

Clinical Profile and Outcome of Adult Tetanus: A Case Series at A Tertiary Care Center in Western Rajasthan

Dr. Lalit Kishore¹ , Dr. Mahendra Kumar^{2*} , Dr. Lakhan Kumar purohit³, Dr. Ashish Palsaniya⁴, Dr. Pooja Guru⁵

¹Professor, Department of General Surgery, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

²Assistant Professor, Department of General Surgery, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

³Assistant Professor, Department of General Surgery, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

⁴Junior Resident-3, Department of General Surgery, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

⁵Senior Demonstrator, Department of Pathology, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

*Corresponding Author: Dr. Mahendra Kumar

Email: yourrathi@yahoo.co.in

Received: 21.04.2026 | Revised: 30.07.2026 | Accepted: 16.08.2026 | Published: 14.09.2026

Abstract: Tetanus is an acute, serious neurological disease that results from a toxin produced by *Clostridium tetani*. Although the incidence of tetanus has decreased considerably worldwide due to immunization programs, the disease still results in a considerable amount of morbidity and mortality in developing countries, especially in adults who have not been adequately immunized. Generalized tetanus is still a treatable condition if it is identified early and treated aggressively in an intensive care unit. Severe disease is often associated with extensive use of intensive care facilities and mechanical ventilation. Early airway protection, sufficient spasm control, immunoglobulin therapy, careful supportive care, and infection monitoring are all key factors in determining good outcomes. Increasing vaccination rates and public awareness of the importance of adult immunization is still crucial to protect against this deadly and vaccine-preventable disease. We present a series of five adult patients with generalized tetanus treated in a specialized tetanus intensive care unit (ICU) in a tertiary care centre.

Keywords: Tetanus, Mechanical ventilation, Tracheostomy.

Citation: Mahendra Kumar *et al.* Clinical Profile and Outcome of Adult Tetanus: A Case Series at A Tertiary Care Center in Western Rajasthan. Grn Int J Apl Med Sci, 2026 Sep-Oct 4(5): 451-455.

INTRODUCTION

Tetanus is a life-threatening, acute neurological disorder that results from the toxin production of *Clostridium tetani*, an anaerobic bacterium found in the gut of humans and animals as well as in soil [1]. Spores are closely associated with contaminated traumatic wounds and enter the body via these wounds. Worldwide, the burden of tetanus has declined greatly in the last few decades, falling from 10.26 per 100,000 population in 1990 to 1.03 per 100,000 in 2019 [2]; however, tetanus continues to be a public health problem among people who are not fully immunized, especially in low- and middle-income countries with poor vaccination coverage and access to health services [2]. Although immunization programs have been developed, tetanus remains a significant cause of death, especially in developing countries. The case fatality rate has been reported to be around 42% in India [3,4]. There is still a long way to go in adult immunization, and this, together with lack of proper wound care and poor access to intensive care units, plays a role in the continuing morbidity and mortality. Tetanus continues to pose a threat to life in the world, particularly for unvaccinated adults, according to the World Health Organization (WHO) [5]. After

entering the host through a skin wound, *C. tetani* spores germinate under anaerobic conditions and transform into vegetative bacilli that synthesize tetanospasmin, a very potent neurotoxin. Tetanospasmin blocks the release of inhibitory neurotransmitters such as gamma-aminobutyric acid (GABA) and glycine from the presynaptic terminals in the central nervous system. This breakdown of inhibitory pathways diminishes the inhibitory effect on the motor neurons, causing continuous muscle contraction and painful spasms that form the clinical syndrome of tetanus [4]. Clinically, tetanus is recognized in four forms: neonatal, localized, cephalic and generalized, which is the most common and severe form [4]. Generalized tetanus is the most common type of tetanus, and the first sign of tetanus in over 80% of people is trismus (lockjaw). Early symptoms may consist of autonomic hyperactivity (sweating, tachycardia) that may evolve to autonomic instability (profuse sweating, arrhythmias, labile blood pressure, fever). Generalized tonic contraction of the muscles, recurrent painful spasms, stiff neck, opisthotonus, risus sardonicus, abdominal rigidity, dysphagia, apneas and upper airway obstruction are hallmark clinical findings [6]. Lab confirmation is not required for the diagnosis of

tetanus. Testing of wounds for *C. tetani* is insensitive and nonspecific, giving false positive and false negative results. Hence, diagnosis is based on identification of matching clinical characteristics in the context of no other more likely diagnosis [7]. Even where a disease occurs infrequently, continued clinical surveillance is vital; early diagnosis and intervention make a big difference to patient outcomes. Management involves neutralization of circulating toxin, control of muscle spasms, management of autonomic dysfunction, and prevention and treatment of complications such as secondary infections and respiratory failure

