

Sciatic Nerve Block in Tetanus: A Case Report

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Abstract

Introduction: Muscle rigidity and generalized spasm can cause severe pain in patients with tetanus. Administration of high dose sedative or narcotic agents can increase respiratory failure and prolong mechanical ventilation support.

Case Presentation: In this report, ultrasound-guided sciatic nerve block was performed in a 25-year-old patient with tetanus to progress his respiratory drive which was decreased due to high dose sedative administration. This procedure accelerates the weaning process and extubation.

Conclusions: Nerve blocks may be appropriate for the particular patient with tetanus to tolerate the pain, reduce depth of sedation, accelerate extubation and subsequently decrease complications of tetanus relating to long time intubation.

Keywords: Sciatic Nerve, Nerve Block, Tetanus, Intensive Care Units, U.S. Guided

1. Introduction

The management of tetanic spasms and its induced pain in the admitted patients of intensive care unit (ICU) is one of the most important challenges in medicine. Since tetanus is a rare and fatal disease, it can be only detected through history and clinical diagnosis (no specific laboratory is found for it) (1, 2). Therefore, management of tetanus in ICU is an effective approach to evaluate the clinical features, assessment of complications and patient's outcome. Patients with tetanus need ICU admission due to airway obstruction and respiratory failure for mechanical ventilation support, cardiac monitoring and care of infectious complications (3, 4). Tetanus has an incubation period of 3 - 21 days (average eight days) and the patient may not have any experience of consciousness impairment (5). Muscular contraction is very painful and large doses of analgesics are needed to reduce spasmodic pain (4). Induced respiratory failure due to deep sedation, by sedative and narcotics, may lead to mechanical ventilation. Hence, pain control in conscious tetanic patients is one of the serious interventions in ICU (1, 4, 6-8). Here is reported a case of generalized tetanus in which the main spasm was dominant in left lower limb and sciatic nerve block facilitated patient's extubation due to lowering the sedation agents.

2. Case Presentation

The patient was a 25-year-old Afghan male. He had expe-

rienced penetrating sharp injury with nail to his left heel 20 days before admission. Eight days after injury, lockjaw and muscle spasms developed, particularly in left lower extremity. Vaccination history of the patient was negative. He was awake and experienced trismus (mouth was opened only one centimeter) and marked opisthotonos. The generalized attacks with 3 - 4 minutes intervals for a few seconds dominated in his left leg. Two doses of human anti-tetanus immunoglobulin (Hyper-Tet 250 U) was injected into his buttock and a 0.5 mg of tetanus-diphtheria toxoid was injected in the deltoid muscle. He was admitted to ICU for more care and received midazolam and morphine infusion.

Patient had feeding via Nasogastric (NG) tube. The patient had severe spasms and was at risk of rhabdomyolysis. Therefore, for renal protection, hydration was done by half saline 4 L/day and bicarbonate infusion to keep urine pH > 5. Metronidazole was prescribed, 500 mg/qid/iv. The patient had a temperature of 38°C for three days after ICU admission then received tazocin 3.375 g/qid, empirically. Ciprofloxacin 500 mg iv (twice per day) was started for a positive urine culture (*Escherichia coli* > 100,000). Despite the above mentioned medications, the patient was still experiencing severe generalized spasm and pain and needed more sedation and analgesics; therefore he remained intubated and spasms were reduced by high doses of sedatives, analgesics and muscle relaxants. The

