

CASE REPORT

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Tetanus infection in an 11-year-old male with full infant vaccination history: a rare case report

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Abstract

Background Tetanus is a potentially life-threatening neurologic disorder caused by the toxin-producing bacterium *Clostridium tetani*. Primary prevention is achieved through vaccination, typically administered during infancy, however, breakthrough cases of tetanus in fully immunized individuals, especially in pediatric populations have been noted posing unique challenges for diagnosis and management. Uganda currently does not provide tetanus booster doses beyond infancy. The World Health Organisation (WHO) recommends 3 dose Tetanus Toxoid (TT) booster doses at ages 12–23 months, 4–7 years and 9–15 years whereas the US-Centers for Disease control (CDC) recommends 3 additional doses at 15–18 months, 4–6 months and at 11–12 years. This case report represents an unusual occurrence of tetanus in an 11-year-old male who had completed the standard infant vaccines recommended in Uganda but still manifested with symptoms consistent with the disease.

Case presentation An 11-year-old male from Uganda was referred to Mulago National Referral Hospital's Acute Care Unit from a peripheral health facility with worsening backache, trismus, difficulty swallowing, and heightened sensitivity to touch and noise. On admission, he presented with severe pain, an arched back, and frequent muscle spasms indicative of tetanus, despite receiving the standard recommended infant vaccines in Uganda. The patient received intravenous metronidazole, alternate diazepam, and chlorpromazine, leading to a steady improvement in symptoms after which he was discharged on day 29.

Conclusion This case underscores the critical necessity of remaining vigilant for tetanus, even in individuals with a documented history of complete immunization at infancy. Additionally, this scenario highlights the pressing need for reviews of vaccination policies in regions where the recommended booster doses are not currently integrated into routine immunization schedules. Emphasizing adherence to these booster doses is key to enhancing tetanus immunity throughout childhood and adolescence.

Keywords Tetanus, Booster doses

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Background

Tetanus is now rare in developed nations due to effective immunization programs, but it remains a threat to all unvaccinated people, especially in undeveloped nations [1]. The true incidence of tetanus remains unknown. However, about 48,000 to 80,000 deaths occurred from tetanus worldwide in 2016. Case fatality for tetanus is reported at 7.2% with overall mortality being highest among adults > 55 years [2].

The prevalence of tetanus has declined through the years owing to heightened vaccination programs. Because immunity to tetanus wanes over time, administration of the diphtheria-tetanus-acellular pertussis (DTaP) vaccine is routinely recommended in children. A single booster dose of a vaccine containing tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) recommended for 11- to 12-year-olds, followed by tetanus toxoid and the reduced diphtheria toxoid in the form of Td or Tdap recommended at 10-year intervals throughout life [3].

The immune response from the primary series of 3 DPT doses decreases over time with serological data indicating that a primary series of 3 tetanus toxoid-containing vaccine (TTCV) doses in infancy, followed by a booster in the second year of life, typically provides 3–5 years of protection. An additional booster in early childhood can extend protection into adolescence, while another booster during adolescence offers immunity lasting through much of adulthood, including the childbearing years for women [4].

The Uganda National Expanded Program on Immunization (UNEPI) guidelines focus on 3 doses administered at 6, 10, and 14 weeks through the Pentavalent DPT vaccine, and 5 additional doses for women of childbearing age (15–49 years). However, it lacks routine booster doses beyond infancy for the general population.

A study by Casey et al.; in Uganda found a higher prevalence of Non neonatal tetanus among older children and adults emphasizing the need for boosters [5]. Both the WHO and the CDC recommend three primary infant doses followed by three booster doses at 12–23 months, 4–7 years, and 9–15 years (WHO), and at 15–18 months, 4–6 years, and 11–12 years (CDC) to ensure lifelong protection, highlighting the importance of boosters beyond infancy [6, 7].

This case report aims to describe tetanus in an 11 year old male, fully vaccinated at infancy (as per Uganda's national guidelines), highlight the potential for waning immunity without boosters and to advocate for their inclusion in national immunization schedules.

