

Incidence and Outcome of Adverse Reactions to Anti-Snake Venom in Envenomous Snake Bite Cases: A Cross-Sectional Study

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Abstract:

Snakebite envenomation is a critical public health issue in tropical and subtropical regions, including India, where agricultural workers are predominantly affected. Anti-snake venom (ASV) is the primary treatment modality, yet it is associated with significant adverse drug reactions (ADRs), including anaphylaxis. This cross-sectional study evaluates the incidence and outcomes of ASV-related ADRs among envenomous snakebite cases in a tertiary care hospital in Thrissur, Kerala. Out of 85 patients admitted with snakebites, 50 were envenomated and administered ASV. ADRs were reported in 40% of these cases, with anaphylaxis occurring in 8%. This study highlights the need for improved ASV administration protocols and public health interventions to enhance safety and outcomes in snakebite management.

Keywords: anti-snake venom, adverse reactions, envenomation, anaphylaxis, snakebite management, pharmacovigilance.

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Introduction

Snakebite is a life-threatening condition and a public health emergency in many low- and middle-income countries.

In India, it is estimated that over 2 million snakebites occur annually, resulting in 35,000–50,000 deaths [1]. Despite its prevalence, snakebite remains a neglected medical issue, particularly in rural areas.

The four primary venomous snakes responsible for envenomations in India are the spectacled cobra (*Naja naja*), common krait (*Bungarus caeruleus*), Russell's viper (*Daboia russelii*), and saw-scaled viper (*Echis carinatus*). Anti-snake venom (ASV) is the only definitive treatment for snakebite envenomation [2]. However, its administration is not without challenges. ASV use is associated with a high incidence of ADRs, ranging from mild hypersensitivity reactions to severe anaphylaxis, which can complicate patient management and adversely affect outcomes [3].

This study aims to investigate the incidence of ADRs following ASV administration and their outcomes in a cohort of envenomous snakebite patients admitted to a tertiary care center in Kerala, India.

Materials and Methods

This cross-sectional study was conducted in the Department of General Medicine at Government Medical College, Thrissur, Kerala, from January 1, 2019, to December 31, 2019. The institution serves as a major referral center for snakebite cases in the region. Patients aged ≥ 18 years admitted with confirmed snakebites were included. Among the 85 patients studied, 50 exhibited clinical signs of envenomation and were administered ASV.

Data on demographic details, clinical presentation, snake identification (if possible), ASV administration, adverse reactions, and patient outcomes were recorded. Ethical clearance was obtained, and informed consent was secured from all participants.

Results

Among the 85 cases, 50 were envenomated and treated with ASV.

Adverse reactions occurred in 40% of cases, with anaphylaxis reported in 8%. Male patients (68%) and farmers (70%) represented the majority of the affected population. The mean age was 39.8 years for ADR patients.

Hemotoxic envenomation was the most common (60%), and higher ASV vial counts were significantly associated with increased ADR risk.

Discussion

The 40% incidence of ADRs observed aligns with global trends. Factors contributing to the high ADR rate include reliance on polyvalent ASV, delayed administration, and large vial usage. Efforts to educate communities on snake identification could improve targeted treatment.

Anaphylaxis remains a critical concern, emphasizing the need for rapid recognition and management to reduce mortality.

Conclusion

Snakebites remain a significant public health challenge in India, disproportionately affecting rural populations. This study underscores the importance of addressing ADRs associated with ASV through pharmacovigilance, education, and the development of safer, species-specific formulations.

Recommendations

1. Equip healthcare providers to manage ADRs effectively and administer ASV safely.
2. Educate high-risk populations on snake identification and first-aid measures.
3. Strengthen ADR reporting systems to improve ASV safety profiles.
4. Research species-specific ASV formulations tailored to regional venom profiles.

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