CASE REPORT

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Tetanus in a Non-Immunized Adult: Early Diagnosis and Successful Management - A Case Report

Monesh Verma[1*], Gourav Patidar[2], Garima Namdev[3]

[1,3]Department of Community Medicine, Chirayu Medical College and Hospital, Bhopal, Madhya Pradesh, India
[2]Department of General Medicine, Chirayu Medical College and Hospital, Bhopal, Madhya Pradesh, India

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***Corresponding author**:
Dr Monesh Verma
(Email: moneshpower24@gmail.com)

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ABSTRACT

Introduction Tetanus is an acute infectious disease of the nervous system caused by Clostridium tetani (C. tetani) characterized by muscle spasms that are caused by the toxin-producing spores of the anaerobic bacteria. These spores are ubiquitous in soil, ash, the intestinal tract of animals and humans, and on the surface of skin and rusty tools like nails, needles, and barbed wire, leading it to be a high-mortality disease. Clinical features of this disease include muscle spasms that begin in the jaw (lockjaw), painful muscle spasms, seizures, headache and fever.

Case report: This report describes a case of 19-year-old male with history of thorn prick presented to a tertiary care hospital in central India.

Conclusion: Ensuring timely and complete immunization is of paramount importance in preventing the occurrence of adult tetanus as it not only provides robust and long-lasting protection against Clostridium tetani but also reduces morbidity and mortality. It also reflects the gross lack of awareness of post-exposure prophylaxis against this deadly infection.

Keywords: Adult tetanus, Lockjaw, Thorn prick, Immunization

INTRODUCTION

Tetanus is an acute infectious disease of the nervous system characterized by muscle spasms that are caused by the toxin-producing spores of the anaerobic bacteria C. tetani. It is a gram-positive, spore-forming, obligate anaerobic bacterium that produces the neurotoxin tetanospasmin. These spores are ubiquitous in soil, ash, the intestinal tracts/faeces of animals and humans, and on the surface of skin and rusty tools like nails, needles, and barbed wire, leading it to be a high-mortality disease.[1] Contaminated wounds are the key entry points for these spores in the human body.

The clinical picture comprises painful muscle spasms that begin in the jaw (lockjaw) and the inability to open the mouth. It often occurs in the back, abdomen and extremities and is triggered by sudden noise, touch or light. Other clinical features are like - headache, fever and sweating, stiffness of neck, shoulder and back muscles, violent generalized muscle spasms, convulsions, difficulty in swallowing and breathing and changes in blood pressure and heart rate.[2]

According to the World Health Organization, in the year 2021, a total of 1240 cases of tetanus were reported in India; out of them, 81 were neonatal, whereas 1159 were non-neonatal, which showed the complexity of in-

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tensive care and the need for adult booster immunizations.[3]

Although the tetanus vaccine protects against infection and is included in the National Immunization Schedule (NIS), also, post-exposure prophylaxis (PEP) plays a crucial role in preventing it. Proper wound care is also very essential based on the type, duration, and severity of the injury.

CASE REPORT

A 19-year-old right-handed male resident of Guna presented with a 07-day history of a thorn prick in his left leg while working with his father in the fields. He neglected the thorn prick, presuming it a minor and casual injury. Later, he noticed a gradual stiffness developing in his neck and presumed it as a result of fatigue, but as the discomfort persisted, he started experiencing difficulty in swallowing, which triggered him to approach the nearest health facility. Due to the unavailability of the resources, he was referred to the tertiary centre for proper management. The patient had not received proper first aid or antiseptic dressing, which increases the risk of tetanus, particularly in the presence of devitalized tissue and poor hygiene.

On the day of admission, a puncture wound was present on the foot with surrounding erythema and mild swelling. He had trismus (lock jaw), developing into risus sardonicus, leading to difficulty in breathing. He also started developing tonic spasms along with shortness of breath that led to the urgency for nasal intubation, maintaining oxygen saturation of 98%.

The general vaccination status of the patient was assessed through a detailed history obtained from the family members, as well as a review of any available immunization records. However, no vaccination documents were provided at the time of admission. Specific inquiry was made regarding tetanus vaccination. The patient had no recollection of receiving a tetanus toxoid (TT) booster in the past 10 years. This incomplete and unverified vaccination history increased the likelihood of susceptibility to tetanus and was taken into account during clinical evaluation and management. It was observed absence of the BCG mark on his left arm, which confirmed his unvaccinated history. The next day, elective nasal intubation was planned, and an infusion of intravenous diazepam along with phentermine was initiated keeping him in full sedation along with fluid management for hydration. On the day of admission, tetanus immunoglobulin was administered at a single dose of 500 IU intramuscularly, along with a Td injection (0.5 ml).