The case presentation

An 11-year-old male, was referred from a peripheral clinic due to a progressive onset of symptoms. Initially

complaining of worsening backache, low-grade fever, and malaise, he later developed difficulty opening his mouth, sore throat, and increased challenges with swallowing, eventually leading to drooling. His condition worsened with recurrent episodes of painful muscle stiffness triggered by touch and noise. There were no signs of muscle weakness, convulsions, mental alterations, or exposure to toxins.

Two weeks before the onset of symptoms, he sustained an injury on his left forearm just below the elbow flexure. The injury, caused by an old compound broomstick during play, initially resulted in swelling and pus discharge three days post-incident. Although the swelling subsided and the wound began to dry up, he did not seek medical attention for the injury.

This was his first hospital admission, and he had no prior history of chronic illness. During pregnancy, his mother tested negative for the Human Immune Virus (HIV) and received two doses of the tetanus toxoid vaccine. He completed his routine childhood immunizations, including three doses of the pentavalent DPT vaccine at 6, 10, and 14 weeks of age. However, no booster doses were administered after infancy, as they are not included in the standard UNEPI schedule. His mother was unaware of the need for a tetanus booster beyond the infant vaccinations.

Upon admission, he was febrile ($T = 37.7^{\circ}\text{C}$), with no signs of pallor, jaundice, lymphadenopathy, or dehydration, and weighed 45 kg. Body Mass Index (BMI) for age z scores were not ascertained given limitations in taking his height.

He was alert and in pain, exhibited an arched back, extended neck, and had frequent muscle spasms triggered by touch and high-pitched sounds (1 every 10 min, lasting 2–5 min each). He struggled to open his mouth, experiencing drooling. He however had normal muscle bulk and power in all limbs but exhibited generalized hypertonia, ankle clonus, and hyperreflexia. Inspection of the suspected portal of entry on the left antecubital fossa revealed a 1 cm wide induration with a dry healing scab over it, warm and firm with mild tenderness. No respiratory distress was noted Respiratory Rate (RR)—23 bpm, a pulse rate of 68 bpm and normal heart sounds. The abdomen was rigid on palpation. A working diagnosis of Grade II tetanus as per the Ablett classification of tetanus severity was made [8, 9]. This was based on the presence of generalized muscle spasms, trismus, neck extension, an arched back, and a likely portal of entry at the left cubital fossa.

Baseline investigations included a complete blood count (CBC) which revealed a neutrophil-predominant leukocytosis with a White Blood Cell count of 16,300. The hemoglobin level was 12.1 g/dL, while other CBC parameters were within normal ranges. The HIV test

