

Severe Generalized Tetanus in an Adolescent Following Delayed Post-Exposure Prophylaxis in Kyrgyzstan: A Case Report

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Abstract

Tetanus is a serious, but not the most common, infection, which can be deadly in the age of universal immunization. The patient represents a clinical case of severe generalized tetanus in a 15-year-old adolescent who contracted the disease due to a puncture wound to the foot without receiving prophylaxis immediately after contact. The case highlights that tetanus is an epidemiologically relevant disease in people who are not fully vaccinated or who have not received booster injections. This illness was described as typical 8-10 days following trauma and was typified by traditional indicators of generalized tetanus, comprising trismus, severe muscle spasms, risus sardonicus, tonic convulsions, and consciousness preservation. The observed clinical manifestation was in line with the established neurotoxicity of tetanospasmin on the inhibitory mechanisms via the central nervous system. The patient was admitted and treated in an intensive care unit. Having antitetanus serum, antibacterial treatment, infusion support, sedation, and muscle relaxants were all taken into account as extensive treatment. The patient underwent constant examination, and their condition improved, avoiding the development of critical complications. This case study brings to the fore the significance

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of wound management, especially in the management of puncture wounds, prompt prophylaxis administration of tetanus in case of supposedly infected wounds, and following booster vaccinations in the adolescent stage strictly. Even the individual instances are to be viewed as signs of possible lapses in vaccination coverage. During active tetanus prevention and control, constant checking of the vaccination status, raising public awareness on the issue of prophylaxis due to injuries, and long-term clinical monitoring are crucial elements of successful prevention of tetanus as a health condition.

Keywords: Tetanus, Generalized tetanus, Adolescent patient, Post-exposure prophylaxis, Immunization booster

Introduction

Tetanus is one of the worst and probably lethal bacterial infections in the nervous system. The condition is typified by increasing rigidity in the muscles, painful tonic spasms that occur in generalized trauma, and autonomic instability that would result in death unless medical care is administered promptly (Karna & Thakur, 2025). *Clostridium tetani* is an obligatory anaerobic, gram-positive, and sporulating bacillus that is highly abundant in the soil, dust, and faeces of animals. It has highly resistant spores that survive environmental circumstances and thus are able to remain in the environment (Cullinane *et al.*, 2006). The infection normally happens when the spores gain access to the body via contaminated wounds, such as non-serious wounds that do not necessarily concern medical practitioners. When the bacteria are in the anaerobic condition, they produce tetanospasmin, which is a powerful neurotoxin that blocks the inhibitory neurotransmitters like glycine and gamma-aminobutyric acid (GABA) in the central nervous system (Yen & Thwaites, 2019). Therefore, the unrestrained excitatory impulses culminate in permanent muscle spasms, trismus, opisthotonos, and overall convulsions. Routine vaccination with tetanus toxoid, which was widely introduced, has greatly decreased the incidence and mortality of tetanus around the world. The prevention lies in active childhood immunization with subsequent boosters (Siddiqui *et al.*, 2023). Also, post-injury prophylaxis, such as wound care and administration of tetanus immunoglobulin in case of need, is an essential measure in the prevention of the onset of the disease. With a well-established



healthcare system in countries where there are high vaccination coverage levels, tetanus has become a rare disease (Imam *et al.*, 2019). Nevertheless, unique instances are still being reported, especially among unvaccinated people, people who had either incomplete vaccination schedules or those whose booster vaccinations were after the recommended timeline. The risk is particularly topical in the rural settings, where the occupational exposure to soil and animal excreta will often be practiced, and the access to timely medical help can be restricted (Khan *et al.*, 2025).

In this case, adolescents are one of the at-risk groups. Despite the fact that they normally form part of the childhood immunization programs, missing the revaccination during adolescence stage could lead to a decrease in the levels of protective antibodies as they age. In others, the time since the last booster shot is too many years, and exposures are putting people at risk of infection (Borella-Venturini *et al.*, 2017). Scholarly separated clinical observations have given reports of severe generalized tetanus in adolescents either partly or had not undergone timely booster immunization. As an example, Akane Y *et al.* (2018) described the case of a 13-year-old patient who exhibited severe cases of muscle rigidity, trismus, and opisthotonos after suffering a minor wound to the foot. Even with antitoxin, sedative therapy, and anticonvulsants, the course of the disease was associated with autonomic dysfunction as an indication of the violent nature of generalized tetanus despite intensive management (Akane *et al.*, 2018). Such cases still happen, which confirms the fact that tetanus is still clinically relevant, even when the incidence is low in the regions. Further, a small injury caused by minor wounds that are not disinfected or even analyzed by a medical expert can be an inadvertent access point to infections. Teenagers performing outdoor activities, agricultural labor, or manual labor can also be at greater risk of exposure, especially in rural areas (Thwaites *et al.*, 2015).