He also exhibited episodes of autonomic dysfunction, including sweating, tachycardia, fluctuating blood pressure and ventilator-associated pneumonia during this period, which was further managed with magnesium sulphate (intravenously, 1 g/hour for 2 days), beta-blockers (intravenous labetalol 30 mg/hour for 2 days), along with broad-spectrum antibiotics. Intravenous Metronidazole (500 mg IV every 7 hrs for 7 days) was also initiated.

Furthermore, selective investigations for this case were performed that resulted in these findings with tetanus toxoid antibody 0.40 IU/ml, indicating non-vaccination status of the case. The values of procalcitonin were 4.81 ng/dl and C-reactive protein, 55.4 ng/dl, respectively. The patient's lipid profile, thyroid profile, and HBA1c, along with routine investigations, were found within normal limits.

Figure 1: Progress of the patient on 5th day in the Intensive Care Unit (ICU)

Figure 2: Spastic muscular rigidity of left hand

Imaging modalities like - USG and Contrast-enhanced magnetic Resonance Imaging (CEMRI) was also conducted with no abnormality detected. On High-Resolution Computed Tomography (HRCT), only patchy subpleural atelectasis was observed.

After 5 weeks of hospitalization, he gradually showed signs of improvement and was switched to oral medications and discharged. Prompt medical intervention and tetanus immunoglobulins contributed to the patient's recovery, as well as preventing complications. Regular follow-up visits should be mandatory to know the consequences of the disease. Thus, in this case, it is to be learnt that a minor injury might cause infection in full-blown form.

DISCUSSION

While neonatal tetanus is often considered a preventable disease due to its widespread immunization programs across the country, the occurrence of adult tetanus case still challenges this assumption. Post exposure prophylaxis immediately after getting wound plays a crucial role in preventing adult tetanus, because the incubation period of this disease is between 3- and 21-days following infection.[4]

Post-exposure prophylaxis (PEP) of tetanus involves the timely administration of a tetanus toxoid-containing vaccine (such as Tdap or Td) and, in certain cases, tetanus immunoglobulin (TIG), depending on the nature of the wound and the individual's immunization history.

The recommended approach based on wound type, i.e. minor wounds less than 6 hours with minimal tissue damage and major wounds more than 6 hours with **significant tissue damage,** puncture, avulsion, crush injury, or presence of foreign material, along with immunization status, is mentioned in the tables. (Tables 1)

Table 1: Recommended Guidelines for Tetanus Prophylaxis (Minor Wounds)

Category	Vaccination History
A	Complete toxoid series + last booster <5 yrs
B	Last booster 5–10 years ago
C	Last booster >10 years ago
D	Incomplete or unknown vaccination status

The present case sustained a small prick that led him to a high-risk, life-threatening condition. In the same city (Bhopal), a case series was provided by Meena M in 2021 and showed that 3 out of 4 adult tetanus cases could not recall their immunization history.[3]

Sometimes, skipping a tetanus booster might seem like an inconsequential matter, but it can turn to be serious form. In a case report by Mohamed Amirali Gulamhussein et al[5] in 2016, a 35-year-old right-handed male received full immunization as a child but had no further boosters. He presented with a 24-hour history of a painful, swollen right thumb with surrounding cellulitis. He recalled that 2 weeks ago, he had been injured by a metal splinter that he was able to extract using a needle; however, this wound became infected and turned out to be a localized tetanus case.[6]

Therefore, it is very important to remember that the pathogenesis of tetanus is often rooted in inadequate wound care or failure to promptly seek medical attention for minor injuries, [7,8] as illustrated in our case, where a seemingly trivial wound (thorn prick) led to a life-threatening condition.

In nutshell, aligning the adult vaccination with the existing national immunization programme for children and providing these services through the well-established primary health-care system is of utmost priority.[9]

Healthcare professionals should also encourage tetanus vaccination for school-going children, farmers and sports persons who are more prone to ground injuries. In parallel, regular awareness sessions should be conducted periodically at the community level.

CONCLUSION

This case illustrates the clinical severity and management challenges associated with generalized tetanus following a neglected minor injury in an unvaccinated adolescent male. The absence of timely wound care and the lack of a tetanus immunization booster contributed significantly to disease onset and progression. Laboratory confirmation of tetanus toxoid antibody levels (0.40 IU/mL) supported the clinical suspicion of inadequate immunization. The patient required critical care interventions, including airway protection via nasal intubation, sedation with muscle relaxants, management of autonomic instability, and treatment of ventilator-associated complications.

Prompt administration of tetanus immunoglobulin and supportive therapy proved beneficial in achieving recovery. Furthermore, it reinforces the utility of serological testing in confirming immunization status when documentation is lacking.

Clinical Message: This case underscores the critical complications associated with missing routine vaccinations under the National Immunisation Schedule. While newborns are often the focus of the immunization panel, it is important to recognize that unimmunized adults also remain at significantly high risk for tetanus.

Consent: Written informed consent was obtained from the patient's relatives for the publication of the case report and the accompanying images.

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