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A CASE REPORT OF LOCKJAW

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ABSTRACT Tetanus is a potentially fatal neurological disorder caused by the neurotoxin tetanospasmin, produced by *Clostridium tetani*. Despite a significant global decline in incidence due to improved immunization, tetanus remains a major health concern in low-resource settings with limited access to vaccination and wound care. This case report presents a 23-year-old laborer from Bihar who developed generalized tetanus following a neglected puncture wound caused by a rusty nail. The patient exhibited classical features including trismus, generalized muscle stiffness, dysphagia, and shortness of breath, necessitating ICU admission. Investigations were largely unremarkable, and differential diagnoses such as meningitis, stroke, and Guillain-Barré syndrome were ruled out. A low anti-tetanus IgG level (0.12 IU/mL) indicated suboptimal immunity. The patient was treated with human tetanus immunoglobulin, intravenous antibiotics, lorazepam for muscle spasms, and supportive care, leading to clinical improvement. This case emphasizes the importance of prompt prophylactic tetanus vaccination after traumatic injuries, especially in individuals with unknown or incomplete immunization status. It also highlights the critical need for increased public health awareness and booster vaccination in adults to prevent such avoidable and life-threatening conditions. Clinicians should maintain a high index of suspicion for tetanus in cases presenting with muscle rigidity and a history of injury, even when minor.

KEYWORDS : Generalized Tetanus, Clostridium tetani, Tetanus Immunization

INTRODUCTION

Tetanus is a neurological disorder caused by a neurotoxin from *Clostridium tetani*, an anaerobic bacterium commonly found in soil. It typically develops after traumatic injuries contaminated with the bacterium. Although global tetanus incidence has declined—from 10.26 per 100,000 in 1990 to 1.03 in 2019—it remains a serious concern in unvaccinated individuals, especially in regions with poor healthcare access.[1,2]

Tetanus presents in four forms: generalized, localized, cephalic, and neonatal. Generalized tetanus is the most common and severe, characterized by widespread muscle spasms and rigidity. Localized tetanus affects muscles near the wound. Cephalic tetanus, a rare form, follows head trauma or ear infections and involves cranial nerves. Neonatal tetanus occurs due to unhygienic delivery practices and remains a major cause of neonatal death in developing countries. The incubation period averages 8 days, ranging from 3 to 21 days.

Generalized tetanus typically begins with trismus (lockjaw), progressing to muscle spasms, autonomic instability, and respiratory compromise. Diagnosis is clinical, and prompt management is critical.[3,4] We present a case of a 23-year-old male with shortness of breath, backache, trismus, and generalized stiffness for 10 days.

Case Presentation

A 23-year-old unmarried male from Bihar, currently residing in Kolhapur and working as a laborer, presented with complaints of shortness of breath for the past 6 days, and difficulty in opening the mouth, backache, and generalized stiffness for the past 10 days. He also reported an inability to bend, difficulty in getting up from a lying position, pain and cramps in the right leg, inability to speak, and difficulty eating solid food due to jaw tightness and gum pain over the same duration. His symptoms were progressive, with initial backache and trismus followed by difficulty in speaking and general muscle stiffness. The inability to consume solid food progressed due to increasing jaw rigidity, although he was still able to take liquids. Six days before admission, he developed progressive shortness of breath which worsened on exertion and eventually necessitated ICU admission.

There was no history of fever, altered sensorium, upper limb weakness, chest pain, palpitations, orthopnea, seizures, gastrointestinal, or urinary complaints. A significant history included a penetrating injury to the sole of the right foot with a rusty nail 20 days before symptom onset, for which no medical treatment or tetanus prophylaxis was taken. There was no history of recent drug intake, injections, animal bites, or toxin exposure. The patient had no known comorbidities, past medical or surgical history, and no family history of similar illnesses.

On personal history, he reported a mixed diet and normal bowel and bladder habits. Sleep was disturbed due to symptoms. He had a history of chewing gutka for the past three years but denied smoking, alcohol, or other substance use. Immunization records were not available, and he had not received a tetanus toxoid injection after the foot injury.

On general examination, the patient was conscious, oriented, and cooperative. He was of thin build, with a BMI of 18.5 kg/m^2. Vital signs were within normal limits: pulse rate of 86 bpm, BP 116/72 mmHg, respiratory rate of 26/min, temperature 98°F, and SpO_2 of 98% on room air. Notably, he had trismus, though signs such as risus sardonicus, opisthotonus, or carpopedal spasms were absent. There were no signs of pallor, cyanosis, clubbing, icterus, lymphadenopathy, or pedal edema.

Systemic examination revealed abdominal muscle rigidity. CNS examination showed normal higher mental functions but difficulty in testing cranial nerves V, VII, IX, X, and XII due to trismus. Motor examination showed normal tone and power with brisk reflexes and equivocal plantars. Cardiovascular and respiratory system examinations were unremarkable.

