

CASE SERIES

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Successful management of pit viper envenoming without antivenom in an intensive care unit (ICU) of a peripheral district hospital of inner terai: a case series

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Abstract

Snakebite is a significant and potentially fatal public health issue worldwide. It can lead to local reactions around the bite site and systemic toxicity. In Nepal, 89 species of snakes are known, of which 17 species are venomous. The country relies on antivenom imported from India. Despite its ineffectiveness against the venom of pit vipers, healthcare providers often administer anti-snake venom to manage pit viper envenomation. Thus, there is a need for a better understanding of local snake species and more effective treatment guidelines for snakebites. Here, we report 20 cases of snakebite with a deranged coagulation profile admitted to the ICU. All patients recovered from envenomation through conservative management without the administration of antivenom. This study aims to identify the clinical presentation and laboratory findings in patients with pit viper envenomation.

Keywords: Antivenom, Envenomation, Intensive Care Unit, Snakebite

INTRODUCTION

Globally, snakebite results in 1.8 to 2.7 million envenoming and 81,000 to 138,000 deaths annually.¹ According to WHO, 20,000 snake bite cases are estimated annually, resulting in over 1000 deaths in Nepal.² Pit viper envenomation accounts for most incidents in the Terai region.^{3,4} The diagnosis of snakebite envenomation requires proper clinical evaluation coagulation profile and renal and hepatic function tests.⁵ However, in most developing countries, the diagnosis is usually based on 20 minutes of whole blood clotting time at the bed site.⁶ Here, we report 20 cases of Pit viper envenomation with a deranged coagulation profile admitted in the ICU who are managed conservatively.

CASE SERIES

Twenty cases of pit vipers presented to the Hetauda Hospital's ICU in 2023. The identification of the snake was made by the photo provided by the patient or the snake brought by them and the symptom presented by the patient. They presented with swelling, pain, tingling, and burning sensation of the bitten limb (Table 1). The swelling was localized to the bite area in 13 patients, extending all over the bitten limb in seven patients. The fang marks of snakebite were present in all the patients. The patients were hemodynamically stable and had no spontaneous bleeding or neurotoxic manifestation. Laboratory investigation suggested coagulopathy in all the patients. The 20-minute whole blood clotting test (20WBCT) was positive in addition to deranged prothrombin time and international normalized ratio (PT/INR) in all the patients. Renal function tests were normal. Patients were observed closely and managed conservatively, monitoring vital signs, urine output, laboratory parameters, clinical status, limb immobilization, bed rest, analgesics, and local wound care. Intramuscular injections were avoided. Tetanus toxoid was administered after the normalization of INR values. None of the patients were given antivenom or blood transfusion. The hospital stay was 3–7 days. All the patients recovered from coagulopathy.

Table 1. Clinical feature of patient presented with viper envenoming

Characteristics	f (%)
Sex	
Male	8 (40%)
Female	12 (60%)
Location of Bite	
Lower limb	14 (70%)
Upper limb	6 (30%)
Swelling Present on Bite Site	
Present	20 (100%)
Absent	0 (0%)
Pain on Bite site	
Present	16 (80%)
Absent	4 (20%)
20 minutes whole blood clotting time(20WBCT)	
Positive	20 (100%)
Negative	0 (0%)

The patient who presented with pit viper envenoming had a mean age of 34.85 with a standard deviation of 13.39 years. The clinical feature of the patient is present on the table 1.

The median INR was 2.5, with a range of 1. All the patients had the normal range of renal function test (RFT). The patient's mean age of hospital stay was 4.95 days, and the standard deviation was 1.15.

DISCUSSION

Snakebite is a potentially fatal medical emergency, and the patient's chances of survival largely depend on proper first aid and referral to a nearby hospital with facilities for supportive treatment and anti-snake venom.⁷ In Nepal, 89 snake species are recorded, among which 17 are highly venomous and dangerous.⁷ Snakebite is a significant public health issue in Nepal's rural and Terai regions. As Nepal is an agricultural country, there is a chance of increased man–snake encounters leading to snakebites.⁸ Green pit vipers are widely distributed and frequently encountered venomous snake species in the Terai regions of Nepal.⁴ The currently available antivenom in Nepal is imported from India. It is polyvalent and is effective against the four common species of snakes found in India (Russell's viper, cobra, Krait, and saw-scaled viper). There is no evidence that the polyvalent snake antivenoms neutralize the venoms of green pit vipers or other species of snakes in Nepal.⁷

Snakebite can lead to local manifestations around the bite site, which can progress to systemic toxicity and coagulopathy.⁹ The standard tests to measure coagulopathy are 20WBCT and PT/INR.¹⁰ All our patients had incoagulable blood on 20WBCT, and the PT/INR level was deranged. The patients were kept in the ICU for observation with regular monitoring and conservative management until the coagulation profile was normalized. All the patients improved clinically without receiving antivenom or blood products. All the patients recovered with no complications.

In a case series done by Bhatt et al., 15 snakebite patients were managed. All the patients had fang marks of snakebite with features of pain and swelling. They were hemodynamically stable with no signs of bleeding or neurotoxic manifestation but had deranged coagulation profiles. All the cases were managed conservatively, which was similar to our cases.¹¹

The use of antivenom has become common practice, with little reference to whether the readily available antivenom is beneficial. Patients who get antivenom inappropriately may result in anaphylactic responses and even death.^{10,12} In research by Sharma et al., out of 155 patients, 13 (8.4%) experienced anaphylaxis, which was associated with the administration of snake antivenom and resulted in the death of eight individuals (5.61%).¹³

This study contains the details of the 20 cases. The liver function test was not considered during this study. Comorbidities that could have deranged the clotting factor

was not considered while doing this study.

CONCLUSION

The National Guideline for Snakebite Management in Nepal 2019 successfully treated all our patients with conservative management. However, we may not have seen the full spectrum of pit viper envenoming in patients presenting to our hospital. Further studies are needed to confirm this finding.

This study highlights the importance of identifying snake species, patient clinical presentation, and laboratory investigation. As coagulopathy is a common manifestation of pit viper envenoming in Nepal, it can be managed conservatively without administering the antivenom currently available in Nepal.

DECLARATIONS

Conflict of interest

All authors declare that they have no potential conflicts of interest.

Consent of the study

The patient involved in this study provided consent to publish this case report and provided written permission.

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Consent for Publication from the Authors

All the authors and participants consented to the publication of the findings.

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