

Case Study on Snake Bite

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Abstract

Snakebites are a major public health concern in India, with the World Health Organization (WHO) estimating approximately 5 million cases annually. Out of these, around 2.7 million involve envenomation, where venom is injected through the snake's bite. These venomous bites pose significant medical emergencies and can lead to severe complications, including permanent physical impairments if not treated promptly. Immediate medical intervention is crucial to mitigating the adverse effects of snakebites. Most deaths resulting from snakebites can be prevented through the timely administration of safe and effective antivenoms. These antivenoms neutralize the venom's toxic effects, thus preventing further deterioration of the victim's condition. Rapid transportation of bite victims to medical facilities and prompt referral to appropriate healthcare services are essential components of effective snakebite management. Ensuring that healthcare systems are adequately stocked with antivenoms and that medical personnel are trained in their proper use is vital. Public education campaigns about the risks of snakebites and the importance of seeking immediate medical attention can also play a critical role in reducing snakebite mortality and morbidity. Improving infrastructure, such as transportation networks, can facilitate quicker access to healthcare facilities, enhancing the overall response to snakebite emergencies. Preventative measures, such as educating people about avoiding snakebite risks and using protective gear, are equally important in reducing the incidence of snakebites. In summary, snakebites in India represent a severe health issue that requires immediate and effective medical responses. With the right combination of accessible antivenoms, prompt medical treatment, public education, and improved healthcare infrastructure, many deaths and disabilities caused by snakebites can be prevented. Addressing this issue comprehensively can significantly reduce the impact of snakebites on public health.

Keywords: Snakebites, WHO, Venomous, morbidity, deterioration

INTRODUCTION

Snakebites pose a significant public health challenge in India, with the World Health Organization (WHO) estimating that approximately 5 million incidents occur annually. Out of these, around 2.7 million involve envenomation, where venom is injected through the bite. Venomous snakebites represent urgent medical emergencies, often leading to severe complications and permanent physical impairments if not treated promptly [1]. The critical nature of these bites demands immediate medical intervention to mitigate the adverse effects. Timely and effective treatment is paramount in reducing the morbidity and mortality associated with snakebites. The majority of fatalities resulting from snakebites can be averted through the use of safe and effective antivenoms [2]. These antivenoms counteract the venom's toxic effects, thereby preventing further deterioration of the victim's condition. In addition to the

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availability of antivenoms, the rapid transport of bite victims to medical facilities and the swift referral to appropriate healthcare services play crucial roles in the management of snakebite cases [3]. Ensuring that healthcare systems are well-equipped with adequate supplies of antivenoms and that medical personnel are trained in the proper administration of these treatments is essential. Public awareness campaigns can also educate communities about the risks of snakebites and the importance of seeking immediate medical attention. Improving infrastructure, such as transportation networks, can facilitate quicker access to healthcare facilities, thereby enhancing the overall response to snakebite emergencies [4]. Moreover, addressing snakebite incidents requires a comprehensive approach that includes preventative measures. This involves educating people about how to avoid snakebite risks, such as avoiding walking barefoot in areas known to be inhabited by venomous snakes, using protective gear, and being vigilant in snake-prone regions. Implementing these preventative strategies can significantly reduce the incidence of snakebites. In conclusion, snakebites in India constitute a severe public health issue that necessitates immediate and effective medical responses [5]. With the right combination of accessible antivenoms, prompt medical treatment, and public education, many of the deaths and disabilities caused by snakebites can be prevented. Enhancing healthcare infrastructure and awareness can play a pivotal role in reducing the impact of this critical health concern.

Case Report

A 19-year-old female was admitted to the Critical Care Unit following an alleged krait snakebite. She presented with symptoms including two episodes of vomiting containing food particles, which were non-projectile and non-foul smelling, as well as breathlessness, chest pain, and drooping eyelids [6]. She had no known comorbidities. Upon admission, her blood pressure was recorded at 120/80 mmHg. Her Glasgow Coma Scale (GCS) score was 3/15, prompting immediate intubation and connection to a mechanical ventilator. The Adaptive Support Ventilation (ASV) protocol was initiated to manage her respiratory needs. She was administered injections of Atropine and Neostigmine to counteract the effects of the venom [7]. After receiving seven days of intensive ventilator support, the patient showed significant improvement. Consequently, after a total of nine days in the ICU, she was stable enough to be transferred to the general ward for further management and recovery. This case underscores the critical importance of prompt and appropriate medical intervention in snakebite cases. The administration of specific antidotes, mechanical ventilation, and close monitoring in an ICU setting were pivotal in the patient's recovery. Early and effective treatment can significantly enhance the prognosis for snakebite victims, highlighting the need for readily available antivenoms and advanced medical care facilities. The patient's recovery trajectory also emphasizes the necessity for continued care and monitoring even after stabilization to ensure complete recovery and prevent potential complications [8].

DISCUSSION

Snakebites are a major public health challenge, particularly in tropical and subtropical areas such as India, Africa, Southeast Asia, and parts of Latin America. According to the World Health Organization (WHO), millions of snakebite incidents occur annually, with a significant number resulting in envenomation, where venom is injected into the body via the bite [9]. Venomous snakebites are critical medical emergencies that demand immediate attention as seen in Table 1. The consequences of snake venom can be severe, causing symptoms ranging from localized pain and swelling to systemic effects like neurotoxicity, coagulopathy, and renal failure. Without prompt treatment, envenomation can result in permanent physical impairments or death. The nature of the venom—hemotoxic, neurotoxic, or cytotoxic—determines the specific symptoms and urgency of treatment required. The primary approach to managing snakebites is the swift administration of antivenom. High-quality antivenoms are the most effective treatment for neutralizing snake venom and reversing its toxic effects. These antivenoms are usually derived from

the plasma of animals immunized with snake venom, tailored to counteract the specific venom components [10].