THE CASE

Case 1

A 46-year-old male presented with complaints of lockjaw, difficulty in swallowing with history of three days. He had sustained trauma to the left great toe 10 days prior to admission with no history of tetanus immunization. On examination patient had generalized body rigidity, and opisthotonus position. He was admitted and managed in a dedicated tetanus intensive care unit (ICU). In view of progressive trismus and anticipated airway compromise, elective endotracheal intubation was performed on the first day of admission. Routine blood investigations, Chest X ray and ECG were within normal limits. Intravenous sedatives and muscle relaxants were initiated for spasm control. Human tetanus immunoglobulin (5000 IU) intramuscular was administered, along with broad-spectrum antibiotics. During his hospital stay, he developed autonomic dysfunction characterized by profuse sweating, fluctuating blood pressure, and variability in heart rate. He remained on oral endotracheal intubation for 5 days. Subsequently tracheostomy was performed on day eight of admission to facilitate prolonged ventilatory support. Daily Chest X rays were done to rule out respiratory infections including ventilator associated pneumonia. Mechanical ventilation was continued, and he was successfully weaned off after 27 days. Sedatives were continued for 16 days, while muscle relaxants were administered for 40 days. Nutritional support was initiated with total parenteral nutrition, followed by Ryle's tube feeding starting on day 8 and gradual transition to oral feeding by day 28. The patient showed steady clinical improvement and was discharged on day 41 of hospitalization with complete recovery.

Case 2

A 22-year-old male presented with reduced mouth opening, generalized body stiffness of 10 days' duration. He had sustained trauma to the right toe 13 days prior to admission with no history of tetanus immunization. Patient developed progressive trismus, abdominal rigidity, neck stiffness and opisthotonus position. He was admitted to the tetanus ICU, and elective endotracheal intubation was performed on day one in view of severe trismus. Routine blood investigations, Chest X ray and ECG were within normal limits. Human tetanus immunoglobulin and high-dose intravenous antibiotics

were initiated. tracheostomy was carried out on day five to facilitate prolonged ventilatory support, and he was successfully weaned off by day 25. Sedatives were administered for 10 days, and muscle relaxants were continued for 30 days. Nutritional support was initiated with total parenteral nutrition, followed by Ryle's tube feeding and gradual transition to oral feeding. During hospitalization, he developed ventilator-associated pneumonia, which was managed with escalation of antibiotics according to tracheal culture, daily chest radiographs, and nebulization therapy. The patient improved gradually and was discharged on day 31 in stable condition.

Case 3

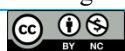
A 40-year-old male presented with reduced mouth opening, generalized muscle spasms for seven days. He had sustained a dirty wound over the right thumb 15 days prior, for which nail excision and debridement had been performed with no history of tetanus immunization. Patient developed gradually progressive lock jaw, autonomic dysfunction, abdominal rigidity and rigidity in both upper and lower limbs with opisthotonus position. He was admitted to the tetanus ICU, and elective endotracheal intubation was performed on day one. Routine blood investigations, Chest X ray and ECG were done which were within normal limits. Human tetanus immunoglobulin, tetanus toxoid, and broad-spectrum intravenous antibiotics were started. Tracheostomy was performed on day six for prolonged airway management. He was successfully weaned off ventilatory support on day 22. Nutritional support was started on day two with Ryle's tube feeding and oral feeding was gradually started as his condition improved. Daily Chest X rays were done to rule out respiratory infections. Sedatives were administered for three days, and muscle relaxants were continued for 23 days. The patient showed steady recovery and was discharged on day 24 in stable condition.

Case 4

A 54-year-old male presented with neck stiffness, lock jaw, and generalized spasm for 10 days. There was history of abrasion over the left foot with no history of tetanus immunization. He was admitted to the tetanus ICU and managed conservatively. Vitals and routine blood investigations, Chest X ray and ECG were within normal limits. Human tetanus immunoglobulin (5000 IU) and intravenous antibiotics were administered. Patient was maintained oxygen saturation via venti mask without the need for intubation. Muscle relaxants were continued for 15 days. Ryle's tube feeding was initiated on day five, followed by oral feeding on day nine. The patient improved clinically and was discharged on day 15 in stable condition.

