Otogenic tetanus: A challenge for anesthetic management

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ABSTRACT

Introduction: Tetanus is a disease caused by endotoxins, tetanolysin and tetanospasmin released from Clostridium tetani which affects motor inhibitory neurons. The challenge for anesthesiologist lies in control of autonomic dysfunction and muscle spasticity. Case Report: In this article we have discussed anesthetic management of a 5-year-old boy with otogenic tetanus posted for removal of foreign body in left ear. He was admitted in infectious ward with trismus, fever, muscle spasm and difficulty in swallowing for last four days. He received intramuscular tetanus toxoid, intramuscular immunoglobulin 5000 IU as bolus followed by 2500 IU/day. Intravenous diazepam 6 mg at every three hours and intravenous cefixime was given. On second day of admission he was posted for removal of foreign body in left ear. Intravenous diazepam and fentanyl were given as premedication and sevoflurane, nitrous oxide and oxygen was used for general anesthesia. During surgery and in postoperative period he developed hypertension and tachycardia, was treated with intravenous labetolol. Conclusion: In case of tetanus, volatile anesthetic agents can be safely used for surgical procedures like cleaning and debridement of wound, removal of foreign body or incision and drainage of abscess. However, use of nondepolarizing muscle relaxant is advisable. As we used sevoflurane in single case, further study is required for confirmation of its efficacy and safety. Autonomic hyperactivity can be managed with beta-blocker, intravenous labetolol is the drug of choice.

Keywords: Otogenic tetanus, Sevoflurane, Labetolol, Foreign body


INTRODUCTION

Tetanus is an infectious disease caused by anaerobic spore forming bacteria Clostridium tetani [1, 2]. Incidence of tetanus is higher in males than in females [3]. Clinical presentation is due to toxins produced by the organisms, tetanospasmin and tetanolysin. The portals of entry of the bacteria into the body is usually contaminated wound. When a suppurating ear is the only known portal of entry, it is termed otogenic tetanus [4]. Otogenic tetanus is more common in children less than 6 years [4]. Mortality is lower in otogenic tetanus than in other groups [3]. In tetanus, mortality is due to respiratory failure and cardiovascular collapse, associated with autonomic instability [5].
Tetanus is a disorder caused by the bacterium Clostridium tetani, which produces a neurotoxin. This neurotoxin blocks the release of neurotransmitters at synapses, leading to muscle spasms and autonomic hyperactivity. The symptoms of tetanus can include muscle spasms, difficulty swallowing, and changes in blood pressure and heart rate. Treatment of tetanus typically involves the administration of antitetanus globulin and intravenous fluids, along with management of the muscle spasms through the use of muscle relaxants and other medications. The use of muscle relaxants can be beneficial in managing the muscle spasms associated with tetanus, as they can help to reduce the frequency and intensity of the spasms, allowing the patient to maintain a better quality of life. Overall, the treatment of tetanus is crucial for ensuring the recovery of the patient and preventing complications.
needed (10–18 mg/kg) by nasogastric tube in sever cases [8]. In case of failure to control spasm by benzodiazepines, nondepolarizing muscle relaxant is used. Nondepolarizing agents occupy the postsynaptic receptors, preventing acetylcholine neuromuscular transmission by competitive inhibiton and producing muscle relaxation. However, since there is heightened efferent neural discharge, generalized tetany markedly increases the requirement for nondepolarizing agents [1, 7]. Neuromuscular blocking drugs with steroid molecule should be avoided in view of prolonged weakness [7]. Vecuronium infusion is free from cardiovascular side effects but may cause little histamine release [1].

Depolarizing neuromuscular blocker succinylcholine should be used with caution, as it may trigger hyperkalemic arrest. This may possibly be related acute renal failure leading to hyperkalemia or myoglobinurina. Dantrolene acts at the level of sarcoplasmic reticulum [6]. Baclafen is administered via the intrathecal route. It diffuses through capillaries of spinal cord and binds to GABA-B receptors in the substantia gelatinosa of dorsal horn to inhibit monosynaptic extensor and polysynaptic flexor transmission [6, 7]. It carries a significant risk of respiratory depression [2]. Volatile anesthetic agents enhance the activity of inhibitory postsynaptic receptors while inhibit excitatory sympathetic channel activity [9]. Volatile anesthetics produce hypnosis, analgesia and inhibit motion, predominantly by acting at the level of the spinal cord. Sevoflurane relieves tetany and allows airway control and ventilation [9]. Supraglottic airway devices may further diminish the need for endotracheal intubation. As most air passes through the nasal passages during mask ventilation, a nasal airway can facilitate ventilation, even in the presence of masseter spasm. Magnesium with its unique property on the neuromuscular junction and sympathetic system has been used to treat both spasms and autonomic dysfunction with limited success [6, 7].

Magnesium reduces autonomic disturbances and spasm [10]. Magnesium blocks catecholamine release from nerves and adrenal medulla [7].

Autonomic dysfunction is the most serious complication of severe tetanus presenting with sustained but labile hypertension, tachycardia, arrhythmia, profuse sweating, pyrexia, increased carbon dioxide, increased catecholamine’s and later on hypotension. These symptoms develop towards the end of first week [6]. Hypotension and bradycardia may also result from brainstem involvement or myocarditis [9]. Autonomic hyperactivity is treated with narcotics which also relieves pain [11]. Labetalol acts by inhibiting uptake of norepinephrine into nerve terminals. It can be helpful along with sedatives and narcotics. We used intravenous fentanyl, midazolam and bolus dose of labetolol but we did not require continuous infusion of labetolol. Epidural blockade is effective in controlling sympathetic over activity and the associated complications [12]. Beta-blockers should be used with caution as they have been implicated in the deaths of some patients with autonomic dysfunction [7]. In treating Clostridium tetani infection, metronidazole is more effective than Penicillin G since it is a GABA antagonist [12]. Even though there is no documented evidence regarding safety of volatile anesthetic agents we used sevoflurane as a sole agent as the procedure is of short duration and in our patient muscle spasm was very well controlled.

CONCLUSION

In case of tetanus, volatile anesthetic agents can be safely used for surgical procedures like cleaning and debridement of wound or incision and drainage of abscess. However, use of nondepolarizing muscle relaxants is advisable. As we used sevoflurane in single case, further study is required for confirmation of its efficacy and safety. Autonomic hyperactivity can be managed with beta-blocker, intravenous labetolol is the drug of choice.

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Anil Shrinivas Joshi – Conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Final approval of the version to be published

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The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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