Laboratory investigations revealed normal renal and liver function tests, normal serum calcium (9.2 mg/dl), normal blood sugars, and normal CPK levels. Troponin levels were negative. Chest X-ray and ECG were normal. MRI of the whole spine and CT angiography were also normal. Anti-tetanus IgG test was done and observed IgG antibody level in the blood was 0.12 IU/mL, which suggested that individual has a detectable level of immunity to tetanus; however, it is advisable to keep it under observation. A booster dose of the

tetanus vaccine may be recommended within 1 to 2 years to ensure continued protection.

A number of differential diagnoses were considered including rhabdomyolysis, meningitis, neuroleptic malignant syndrome, strychnine poisoning, hypocalcemia, rabies, stroke, stiff person syndrome, snakebite, and Guillain-Barré syndrome—all of which were ruled out based on history, clinical findings, and investigation results. Based on the classical presentation—trismus, generalized muscle rigidity and spasms, dysphagia with preserved sensorium, and a clear history of a neglected penetrating injury—the most probable diagnosis was generalized tetanus, likely progressing from a localized form.

The patient was managed with human tetanus immunoglobulin (HTIG) 3000 IU intramuscularly, intravenous metronidazole 500 mg every 6 hours, and Augmentin 1.2 g twice daily for 7 days. Lorazepam 0.5 mg IV was given for spasms, with symptomatic improvement noted the following day. Supportive care included soft diet, physiotherapy, abdominal hot fomentation, and initiation of tetanus immunization. Wound hygiene and proper dressing were ensured.

This case underscores the importance of early tetanus prophylaxis in wound management and the need for adult booster doses to maintain immunity. Tetanus immunization during infancy provides about 84% protection, but booster doses during school years and adulthood are essential. Preventive measures such as safe cord care in neonates and hygienic wound management remain key public health strategies for tetanus prevention.

DISCUSSION

Tetanus remains a rare but serious infectious disease, particularly in areas where vaccination coverage is inadequate. This case highlights the classical clinical features of generalized tetanus in a young adult male who sustained a minor penetrating foot injury from a rusted nail and did not receive appropriate wound care or tetanus prophylaxis. The progression from localized symptoms such as trismus and back pain to generalized rigidity and spasms underscores the potentially life-threatening nature of this condition if not identified and managed early.

Generalized tetanus is the most frequent clinical form and is typically characterized by trismus, dysphagia, muscle rigidity, and painful spasms triggered by sensory stimuli. The pathophysiology involves the tetanospasmin toxin binding irreversibly to nerve terminals, preventing the release of inhibitory neurotransmitters like glycine and gamma-aminobutyric acid (GABA), leading to disinhibition of motor neurons and sustained muscle contraction. The incubation period in this case—approximately 10 days from injury to symptom onset—is within the typical range of 3 to 21 days, with shorter intervals generally indicating more severe disease.[5-7]

Diagnosis of tetanus is clinical, as laboratory and radiologic tests are often nonspecific.[4] In this case, investigations including creatine kinase, MRI spine, and cerebrospinal fluid analysis were unremarkable, helping rule out differential diagnoses such as rhabdomyolysis, meningitis, and stroke. The absence of fever, neck rigidity, or altered mental status helped exclude central nervous system infections, while the lack of autonomic instability and antipsychotic use made neuroleptic malignant syndrome less likely. Guillain-Barré Syndrome was considered but ruled out based on preserved reflexes and absence of ascending paralysis.

The mainstay of tetanus management includes neutralization of circulating toxin using human tetanus immunoglobulin (HTIG), eradication of *Clostridium tetani* with appropriate antibiotics (typically metronidazole), control of muscle spasms with agents such as benzodiazepines, and supportive care including physiotherapy and nutrition.[3, 4] In this patient, administration of HTIG, antibiotics, and lorazepam resulted in notable clinical improvement, confirming the diagnosis retrospectively.

Importantly, the patient's uncertain vaccination history highlights the continuing gaps in adult immunization practices. Although tetanus is preventable through immunization, many adults in low- and middle-income countries remain at risk due to incomplete vaccine schedules or lack of booster doses. According to WHO guidelines, after the primary childhood series, booster doses should be administered during adolescence and adulthood to maintain lifelong immunity.[8]

This case underscores the need for public health awareness on wound hygiene and tetanus immunization, particularly in occupational groups such as laborers who are more prone to injuries. Early recognition and prompt treatment of tetanus are crucial to prevent complications and mortality, which can be as high as 30–50% in severe cases without access to intensive care.

CONCLUSION

This case highlights the clinical progression of a likely *localized tetanus* transforming into *generalized tetanus* in a young male following an untreated puncture wound from a rusty nail. This report underscores the critical importance of thorough history-taking, especially in cases of minor trauma, and reinforces the need for public health awareness regarding wound care and timely tetanus vaccination. It also serves as a reminder for clinicians to maintain a high index of suspicion for tetanus, even in the absence of classic signs or visible injuries, particularly in unvaccinated or uncertain vaccination status individuals.

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