This clinical case study of individual clinical cases from Kyrgyzstan of severe generalized tetanus in teens is of practical meaning. These observations can give information on the development of a disease, complications, and treatment issues. They also bring to prominence the effects of partial immunization or non-delivery of post-exposure prophylaxis in time. This clinical report explains one of the severe cases of generalized tetanus in an adolescent who was not receiving the treatment on time in terms of antibacterial and immunoprophylaxis, which reflects not only the course of the disease but also the current requirements of preventative vigilance.

Materials and Methods

Case Presentation

The study gives one clinical case of severe generalized tetanus in a 15-year-old adolescent patient who was treated in the Infectious Diseases Department of Osh City Clinical Hospital, Kyrgyzstan in October 2025. The research project was undertaken in the form of a retrospective review of the medical records of the patient. Inpatient chart provided clinical information, such as admission report, daily progress reports, intensive care monitoring report, laboratory report, and the treatment regimen. Data about the cause

of injury and immunization history were confirmed by means of vaccination history and interviews with the legal guardians of the patient. Before analysis, all data were anonymized.

The case of tetanus was diagnosed clinically and via typical neurologic manifestations in the case of the recent trauma and poor history of immunization. The systemic condition was evaluated by laboratory investigations, which provided information to support therapy. The management used common protocols in generalized tetanus and involved the use of human tetanus immunoglobulin, antimicrobial therapy, spasm control through sedation, and intensive supportive care.

The Ethical Committee of Osh State University gave the study its approval. The legal guardians of the patient, consenting to publication of anonymized clinical information, signed an informed consent in writing. All the practices were carried out in compliance with the postulates of the Declaration of Helsinki (World Medical Association, 2013).

Medical History

On 30th September, 2025, the patient was either punctured on the sole of the right foot in the construction works she was undertaking as a result of stepping over a nail. At home, the wound was treated using hydrogen peroxide. The next day, the medical staff suggested taking tetanus toxoid; nevertheless, the patient failed to visit the physician and did not get post-exposure prophylaxis. About a week or eight days following the injury, the patient started to experience typical symptoms, which are progressive trismus, which is followed by rigidity of the muscles, and the development of generalized convulsive spasms. He was hospitalized because his condition worsened as described in **Table 1**.

Upon admission, the patient was also conscious and oriented and had intact speech. His attitude in bed had been violent and of opisthotonos. Body temperature was 36.6 degree C. The heartbeat was 80bpm, blood pressure was 128/90mmHg, respiratory rate was 20 breaths per minute, and oxygen saturation (SpO₂) was 96 spontaneous on air. The neurological examination showed severe meningeal signs (+++), severe trismus, cervical and abdominal muscle rigidity. Minor external provocation would cause painful muscle spasms. The skin was pale. Breathing, vesicular, without wheezing. The cardiovascular system was not remarkable. On local inspection of the right foot, a small healed scar on the sole was found without hyperaemia, edema, or active inflammation.

Investigations revealed the following results in the laboratory: haemoglobin 141 g/L; leukocyte count 8.6 x 10⁹/ml; erythrocyte sedimentation rate (ESR) 16mm/h; C-reactive protein (CRP) 34.6 mg/L; blood glucose 5.4 mmol/L; alanine aminotransferase (ALT) 40 U/L; aspartate aminotransferase (AST). According to the history of trauma and the clinical appearance, the diagnosis was determined as A35.0 - Tetanus, severe course (generalized form).

Results and Discussion

The patient was immediately hooked up to the intensive care unit to be placed under prolonged observation and care after admission. Extensive therapy was introduced, relating to the clinical standards of the World Health Organization and the Kyrgyz health ministry. Certain immunotherapy consisted of anti-tetanus serum 200,000 IU intravenously on the condition of negative Bezredka sensitivity. Benzylpenicillin was used as the starting treatment of 2 million units six times daily as an antibacterial. The infusion therapy was Ringer solution, Reosorbilact solution, and 0.9% sodium chloride solution to aid in the balance of fluids and electrolytes.

Sedatives and muscle relaxants were used to control spasms and prevent convulsions: diazepam (Sibazon) 2 ml intravenously, propofol 20 ml in 200 ml of saline infused intravenously, and finally tolperisone (Mydocalm) 2 ml as 2 ml. Ketoprofen 2 ml intramuscularly was used as analgesia. Intravenous vitamin C (5% 4 ml), oxygen therapy, and nutritional support that was bolstered with protein were offered as supportive therapy. In the initial five days of the intensive treatment, the patient was in a serious yet stable condition. The generalized muscle spasms progressively stopped and diminished. During the hospitalization, consciousness was very clear, and respiratory failure did not occur. By October 12, the patient started to show improvement in the clinic, such as a decrease in seizure severity and partial recovery of swallowing behavior. There were no instances of complications with respect to treatment in the hospital.