Case 5

A 40-year-old male presented with abnormal facial movements initially associated with tongue bite, which progressively involved the upper limbs, chest, and



subsequently the entire body over two days with no known history of trauma with no history of tetanus immunization. Opisthotonus was noted on examination. Neurology reference was done and MRI brain and spine was done to rule out any other cause. He was managed in the tetanus ICU. Vitals and routine blood investigations, Chest X ray, ECG were within normal limits. Human tetanus immunoglobulin (5000 IU) and

intravenous antibiotics were administered. Airway remained stable and intubation was not required. Sedatives were administered for 3 days, and muscle relaxants were continued for 20 days. Ryle's tube feeding was initiated on day four, and oral feeding was resumed by day eight. The patient showed gradual clinical improvement and was discharged on day 21 in stable condition.

Table 1. Baseline Characteristics of Patients

Variable	Case 1	Case 2	Case 3	Case 4	Case 5
Age (years)	46	22	40	54	40
Sex	Male	Male	Male	Male	Male
Trauma history	Toe injury	Toe injury	Thumb wound	Foot abrasion	Not identified
Vaccination history	None	None	None	None	None
Incubation period	10 days	13 days	15 days	Not specified	No identifiable trauma
Trismus	Yes	Yes	Yes	Yes	No (initially facial spasm)
Generalized rigidity	Yes	Yes	Yes	Yes	Yes
Opisthotonus	Yes	Yes	Yes	No	Yes
Autonomic dysfunction	Yes	No	Yes	No	No

Table 2. ICU Management Comparison

Variable	Case 1	Case 2	Case 3	Case 4	Case 5
Intubation	Yes	Yes	Yes	No	No
Tracheostomy	Yes	Yes	Yes	No	No
Mechanical ventilation	27 days	25 days	22 days	No	No
Human TIG	Yes	Yes	Yes	Yes	Yes

Table 3. Nutritional Support, Feeding, ICU Complications, and Outcome

Variable	Case 1	Case 2	Case 3	Case 4	Case 5
TPN	Yes	Yes	No	No	No
Ryle's tube feeding	Day 8	Yes	Day 2	Day 5	Day 4
Oral feeding	Day 28	Gradual	Gradual	Day 9	Day 8
ICU complication	Autonomic dysfunction	VAP	None	None	None
Hospital stays	41 days	31 days	24 days	15 days	21 days
Outcome	Recovered	Recovered	Recovered	Recovered	Recovered

Table 4. Comparative Summary of Clinical Outcomes

Parameter	Value
Total number of patients	5
Male patients	5 (100%)
History of trauma	4 (80%)
Unvaccinated patients	5 (100%)
Generalized tetanus	5 (100%)
Required intubation	3 (60%)
Required tracheostomy	3 (60%)
Required mechanical ventilation	3 (60%)
Autonomic dysfunction	2 (40%)
Ventilator-associated pneumonia	1 (20%)
Complete recovery	5 (100%)
Mortality	0 (0%)

DISCUSSION

Tetanus is an acute, rapidly developing neurological disorder that can be life-threatening. The diagnosis of tetanus is difficult to confirm because there are no specific laboratory tests to confirm the diagnosis of a clinical syndrome. Concentrations of anti-tetanus antibody are usually not detectable in most people with tetanus, and there have been reports of people becoming ill despite antibody levels above the protective level of 0.01 IU/L [8]. Laboratory testing is not definitive for tetanus, but it is important to rule out conditions that could be confused with the symptoms of tetanus, including neuroleptic malignant syndrome, stiff person syndrome, and strychnine poisoning. Although tetanus is a major cause of morbidity and mortality in developing countries, especially among those who were not sufficiently immunized, its incidence has significantly decreased in many parts of the world due to widespread immunization [1,2]. Even in the Indian context, the disease has a substantial case fatality rate, primarily due to poor adult booster coverage and late presentation [1,2]. In our series, all patients were adult males and none were vaccinated, highlighting the continuing importance of improving adult immunization strategies. The most common and severe clinical manifestation was generalized tetanus, which is typical of the literature [4]. The first symptom in most patients was trismus, followed by generalized rigidity, painful spasms and opisthotonus, all of which are characteristic features of toxin-mediated neuromuscular disinhibition [4,6]. In severe cases, autonomic dysfunction such as labile blood pressure and excessive sweating was seen, reflecting the systemic action of tetanospasmin on inhibitory neurotransmitter pathways [4,6]. In one patient, there was no definite history of trauma, further emphasizing that even minor or unsuspected wounds may serve as a portal of entry, and that diagnosis is still predominantly clinical [7]. In generalized tetanus, laryngospasm and rigidity of the respiratory muscles are significant factors affecting outcome, due to airway compromise [6]. In our series, early elective intubation was done in severe cases for progressive trismus, and tracheostomy was done when prolonged ventilatory support was expected. The outcomes seen were favourable, and it is likely that the proactive airway management played a role in this. In severe cases, mechanical ventilation was needed for long periods of time, which is consistent with the long duration of action of tetanospasmin. All the patients were given human tetanus immunoglobulin to neutralize any circulating toxin, along with broad-spectrum antibiotics, sedatives and muscle relaxants according to standard management guidelines. Nutritional support with parenteral nutrition and subsequent Ryle's tube feeding was essential, as tetanus is associated with increased metabolic demand due to sustained muscle activity. One patient had ventilator-associated pneumonia, which was treated effectively with immediate intervention. Encouragingly, all five patients recovered and were discharged in stable condition. These outcomes emphasize that early recognition, aggressive intensive