Table 1. Difference between book picture and patient picture.

Book picture	Patient picture
<p>Risk factors</p> <ul style="list-style-type: none"> • Children between 1 and 9 years of age • People who spend a lot of time outdoors in snake-populated areas • Daylight hours and early evening of the summer months • The most common site is the upper extremity. 	<ul style="list-style-type: none"> • Snake populated area • Summer month, night time at home • Upper extremity right index finger
<p>Clinical Manifestations</p> <ul style="list-style-type: none"> • Ecchymosis • Sign of fang punctures, pain, edema, and erythema of the bite tissues • Necrosis • Nausea • Vomiting • Headache • Fainting • Abdominal pain • Paresthesia • Dyspnea or apnea • Severe paralysis • Apnea • Bleeding disorders and fatal haemorrhages • lymph node tenderness • Numbness • Metallic taste in the mouth. • Fasciculations • Hypotension • Paresthesias • Seizures • Coma • Kidney failure. • Severe local tissue destruction leads to disability and limb amputation. 	<ul style="list-style-type: none"> • Sign of fang puncture and edema at site • Vomiting • Chest pain • Drooping of eyelids • Apnea • Hypotension at the time of admission
<p>Diagnostic tests</p> <ul style="list-style-type: none"> • Physical examination • Blood studies: coagulation profile, CBC, renal function test • ECG • CT scan 	<ul style="list-style-type: none"> • Physical examination • Blood studies: coagulation profile, CBC, renal function test • EEG
<p>Management</p> <ul style="list-style-type: none"> • Vital signs monitoring • GCS monitoring • Antibiotics • Antivenin (Polyvalent Anti Snake Venom-ASV) • Ventilator support • Monitor urine output, and lab parameters regularly • Circumference of the bitten extremity and compare with opposite extremity 	<ul style="list-style-type: none"> • Vital signs monitored and stable with ventilator support • GCS – 3/15 on admission • Antibiotics (Inj. Piptaz 4.5 gm) • Anti- Snake Venom as per protocol • Ventilator support given for 7 days and then extubated

However, the availability and accessibility of antivenoms are major hurdles. Many regions with high snakebite rates do not have sufficient supplies of effective antivenoms, leading to preventable

deaths and disabilities. Ensuring a reliable supply chain and distribution network for antivenoms is essential. Additionally, healthcare providers need to be trained in the correct use of antivenoms and the management of possible adverse reactions. Several strategies can be employed to reduce the public health burden of snakebites. Public education on snakebite prevention, first aid, and the importance of seeking immediate medical care is crucial. Awareness campaigns can significantly lower snakebite incidents and improve outcomes by promoting timely medical intervention. Improved Strengthening healthcare systems, especially in rural and underserved areas, is vital. This includes ensuring the availability of antivenoms, training healthcare personnel, and enhancing transportation networks for rapid access to medical facilities. Ongoing research into more effective and affordable antivenoms is necessary. Advances in biotechnology can lead to improved formulations that are easier to produce, store, and administer. Involving local communities in snakebite prevention efforts can be very effective. This can include promoting the use of protective gear, encouraging safe agricultural practices, and involving community leaders in educational initiatives. Policy and Advocacy: Governments and international organizations should prioritize snakebite management in public health agendas. Policies that support funding for antivenom production, research, and healthcare improvements are essential to reduce the global burden of snakebites. Snakebites are a significant yet often overlooked public health issue. By improving the availability and accessibility of high-quality antivenoms, enhancing healthcare infrastructure, and increasing public awareness, many of the deaths and severe consequences of snakebites can be prevented. A coordinated effort involving governments, healthcare providers, researchers, and communities is essential to effectively address this urgent health challenge.

CONCLUSION

After nine days of intensive care in the ICU, the patient's condition stabilized, allowing for a transfer to the general ward for continued management. This case highlights that many deaths and serious consequences resulting from snakebites can be entirely prevented by ensuring that safe and effective antivenoms are more widely available and accessible. High-quality snake antivenoms are the most effective treatment option to counteract or reverse the majority of venomous effects caused by snakebites. The availability and accessibility of these antivenoms are crucial in mitigating the life-threatening impacts of envenomation. Effective antivenoms work by neutralizing the toxins present in the snake venom, thereby preventing further damage to the victim's body. When administered promptly, these antivenoms can significantly improve the patient's prognosis, reducing the likelihood of severe complications or fatalities. In addition to the medical benefits, making antivenoms more accessible also alleviates the burden on healthcare systems. Quick and effective treatment of snakebite victims reduces the need for prolonged hospital stays and intensive care, allowing for more efficient use of medical resources. This can lead to better overall outcomes for patients and more streamlined healthcare operations. Furthermore, increasing public awareness about the importance of timely medical intervention and the availability of antivenoms is essential. Education campaigns can inform communities about the dangers of snakebites and the critical role of antivenoms in treatment. This knowledge can encourage individuals to seek immediate medical help when bitten, thereby improving their chances of a full recovery. In summary, the stabilization of a patient after ICU care for a snakebite underscores the importance of making high-quality antivenoms more accessible. These antivenoms are the most effective treatment for neutralizing venomous effects and preventing severe outcomes. By ensuring their widespread availability and raising public awareness, many deaths and serious consequences of snakebites can be prevented.

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