Dynamics of the Condition by Day

Table 1. Treatment Regimen and Clinical Course of Severe Generalized Tetanus in an Adolescent Patient.

Date	Main symptoms	Treatment and interventions	Notes
October 8, 2025	Trismus, neck rigidity, hypertonia of the trunk muscles	Serum administration, antibiotic therapy, and infusions have been started.	Transferred to intensive care
October 9, 2025	Increased convulsions, difficulty swallowing, tachycardia	Additionally, 15,000 IU serum, 8 mg dexamethasone, and 2 ml sibazon were administered intravenously.	The condition is serious, SpO ₂ 94%
October 10, 2025	Tonic convulsions, risus sardonius	Muscle relaxants and propofol, maintenance therapy	Breathing is stable
October 11, 2025	Recurring spasms, difficulty swallowing, sweating	Ketoprofen 2 ml intramuscularly, sibazon 2 ml intravenously, Ringer 300 ml intravenously	Intensive surveillance
October 12, 2025	Increased muscle tension, tremors	Propofol 20 ml + NaCl 0.9% 200 ml IV, sedation	Diuresis 1750 ml,

			infusions 1100 ml
October 13, 2025	The condition is stable but serious; consciousness is clear.	Sedation, antibacterial and detoxification therapy were continued.	CRP 34.6 mg/l, AST 104 U/L

Day 1 - September 30, 2025

During construction work at home, the patient stepped on a rusty nail, resulting in a puncture wound to the sole of the right foot. The injury was managed at home with hydrogen peroxide. No professional medical evaluation was sought at that time. The patient had not received a tetanus vaccination before the injury (Mojsak *et al.*, 2022; Sugimori *et al.*, 2022; Kajanova & Badrov, 2024; Lee & Ferreira, 2024).

Day 2 - October 1, 2025

The case was about a patient reported to Nariman Territorial Hospital. Anti-tetanus serum was prescribed by the workers of the emergency medical staff. Nonetheless, there was no prophylactic immunization that was administered, and the patient went back home without the immunization.

Day 5-7 — October 4-6, 2025

Early clinical manifestations were observed in seven to eight days after the injury. The patient experienced headache and pronounced tension in the region of the head (Constantin *et al.*, 2022; Mojsak *et al.*, 2022; Essah *et al.*, 2024; Frost *et al.*, 2024; Rosellini *et al.*, 2024; Umarova *et al.*, 2024). The patient experienced painful spasms of the facial and cervical muscles, and he has had problems in chewing and swallowing. Sweating and irritability had increased as well. Body temperature was within the normal range. These symptoms developed slowly, which is in line with the normal incubation stage of tetanus (Alhussain *et al.*, 2022; Balaji *et al.*, 2022; Tsiganock *et al.*, 2023; Delcea *et al.*, 2024; Ribeiro *et al.*, 2024; Sanlier & Yasan, 2024; Uneno *et al.*, 2024).

Day 8 - October 8, 2025

The patient was taken to the infectious diseases department on October 8, 2025. During the presentation, he also reported about such pains as the occipital and cervical areas, difficulty swallowing, spasms in the limbs, and excessive perspiration. Physically, consciousness was clear and speech preserved; however, the patient was in a forced position with components of opisthotonos. Tension of the occipital muscles marked and pronounced meningeal signs (+++). The tone of the muscle was much elevated, and generalized spasticity occurred. An examination of the respiratory system showed vesicular breaths without wheezing. The pulse rate was between 79 and 82 beats per minute, and the blood pressure was 128/86 mmHg. Local inspection of the right foot revealed a small scar in the sole where there was a puncture wound with no inflammation or suppuration. Primary therapy was initiated. A negative Bezredka sensitivity test was observed; antitetanus serum 100,000 IU was then given. Benzylpenicillin 2 million units 6 per day antibacterial therapy was

initiated. Infusion was done with 200 mL of Reosorbilact and 200 mL of Ringer solution delivered via intravenous medium. The supportive treatment involved vitamin C 5% (4 ml intravenously) and ketoprofen 2 ml intramuscularly as analgesic agents. The patient was put under dynamic clinical observation as shown in **Table 2** (Adeleke, 2022; Razhaeva *et al.*, 2022; Rojas *et al.*, 2022; Sri *et al.*, 2022; Al Abadie *et al.*, 2023; Guzek *et al.*, 2023; Simonyan *et al.*, 2023; Aksoy & Akaydin, 2025; Kunie *et al.*, 2025).