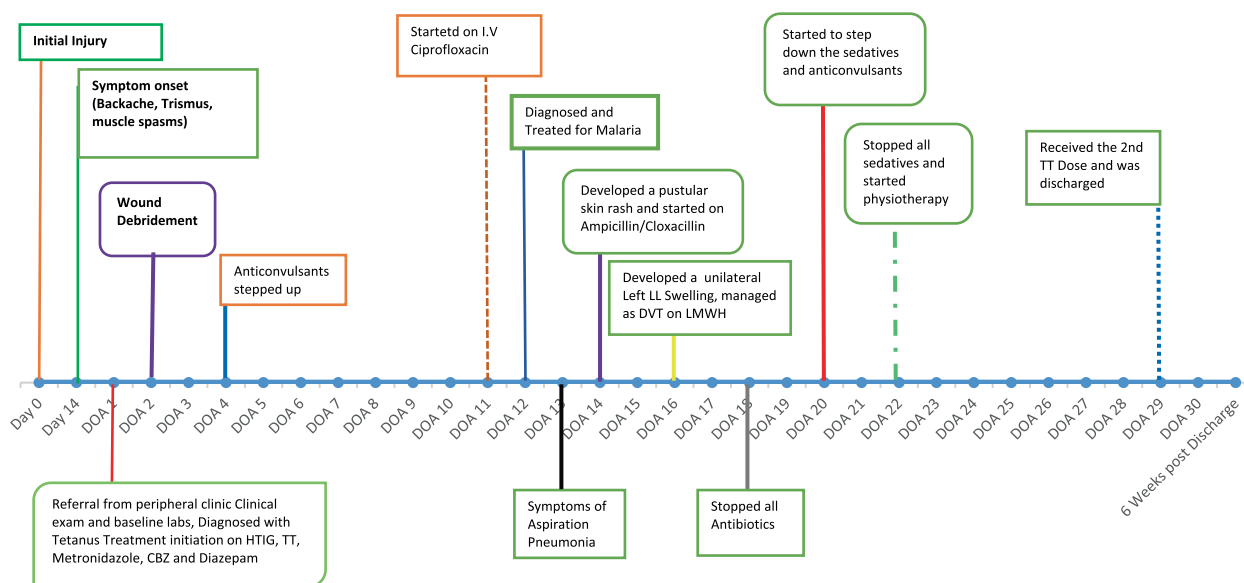


Fig. 1 A timeline illustrating the progression of clinical events during hospitalization

was negative, and an initial blood smear for Malaria was negative, however, it tested positive on day 12. Parameters for renal and liver function tests were within normal limits. Due to resource constraints, attempts to conduct blood culture and pus swab culture were unsuccessful. He was initiated on intravenous metronidazole (450 mg every 8 h), oral chlorpromazine (50 mg every 6 h alternated with oral diazepam at 15 mg every 6 h in 3-hourly intervals). He received 3000 IU of intramuscular tetanus immunoglobulin as a single dose, with 250 IU infiltrated at the wound site. Additionally, a stat dose of tetanus toxoid vaccine was administered.

A temperature and fluid balance chart tracked intake and output. The child was placed in a darkroom and had spasm frequency tallied. Caretakers were counseled to minimize stimuli. On day 2, wound debridement revealed a 6 cm broomstick fragment, and a purulent discharge which persisted.

During the ward stay, the frequency of spasms increased, leading to an upward adjustment of chlorpromazine to 75 mg and diazepam to 20 mg on day 4. Ciprofloxacin 500 mg 12 hourly was added for a week. This addition was considered owing to the synergistic activity of metronidazole and ciprofloxacin against anaerobic bacteria. He was also started on Intravenous Artesunate 3 doses 12 h apart having tested positive for malaria on day 12 of admission. He also developed recurrent aspiration pneumonia and often required suction. He later developed a pustular non-pruritic rash, however, no specific tests were done to determine its cause. We presumed it was staphylococcal in origin. Consequently, he received oral Ampicillin and Cloxacillin drug combination at 500 mg 6 hourly for 5 days. On day 16, he had

a unilateral left lower limb swelling managed as deep venous thrombosis (DVT) with daily Low Molecular Weight Heparin given the relatively higher risk of DVT in this age group. On day 18, all antibiotics were stopped, and by day 20, the patient had been spasm free for eight days with significant improvement noted. Gradual sedative weaning commenced, physiotherapy was initiated, and he was discharged on day 29. Tetanus Toxoid shots were recommended upon discharge and at 6 weeks.

A timeline illustration showing clinical events during hospitalization (Fig. 1)

Discussion

This case reflects a typical presentation of tetanus, diagnosed based on generalized hypertonia and painful muscle spasms, including the jaw and neck stiffness. He exhibited spasms triggered by various stimuli along with trismus, bilateral ankle clonus, and hyperreflexia. The child's initial back pain may suggest that symptoms started from the back, though typical tetanus features like trismus, risus sardonicus, severe spasms, and opisthotonus were present. Potential findings like abdominal tenderness or cranial nerve palsies were absent [10]. Tetanus can also cause autonomic dysfunction, with alternating hypertension, tachycardia, hypotension, and bradycardia, although his heart rate was normal, and blood pressure was difficult to monitor. The portal of entry was likely a broomstick injury, which increased the risk due to exposure to soil-borne *Clostridium tetani*. This bacterium thrives in environments rich in organic matter and enters through wounds or skin breaks. While his mother was vaccinated for tetanus during pregnancy, and the patient

