

Evidence Based Diagnosis of a Case of Tetanus

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Abstract

A 40-year-old male presented with spasms, trismus, and difficulty in swallowing, progressing to severe muscle rigidity and convulsions following a thorn prick injury on his left sole sustained 15 days earlier. The patient had no prior vaccination history, including for tetanus, and was previously in good health. Clinical examination revealed trismus, generalized muscle stiffness, and respiratory distress. Laboratory investigations were largely unremarkable, except for hypoxemia, leading to tracheostomy for respiratory support. Based on clinical findings and microbiological evidence from an abscess culture revealing *Clostridium tetani* with characteristic drumstick morphology, a diagnosis of tetanus was confirmed. Management included tetanus toxoid, human tetanus immunoglobulin, antibiotics, muscle relaxants, anti-epileptics, and ventilatory support. The patient recovered after two weeks and was discharged in stable condition. This case highlights the ongoing public health challenge posed by tetanus in unvaccinated adults and underscores the importance of preventive immunization and wound management to reduce the disease burden. Comprehensive diagnosis and evidence-based treatment are essential for improved outcomes in such preventable cases.

Keywords: *Clostridium tetani*; Tetanus; Trismus; Tonic Spasms; Robertson Cooked Meat Broth; Thioglycolate Broth

Introduction

Tetanus is a life-threatening, vaccine-preventable disease caused by *Clostridium tetani*, an anaerobic, spore-forming bacterium widely present in soil and environmental surfaces [1]. Despite global efforts toward eradication through immunization, tetanus remains a significant public health concern in developing countries, including India, particularly in unvaccinated individuals or those with incomplete immunization. It is commonly associated with trauma or wounds, especially in individuals involved in agricultural activities [2]. This case report highlights the clinical presentation, microbiological diagnosis, and multidisciplinary management of tetanus in a 40-year-old male with a history of a thorn prick injury, emphasizing the importance of immunization, early diagnosis, and comprehensive care in improving outcomes.

Case Report

A 40-year-old male was admitted to our hospital with primary complaints of muscle spasms in all limbs and lockjaw persisting for two days. The patient presented with trismus, muscle pain initially in the upper limbs progressing to the lower limbs, muscle stiffness, and difficulty swallowing. The spasms were gradually progressive, and the patient was unable to open his mouth upon presentation. He

reported a history of repeated grand mal convulsions over the previous three days and a thorn prick injury sustained in an agricultural field 15 days prior. Despite treatment by a private practitioner, he had received no vaccinations, including tetanus, since childhood. The patient was previously healthy, with no history of diabetes or hypertension.

General examination

Upon examination, the patient was restless with notable trismus and muscle rigidity throughout the body. An abscess, measuring 2x2 cm, was observed on the left sole. Vital signs revealed a pulse rate of 120/min, respiratory rate of 22 cycles/min, blood pressure of 130/80 mm Hg, and oxygen saturation (SpO₂) of 96% on room air. Heart sounds (S1 and S2) were present, and lung examination was clear. Due to trismus, the patient was unable to communicate effectively, although he was irritable and restless. There was no evidence of opisthotonus.

Central nervous system examination

The patient had intact deep tendon reflexes, flexor plantar responses, and neck stiffness. Cranial nerve function was normal.

Laboratory investigations

A complete blood count showed normal results, and peripheral smear examination was unremarkable. Erythrocyte sedimentation rate (ESR) was 20 mm/hr, HIV serology was negative, and plasma glucose levels were normal. Serum urea, creatinine, liver function tests, and electrolyte levels were within normal limits, as were cerebrospinal fluid (CSF) findings.

Clinical course

Two days after admission, the patient required a tracheostomy due to dyspnea and hypoxemia with a PO₂ of 40 mmHg, PCO₂ of 30 mmHg, and pH of 7.2. Based on the clinical presentation trismus, tonic spasms in the limbs, neck stiffness, and convulsions-a provisional diagnosis of tetanus was made, supported by the history of a thorn prick injury.

Microbiological investigations

Tissue samples from the necrotic wound area were collected and cultured under both aerobic and anaerobic conditions. Blood agar and MacConkey agar were used for aerobic culture, while blood agar plates were incubated anaerobically using a gaspak jar. Samples were also inoculated into thioglycolate broth, an anaerobic transport medium, and into three tubes of Robertson's cooked meat broth. The broths were heated variably to selectively kill vegetative bacteria while preserving tetanus spores, which are resistant to heat. After daily subculturing onto blood agar for four days, anaerobic cultures showed characteristic swarming growth of *Clostridium tetani* on the third day. Gram staining revealed typical drumstick-shaped bacilli, confirming *Clostridium tetani* (Figure 1). The swarming inhibition test with anti-tetanus serum further verified the diagnosis.

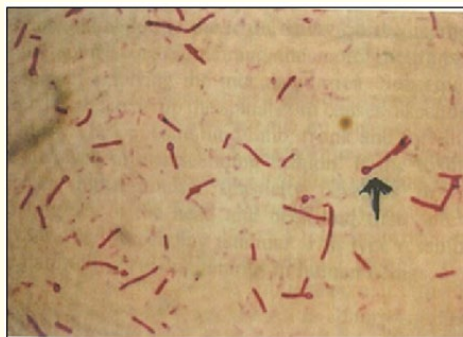


Figure 1: Showing the *Clostridium tetani* isolated from the patients sample.

Management

The patient was promptly transferred to the MICU and started on treatment. Tetanus toxoid and antibiotics (Amikacin 500 mg IV every 12 hours for five days and Ceftriaxone + Sulbactam 1g + 250 mg daily for seven days) were administered. Following the confirmatory diagnosis, a single dose of 5,000 I.U. human tetanus immunoglobulin was given intramuscularly to neutralize the toxin. The patient was intubated, connected to a ventilator, and received supportive therapy, including muscle relaxants and anti-epileptics. The patient improved with ventilator support and was successfully extubated after five days. He continued to recover and was discharged two weeks after admission in stable condition.

Discussion

Tetanus, caused by *Clostridium tetani*, remains a preventable yet life-threatening condition, particularly in regions with inadequate vaccination and wound care practices [3]. The disease is driven by tetanospasmin, a potent neurotoxin causing unopposed muscle contractions and spasms. Despite global efforts to improve vaccination coverage, tetanus persists in rural, agricultural populations due to environmental exposure, poor healthcare access, and declining adult immunity [4,5]. Diagnosis is clinical, supported by microbiological confirmation when available. Management involves toxin neutralization with immunoglobulin, antibiotics, wound debridement, and intensive supportive care, often necessitating prolonged ICU stays [6]. Public health priorities include strengthening immunization programs, raising awareness about wound care, and improving access to prophylactic and therapeutic interventions [7]. This case underscores the need for early diagnosis and evidence-based management to reduce morbidity and mortality from this preventable disease.

This case explains the necessity for routine immunization and thorough wound care, especially in individuals at high risk for injury. Males, who frequently engage in outdoor and agricultural work, are more exposed to *C. tetani*, often from injuries on the lower extremities, as seen in our patient's thorn prick injury on the left sole. Additionally, declining immunity in adults, notably beyond 40 years, further exacerbates the risk of tetanus in this demographic.

Conclusion

Tetanus continues to be a public health concern in India, straining limited healthcare resources despite being preventable. Essential measures for prevention include proper wound care, toxin neutralization, antibiotic therapy, intensive care, and active immunization. Evidence-based diagnosis and management, including basic microbiological investigations, are critical for improving patient outcomes and minimizing preventable deaths due to tetanus.

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