be emphasized by the government as well as the need for early hospital treatment for the victims so as to prevent poor outcomes. Government and non-governmental organizations should determine the best way to provide anti-snake venom, perhaps learning from the experiences of other countries. Training based on the World Health Organization guidelines for the African Region should be given to health professionals, including first-aid and preventive measures for local community education, emphasizing the need for early identification and referral to appropriate care, case documentation and reporting and preserving the dead snake, labeled with patient's details for later expert identification [3,7]. Further research should be conducted to identify the relevant species and exact burden of morbidity and mortality since this information is currently lacking.

### Conclusion

Snake bite is a serious issue resulting in significant morbidity including loss of limb and possibly mortality. Delays in medical treatment worsen the condition, predominantly in resource limited settings.

### Conflict of Interest

The author declares no conflict of interest.

### Patient Consent

Obtained to disseminate the cases in the literature for educational purposes.

## Author Contribution

Both authors came up with the idea of the research and both contributed equally. Author 1 come up with the idea and of this two case reports which later modified rigorously by author 3 and later approved by the department of Emergency Medicine. At every step both authors discusses deeply and came up with the final manuscript. Author 2 revised the final manuscript and equally involved.

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