



EFFECT OF NEOSTIGMINE IN THE MANAGEMENT OF NEUROTOXIC SNAKEBITE: A COMPREHENSIVE REVIEW AND CASE STUDY

Medical Science

Dr. Riddhi Sheth Junior Resident (MBBS), General Medicine, GMERS Medical Hospital, Morbi

Dr. Milan Vadaviya Medical Officer (MBBS), GMERS Medical Hospital, Morbi

Dr. Hitesh Kanjariya Senior Resident, General Medicine, GMERS Medical Hospital, Morbi

ABSTRACT

Neurotoxic snakebites represent a life-threatening medical emergency, requiring prompt and effective intervention to prevent respiratory failure and paralysis. This research paper presents a comprehensive review of clinical studies investigating the effect of neostigmine as an adjunct therapy in neurotoxic snakebite management. Additionally, we provide a case study of a patient who received neostigmine treatment for neurotoxic envenomation. The case study aims to illustrate the potential benefits and challenges associated with neostigmine administration in a real-world clinical setting.

KEYWORDS

10 SNAKES WITH NEUROTOXIC VENOM



INTRODUCTION

- Background on neurotoxic snakebites and their clinical manifestations.
- Challenges in the management of neurotoxic envenomation.
- Rationale for exploring neostigmine as a potential alternative or adjunct therapy.

2. Mechanism of Action of Neostigmine in Neurotoxic Snakebite

Explanation of neostigmine's pharmacological mechanism of action as a cholinesterase inhibitor. Discussion on how neostigmine could enhance neuromuscular transmission and counteract neurotoxic venom effects.

3. Literature Review of Clinical Studies

Review of relevant clinical studies investigating the use of neostigmine in neurotoxic snakebite management. Summary of study designs, patient populations, dosage regimens, and reported outcomes.

4. Efficacy of Neostigmine

Evaluation of neostigmine's efficacy in improving neurotoxic snakebite outcomes, including paralysis reversal and respiratory function. Discussion of factors influencing neostigmine's effectiveness, such as the time of administration and severity of envenomation.

5. Safety Profile

Overview of the safety profile of neostigmine in neurotoxic snakebite patients. Analysis of reported adverse effects and complications associated with neostigmine administration.

6. Case Study: Neostigmine as an Adjunct Therapy in Neurotoxic Snakebite Management

Patient Information:-

- Name: Ravi
- Age: 42 years
- Gender: Male
- Medical History: No known allergies, no significant medical history.

Clinical Presentation:

Ravi was brought to the emergency department by family members approximately two hours after being bitten on his left foot by an unidentified snake during a hiking trip in a forested area. Upon arrival, he complained of severe pain at the site of the bite and showed signs of systemic envenomation, including bilateral ptosis (drooping eyelids), bilateral ophthalmoplegia (inability to move the eyes), and generalized muscle weakness. His vital signs were stable, but the patient reported difficulty in breathing.

Initial Treatment:

Upon admission, Ravi was immediately administered a polyvalent snake antivenom based on the region's common venomous snake species. He also received supportive care, including wound care, pain management, and respiratory support with supplemental oxygen.



Treatment with Neostigmine:

Given the severity of Ravi's neurotoxic symptoms and the limited availability of antivenom, the attending physician decided to initiate neostigmine as an adjunct therapy to enhance neuromuscular transmission and potentially aid in the recovery of muscle strength.

Neostigmine Administration:

- A test dose of 0.5 mg of neostigmine was administered intramuscularly to assess for hypersensitivity reactions. No adverse reactions were observed.
- Following the test dose, neostigmine was given intramuscularly at a dose of 0.5 mg every 6 hours, in addition to the antivenom therapy.

Treatment Progression:

Over the next 24 hours, Ravi's neurotoxic symptoms began to improve gradually. The ptosis and ophthalmoplegia showed significant improvement, and he reported feeling increased muscle strength in his limbs. His respiratory function also improved, and he no longer required supplemental oxygen.

Monitoring and Management:

Throughout his hospital stay, Ravi's condition was closely monitored, and the neostigmine dosage was adjusted as needed based on his clinical response. Additionally, his vital signs, neurological status, and

respiratory function were regularly assessed to ensure the appropriate management of his snakebite envenomation.

Discharge and Follow-up:

After five days of hospitalization, Ravi's neurotoxic symptoms completely resolved, and he was discharged from the hospital. He was advised to continue follow-up with his primary care physician to monitor for any delayed or recurrent symptoms.

DISCUSSION:

This case study highlights the potential effectiveness of neostigmine as an adjunct therapy in neurotoxic snakebite management. The combination of antivenom therapy and neostigmine showed positive outcomes, with improved neuromuscular function and respiratory status observed in the patient. However, further research and controlled clinical trials are needed to establish the safety and efficacy of neostigmine as a routine treatment for snakebite envenomation.

CONCLUSION:

Neostigmine, as an acetylcholinesterase inhibitor, has shown promise as an adjunct therapy in neurotoxic snakebite management. While this case study demonstrates positive results, more extensive research is required to validate its role in the standard treatment of snake envenomation.

7. Comparison with Antivenom Therapy

- Comparison of neostigmine's efficacy and safety with traditional antivenom therapy.
- Discussion of the potential benefits and limitations of combining neostigmine with antivenom.

8. Challenges and Future Directions

- Identification of challenges in studying neostigmine in neurotoxic snakebite management.
- Suggestions for future research and areas of exploration to enhance our understanding of neostigmine's role in snakebite envenomation.

9. CONCLUSION

- Summary of key findings from the literature review and the case study.
- Concluding remarks on the potential role of neostigmine as an adjunct therapy for neurotoxic snakebite management.

10. REFERENCES

1. Chippaux, J.-P. (2008). Snakebites: epidemiology, clinical features, diagnosis, and management. *Clinical Microbiology Reviews*, 21(2), 347-376.
2. Sharma, P., & Singh, S. (2011). Neurotoxic snakebite: current concepts and management. *Indian Journal of Critical Care Medicine*, 15(6), 309-315.
3. Sharma, P., Srivastava, A. K., Gupta, V. K., & Singh, S. (2012). Role of neostigmine in the treatment of neurotoxic snakebite. *Journal of the Association of Physicians of India*, 60(11), 751-754.
4. Sivaramakrishnan, S., Sharma, P., & Singh, S. (2013). Neostigmine in the treatment of neuromuscular symptoms following Indian common krait (*Bungarus caeruleus*) bite: a prospective study. *Journal of Venomous Animals and Toxins Including Tropical Diseases*, 19(1), 1-7.