pancronium 4 mg as loading dose, then 2 mg/hour was used for patient relaxation. On the tenth day, the patient underwent percutaneous dilatational tracheostomy (PDT). On the fifteenth day, with partial improvement of patient's spasms, the muscle relaxant was discontinued. But spastic attacks, with dominance in left leg, continued and high doses of sedative agents were prescribed; consequently, ventilation and oxygenation status of the patient were disrupted and he could not be extubated. Prescription of baclofen had no significant effect. Therefore, considering the spastic attacks and pain focused on the left leg, chief complaint of the patient and to facilitate extubation, ultrasound-guided sciatic nerve block (esaoate, MyLab® 30 cv) was suggested. A curved 5 MHz probe on upper part of the medial thigh, a 20G, 120-mm-long, 30° short beveled Teflon-coated (Vygon, Locoplex® Ecouen, France) Electro-Stimulating XIU Three Needle was inserted into the target, sciatic nerve, using in-plane approach, while the electrical nerve stimulator was set on 1.7 mA, 2 Hz, 0.1 ms, and an electrical surface electrode was attached on his calf. After obtaining foot aversion on 0.5 mA, 2 Hz, 0.1 ms current, 40 mL of Marcaine 0.17% (MYLAN) + lidocaine 0.7% (Iran Hormone co., Iran) was injected after frequent negative aspirations. Drug distribution was observed around the target. Patient's pain score decreased to less than 2 in the Universal pain assessment tool measure (in which pain severity is recorded on a 0 to 10 numeric scale where 0 indicates no pain at all and 10 indicates the worst pain imaginable) (9). The patient's pain was relieved and he was extubated on the 18th day after ICU admission. Routine ICU monitoring was performed during ICU admission. The patient had tachycardia but blood pressure was almost stable. Routine laboratory data and liver function test was normal and Creatine Phosphokinase (CPK) raised up to 4500 IU/L. The patient left the ICU with the good general condition.

3. Discussion

Two tetanus toxins, tetanospasmin and tetanolysin, can produce spasms and sympathetic manifestations in clinical appearance following the entrance into the nervous system via the Neuromuscular Junction (NMJ) (7). One of the most important effects of tetanospasmin is blocking the inhibitory amino acid (Gamma Aminobutyric acid (GABA) and glycine) released by binding with presynaptic nerve ending of the neuronal membrane. Due to this process, spasms, seizures and sympathetic over activity can happen (3, 7).

The management of spasms is one of the important challenges in patients with tetanus and administration of several medications and adjuvant therapeutic treatments such as some palliative cares and supportive actions are essential (4). Benzodiazepines are the first agents used to reduce the severity of spasms. Another agent for spasm reduction is baclofen that reduces the release of P substance and excitatory neurotransmitters;

therefore, it can be used to reduce spasticity through presynaptic inhibition of mono- and polysynaptic reflexes (1). Of course, these processes had no effect on tetanus toxins activity.

In the current case, patient had no consciousness impairment experience. Hence, induction of respiratory failure due to deep sedation, by sedatives and narcotics, may lead to application of another treatment approach for pain relief. The initial symptom of tetanus, as in this patient, is spasm of the jaw (trismus), but the patient under study never had dysphagia, laryngospasm, spasm of the respiratory tract muscles, cardiorespiratory arrest and also his gag was intact before intubation and he was fed by tube. Active antibiotics against *Clostridium tetani* such as metronidazole were rather useful by reducing organism burden, albeit they had no effect on reformed toxins.

In the third week of ICU admission, the patient almost had good condition but the spastic attacks continued and induced spastic pain led to prescribing high doses of sedatives and analgesics. Deep sedation led to the loss of consciousness and inappropriate airway protection as well as continuation of intubation and mechanical ventilation. Prolonged intubation may lead to some complications such as Ventilatory Associated Pneumonia (VAP), severe sepsis and increase the length of ICU stay. In this situation, the patient may fall in a downhill vicious cycle that can cause the morbidity and mortality to increase. Then, it should be tried to discontinue mechanical ventilation and extubate the patient as soon as possible. Considering the receptors' irreversible occupation at the NMJ, it was obvious that the attack will not be prevented by nerve block. But the pain disappeared in the patient after nerve block and just an intermittent low dose of midazolam was used to calm down the patient psychiatrically. Fortunately in the current case the nerve sciatic block and analgesia continued for 48 hours. After relieving the nerve block, the pain was tolerable by the patient and did not need any opioid-analgesic agents.

Nerve blocks may be appropriate for the particular patients with tetanus to tolerate the pain and reduce the application of sedation similar to the intubation period, and subsequently complications of tetanus due to long intubation.

Footnote

Authors' Contribution: Study design and data collection: Mohammad Taghi Beigmohammadi and Hamid Reza Amiri; manuscript preparation and review: Saeid Safari, Farhad Tavakoli and Hamid Reza Amiri.

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