had completed the childhood vaccination schedule, his risk was due to waning immunity at age 11, as booster doses were missed. This emphasizes the importance of following recommendations for interval booster doses beyond infancy [11, 12]. Tetanus is more common in the unvaccinated neonates and children in countries lacking immunization programs [13, 14]. Immune compromise is a potential risk factor for tetanus however there were no clinical features suggestive of immune-deficiency syndromes. HIV infection, a potential cause of immune incompetence, was excluded with the negative HIV serology.

This case underscores challenges in preventing tetanus infection, even among individuals who have completed the nationally recommended vaccination series at infancy. The primary concern in this case was the development of tetanus despite the child having received the full tetanus vaccination series per Uganda's national schedule during infancy. This raises significant questions about the adequacy of the current immunization schedule, where booster doses for tetanus are not consistently included in routine vaccination programs. Absence of boosters increases the potential for waning immunity as children grow older, leaving them vulnerable to tetanus. This infection could have been prevented had the recommended booster doses been administered at the appropriate intervals.

This case underscores the need for a review of Uganda's national vaccine schedule, especially in terms of integrating tetanus booster doses into the routine immunization program. Doing so could ensure longer-lasting immunity and reduce the risk of tetanus in children and adolescents. From a broader perspective, this case highlights the importance of not only adhering to infant vaccination schedules but also ensuring that follow-up booster doses are prioritized to maintain protection against preventable diseases like tetanus. The national vaccination schedule in Uganda does not currently include these boosters, raising concerns about its adequacy. A broader review of the schedule to integrate booster doses is crucial to prevent cases like this, ensuring immunity lasts into adolescence and adulthood.

C. tetani secretes toxins that cause muscle rigidity, spasms, and autonomic instability. The patient's symptoms emerged about two weeks after the injury, within the typical incubation period of 7–10 days, although it can range up to 60 days. Diagnosis is clinical, as there is no specific lab test for tetanus. Antitoxin levels, though useful for ruling out tetanus, were not performed. First-line treatment includes Human Tetanus Immunoglobulin (HTIG), wound debridement, and antibiotics. Metronidazole was used as it limits *C. tetani* growth, and diazepam provided muscle relaxation [15].

The patient received HTIG, debridement, and alternating sedatives. During recovery, he received his first tetanus toxoid vaccine since infection does not confer future immunity. Although the prognosis depends on the time from symptom onset to the first spasm, the 1-week interval in this case suggests a favorable outcome. Recovery is typically slow, and complications like pneumonia, pressure sores, and autonomic dysfunction can arise, with mortality resulting from respiratory failure and cardiovascular collapse [16].

Conclusion

In conclusion, this case highlights the urgent need to address the issue of waning immunity against tetanus in children beyond the standard childhood immunization schedule. Despite completing the initial vaccination series, the patient's development of tetanus at age 11 underscores the critical importance of administering booster doses to maintain long-term protection. Enhanced awareness and integration of the recommended booster schedules into national vaccination programs are essential to prevent such infections and mitigate their socioeconomic impact. A comprehensive review of vaccination policies and practices is needed to ensure sustained immunity and safeguard public health effectively.

Abbreviations

CBC	Complete Blood Count
GABA	Gamma-aminobutyric acid
HIV	Human Immune Virus
HTIG	Human Tetanus Immunoglobulin
TT	Tetanus Toxoid
WHO	World Health Organization

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12887-026-06588-x>.

Supplementary Material 1.

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Authors' contributions

FA took patient history, participated in patient management and drafted the initial manuscript. SA took part in patient management and edited the manuscript. FN also took part in patient management and edited the manuscript. VM oversaw the manuscript writing process and edited the manuscript. All authors read and approved the final manuscript.