care management, timely airway protection, and comprehensive supportive therapy can significantly reduce mortality in generalized tetanus. Strengthening adult vaccination coverage and public awareness remains crucial to preventing this entirely vaccine-preventable disease [1–3,7].

CONCLUSIONS

Tetanus is an acute neurologic condition that can be fatal. Although there has been a dramatic decrease in incidence worldwide, tetanus remains a major cause of morbidity and mortality in developing countries, especially in adults who are not fully immunized. Generalized tetanus is associated with high mortality, but early diagnosis, intensive care supportive treatment and prompt airway protection will diminish mortality. These cases underscore the urgent need for improved public health measures, especially adult vaccination campaigns, to prevent such life-threatening infections.

Authors contributions

Dr. Lalit Kishore: Clinical management and treatment of patients; supervision of patient care.

Dr. Mahendra Kumar: Manuscript editing, critical revision of the manuscript, and correspondence.

Dr. Lakhan Kumar Purohit: Data collection and compilation.

Dr. Ashish Palsaniya: Data collection and compilation.

Dr. Pooja Guru: Manuscript drafting, writing, and editing.

All authors reviewed and approved the final version of the manuscript and agree to be accountable for the work.

Author acknowledgement:

The authors acknowledge the medical, nursing, and supporting staff involved in the clinical care and intensive care management of the patients included in this case series.

Conflicts of interest:

The authors declare that they have no conflicts of interest related to this work.

Funding:

The authors received no financial support or external funding for the research, authorship, and/or publication of this article.

Ethical statement: The study was conducted in accordance with applicable institutional ethical standards and the principles of the Declaration of Helsinki. Written informed consent was obtained from the patients for publication of their clinical information. Patient confidentiality and anonymity were maintained throughout the manuscript.

Dr. Lalit Kishore: ORCID ID:0000-0002-0746-9771

Dr. Mahendra Kumar: ORCID ID:0000-0003-3120-8616



REFERENCES

1. George EK, DeJesus O, Tobin EH, et al.: Tetanus (Clostridium tetani Infection) Stat Pearls [Internet]. Stat Pearls Publishing, Treasure Island (FL); 2024.
2. Li J, Liu Z, Yu C, Tan K, Gui S, Zhang S, Shen Y: Global epidemiology and burden of tetanus from 1990 to 2019: a systematic analysis for the Global Burden of Disease Study 2019. *Int J Infect Dis.* 2023, 132:118-26.
3. Marulappa VG, Manjunath R, Mahesh Babu N, Maligegowda L. A ten-year retrospective study on adult tetanus at the epidemic disease (ED) hospital, Mysore in Southern India: A review of 512 cases. *J Clin Diagn Res* 2012; 6:1377–80.
4. Hassel B: Tetanus: pathophysiology, treatment, and the possibility of using botulinum toxin against tetanus-induced rigidity and spasms. *Toxins (Basel).* 2013, 5:73-83.
5. World Health Organization. Tetanus: Key facts. Available at www.who/website (accessed on 10 Dec 2024).
6. Castaneda K, Lemus LF, Revelo E: Generalized tetanus in an adult patient. *Cureus.* 2023, 15: e44958.
7. CDC | Tetanus | Clinical guidance for wound management to prevent tetanus. (2024). Accessed: November 20, 2024.
8. Reder S, Riffelmann M, Becker C, Wirsing von König CH: Measuring immunoglobulin G antibodies to tetanus toxin, diphtheria toxin, and pertussis toxin with single-antigen enzyme-linked immunosorbent assays and a bead-based multiplex assay. *Clin Vaccine Immunol.* 2008, 15:744-9.
9. Moniuszko A, Zajkowska A, Tumiel E, et al.: Meningitis, clinical presentation of tetanus. *Case Rep Infect Dis.* 2015, 2015:372375.