Table 2. Initial Treatment Regimen on Day 8

Therapy Type	Medication	Dose / Route
Immunotherapy	Antitetanus serum	100,000 IU IV
Antibiotic	Benzylpenicillin	2 million units × 6/day
Infusion	Reosorbilact	200 ml IV
Infusion	Ringer's solution	200 ml IV
Supportive	Vitamin C 5%	4 ml IV
Analgesia	Ketoprofen	2 ml IM

Day 9 - October 9, 2025

The patient's condition remained severe. Convulsions persisted, and swallowing difficulty intensified. Additional measures included as also shown in **Table 3**:

- Antitetanus serum 15,000 IU + 0.9% NaCl 100 ml
- Dexamethasone 8 mg IV
- Sibazon 2 ml IV
- Continued infusion therapy and monitoring

Table 3. Laboratory findings on Day 9

Parameter	Value	Interpretation
Hemoglobin	141 g/L	Normal
WBC	$8.6 \times 10^9/L$	Normal
ESR	16 mm/h	Mild elevation
Prothrombin Index	63%	Reduced
ALT	19 U/L	Normal
AST	40 U/L	Upper normal
Creatinine	47 $\mu\text{mol/L}$	Normal

Day 10 - October 10, 2025

Clinical deterioration in neuromuscular symptoms was observed:

- Increased occipital rigidity
- Pronounced trismus
- Trunk muscle spasticity
- Periodic tonic convulsions

Consciousness remained clear, although speech became difficult due to muscle rigidity. Antibiotic therapy, muscle relaxants, sibazon, and infusion therapy were continued under intensive monitoring.

Day 11 – October 11, 2025

A neurological consultation was performed on the 11th of October 2025 at 3.00-18.00. The examination revealed the continuation of generalized convulsions and strong meningeal symptoms (+++). The patient still had problems with swallowing. There was no change in the respiratory activity as oxygen saturation was kept at 96%. The therapeutic intervention involved the use of sibazon 2 ml intravenous and ketoprofen 2 ml intramuscular. Infusion treatment was also proceeded and the patient was kept under strict clinical surveillance.

Day 12 - October 12, 2025

The situation of the patient was very difficult. It was pasted with serious generalized muscle spasms, excessive sweating, and tachypnea. Consciousness remained intact, although neuromuscular symptoms were so intense. Propofol 20 ml/200ml of 0.9% sodium chloride solution was injected intravenously as sedation. Close fluid balance was observed, and diuresis of 1,750 ml/day was administered, and the overall infusion fluid intake reached 1,100 ml daily.

During this time period, the hemodynamic monitoring was performed continuously, the diuretic was administered at 1,750 ml/day, and the total infusion volume was 1,100 ml/day.

Day 13 – October 13, 2025

The patient was evaluated on October 13, 2025, and was found to be stable, though with a serious condition, and moderately improved with the respiratory functions. Oxygen level was kept at 95-97%, and body temperature was 36.7-36.9 deg C. Although the vital parameters were stabilized, the presence of acute occipital rigidity (+++) and generalized hypertonicity of muscles remained. Lab results showed a high level of C-reactive protein (34.6 mg/L), which signifies the existence of an inflammatory reaction, and a high aspartate aminotransferase (AST) level at 104 U/L, which is indicative of a toxic involvement in the liver. There was no problem with the blood glucose level of 5.44 mmol/L. Therapy was resumed with antimicrobial and detoxification agents as well as therapeutic muscle relaxation with propofol and sibazon. The start of the disease was 8-10 days after the first injury, which is the normal range of tetanus incubation. Clinical appearance also reported was typical of a severe generalized type with trismus, risus sardonius, severe cervical rigidity, tonic convulsions, and was aware of what was happening. Complete intensive treatment was done, which consisted of antitetanus serum, antibacterial treatment, infusion treatment, sedation, and relaxation of the muscles. The patient was still in a severe but stable condition as of October 13, 2025, and he was under constant intensive observation.

Conclusion

This case of severe generalized tetanus highlights that while mass immunization is effective, the disease remains a serious risk without timely post-exposure prophylaxis and booster doses. The classic presentation (trismus, rigidity, risus sardonius, convulsions) reflects tetanospasmin's neurotoxic effects. Early intensive management ensured recovery, underscoring the importance of clinical vigilance. Prevention relies on adherence to

vaccination schedules, boosters every 10 years, proper wound management, and increased awareness among both the public and healthcare professionals.

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Conflict of interest: None

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Ethics statement: Informed oral consent was obtained from the patient for participation in this study. Ethical approval was granted by the Institutional Review Board of Osh State University, and the study was conducted in accordance with the principles of the Declaration of Helsinki.

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