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Data availability

All data supporting our findings are provided within the manuscript.

Declarations

Ethics approval and consent to participate

Ethical approval was not required for single case reports; hence, the study was not submitted for ethical review.

Consent for publication

We affirm that written informed consent has been obtained from the patient's legal guardian for the publication of this case report. A copy of the written consent is readily available for review by the Editor-in-Chief of this journal.

Competing interests

The authors declare no competing interests.

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References

1. Hasnain MG, Maruf S, Nath P, Anuwarul A, Ahmed MNU, Chowdhury IH, et al. Managing severe tetanus without ventilation support in a resource-limited setting in Bangladesh. *Am J Trop Med Hyg*. 2018;99(5):1234–8.
2. Centers for Disease Control and Prevention. Manual for the Surveillance of Vaccine-Preventable Diseases. Atlanta (GA). 2024. Available from: <https://www.cdc.gov/surv-manual/php/index.html>.
3. Liang JL, Tiwari T, Moro P, Messonnier NE, Reingold A, Sawyer M, et al. Prevention of pertussis, tetanus, and diphtheria with vaccines in the United States: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 2018;67(2):1–44.
4. Hammarlund E, Thomas A, Poore EA, Amanna IJ, Rynko AE, Mori M, et al. Durability of vaccine-induced immunity against tetanus and diphtheria toxins: a cross-sectional analysis. *Clin Infect Dis*. 2016;62(9):1111–8.
5. Casey RM, Nguna J, Opar B, Ampaire I, Lubwama J, Tanifum P, et al. Field investigation of high reported non-neonatal tetanus burden in Uganda, 2016–2017. *Int J Epidemiol*. 2023;52(4):1150–62.
6. Tetanus vaccines: WHO position paper, February 2017 – Recommendations. *Vaccine*. 2018. <https://doi.org/10.1016/j.vaccine.2017.02.034>.
7. CDC. Tetanus Vaccine Recommendations. Available from: <https://www.cdc.gov/tetanus/hcp/vaccine-recommendations/index.html>. Cited 2025 Aug 15.
8. Miranda-Filho DB, Ximenes RAA, Barone AA, Vaz VL, Vieira AG, Albuquerque VMG. Clinical classification of tetanus patients. *Braz J Med Biol Res*. 2006;39(10):1329–37.
9. Govender I, Clark C. Tetanus: a patient in a primary healthcare setting. *South Afr J Infect Dis*. 2015;30(3):194–7.
10. Fan Z, Zhao Y, Wang S, Zhang F, Zhuang C. Clinical features and outcomes of tetanus: a retrospective study. *Infect Drug Resist*. 2019;12:1289–93.
11. Dong M, Masuyer G, Stenmark P. Botulinum and tetanus neurotoxins. *Annu Rev Biochem*. 2019;88:811–37.
12. Cardinal PR, Henry SM, Joshi MG, Lauerma MH, Park HS. Fatal necrotizing soft-tissue infection caused by *Clostridium tetani* in an injecting drug user: a case report. *Surg Infect (Larchmt)*. 2020;21(5):457–60.
13. Fetuga BM, Ogunlesi TA, Adekanmbi FA. Risk factors for mortality in neonatal tetanus: A 15-year experience in Sagamu, Nigeria *World J Pediatr*. 2010;6(1):71–5.
14. Yildirim I, Omer SB. Tetanus. In: *Maternal Immunization*. 2019. <https://doi.org/10.1016/B978-0-323-79058-1.00073-6>.
15. Thwaites CL, Yen LM, Glover C, Tuan PQ, Nga NTN, Parry J, et al. Predicting the clinical outcome of tetanus: The tetanus severity score. *Trop Med Int Heal*. 2006;11(3):279–87.
16. Kyu HH, Mumford JE, Stanaway JD, Barber RM, Hancock JR, Vos T, et al. Mortality from tetanus between 1990 and 2015: findings from the global burden of disease study 2015. *BMC Public Health*. 2017;17(1):179.

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