

Generalised Tetanus Masquerading as Refractory Meningoencephalitis in an Unimmunized Toddler: A Diagnostic Challenge in the Pediatric Intensive Care Unit

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Abstract

Background

Generalised tetanus is a vaccine-preventable neurological disorder caused by the neurotoxin tetanospasmin produced by *Clostridium tetani*. The incidence of the disease has been decreasing in the developed world, mainly due to effective immunisation programs⁽¹⁾. In developed countries, national immunisation programs have successfully reduced the number of tetanus infections over the past four decades.⁽²⁾ Although uncommon, tetanus continues to occur in inadequately immunised children and may present with atypical features, leading to diagnostic delays⁽³⁾. Globally, since 2010, vaccination coverage with three doses of Diphtheria, Tetanus and Pertussis (DTaP) and one dose of measles vaccine has stalled around 86%. To protect against an outbreak of vaccine-preventable disease, at least 90% coverage is needed⁽⁴⁾.

Case Presentation

A 2.5-year-old female toddler with unknown immunisation status presented to us with fever, ear discharge, refusal to feed, headache, dystonic posturing and altered sensorium for one day. On admission, she was febrile, drowsy, had recurrent abnormal movements, and signs of meningeal irritation were present. In view of worsening sensorium and impending respiratory failure, she required endotracheal intubation. A provisional diagnosis of meningoencephalitis was made, and she was treated with empirical antibiotics, antiedema measures, corticosteroids, and antiepileptic drugs. Neuroimaging, fundus examination, and cerebrospinal fluid analysis were normal. Persistent opisthotonic posturing incited the diagnosis of status epilepticus, but absence of clinical improvement despite multiple antiepileptic medications prompted reconsideration of the diagnosis. Eventually, after 2 days, clinical findings of trismus and recurrent opisthotonic spasms strongly suggested generalised tetanus. The child was managed with strict isolation in a quite dark environment, tetanus immune globulin, high-dose diazepam therapy ranging up to 55 mg/kg/day and supportive intensive care. She was successfully extubated after ten days of ventilation and discharged on day 15 with moderate disability (GMFCS grade 4). Complete functional recovery was documented at thirty-day follow-up.

Conclusion

Generalised tetanus may mimic meningoencephalitis and refractory seizures in incompletely immunised children. Atypical presentations of tetanus often obscure the underlying diagnosis; hence, early recognition of characteristic clinical signs and a careful review of vaccination is essential for timely diagnosis and successful management.⁽⁵⁾

Keywords: Generalised tetanus, unimmunized child, meningoencephalitis mimic, opisthotonus, trismus, pediatric intensive care.

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Introduction

Tetanus is an acute neurological disease caused by the potent exotoxin tetanospasmin produced by *Clostridium tetani*. The disease develops when the anaerobe *Clostridium tetani*, common in the soil, penetrates traumatically injured tissue and produces a neurotoxin.⁽⁶⁾ Symptoms of tetanus can appear days to weeks after a wound.⁽⁷⁾ The clinical forms of tetanus are generalised, localised, cephalic, and neonatal.⁽⁸⁾ Generalised tetanus is the most frequent and fatal clinical form of tetanus. Generalised tetanus evolves to broad muscle stiffness and opisthotonus.⁽⁹⁾ Muscle spasms can be very painful and are frequently triggered by stimulation⁽¹⁰⁾

Despite being entirely vaccine-preventable, tetanus remains a cause of significant morbidity and mortality in regions with inadequate immunisation coverage, especially in developing and lower socio-economic index countries.⁽⁵⁾ The diagnosis is primarily clinical and is based on the recognition of characteristic manifestations such as trismus, muscle rigidity, and painful spasms

Classical presentations are increasingly uncommon in routine pediatric practice, resulting in delayed recognition when symptoms overlap with more common neurological disorders.⁽¹¹⁾ Sesama et al described cephalic tetanus presenting with isolated ptosis without facial palsy, secondary to chronic otitis media.⁽¹²⁾ Other atypical prodromes include repeated falls and dysphagia, as shown in a study by Brian et.al.⁽¹³⁾ A literature review of 146 pediatric cases reported otogenic tetanus with ear discharge and isolated trismus as first signs.⁽¹⁴⁾ We report a case of generalised tetanus in an unimmunized toddler who initially presented with fever, otorrhoea, altered sensorium, and abnormal posturing, leading to a provisional diagnosis of meningoencephalitis.

Case Presentation

A 2.5-year-old female child weighing 9 kg, moderately built and nourished, was admitted with complaints of fever, ear discharge, refusal to feed, generalised tonic posturing, and altered sensorium. She was the third child born to non-consanguineous parents. There was no significant antenatal, perinatal, or neonatal history. All developmental milestones had been attained appropriately for age. Immunisation history was unknown. On examination, the child was febrile, drowsy, and experiencing recurrent episodes of generalised tonic posturing. Signs of meningeal irritation were

present. Deteriorating sensorium with impending respiratory failure necessitated endotracheal intubation for mechanical ventilation.

Based on the presence of fever, otorrhoea, altered sensorium, abnormal movements, and meningeal signs, a provisional diagnosis of meningoencephalitis was made. The child was initiated on empirical broad-spectrum antibiotics, antiedema measures, corticosteroids, and antiepileptics. EEG done was suggestive of mild to moderate encephalopathy.

Initial Investigations	Results
Hemogram	Neutrophilic leucocytosis
Coagulation profile	Within normal limits
CRP	Positive
Serum electrolytes	Within normal limits
Liver function test	Within normal limits
Kidney function test	Within normal limits
CSF analysis	Normal
MRI brain	No abnormality detected
CPK	Raised

Table No. 1 showing the investigations sent

On day 2, marked trismus was noted. Recurrent episodes of opisthotonic posturing hinted towards a diagnosis other than meningoencephalitis and status epilepticus. Fundus examination revealed no papilledema, and MRI of the brain was normal. CSF examination revealed no evidence of pleocytosis. Continuous EEG monitoring was done, which didn't suggest a state of non-convulsive status, and despite injectable antiepileptic medications and subsequently Midazolam infusion, the child continued to have recurrent dystonic posturing. The persistence of trismus and recurrent opisthotonic spasms prompted reconsideration of the diagnosis. A detailed re-evaluation of the immunisation history confirmed that the child had not received any vaccinations beyond the birth doses. Eventually, the child continued to have profound trismus,

generalised rigidity, and opisthotonic spasms; a clinical diagnosis of generalised tetanus was made.



Fig 1 showing increased tonicity of abdominal muscles

Fig 2 showing persistent opisthotonic posturing

The child was immediately managed in a low-stimulation environment with isolation, minimal handling, and reduced exposure to light and noise. Tetanus immune globulin was administered; however, the availability remained a constraint, and 1500 IU was administered. Oral diazepam therapy was initiated and gradually escalated every 2-4 hours to a maximum dose of 55 mg/kg/day depending on the intensity of the spasms. Chlorpromazine was added for additional control of spasms. Antiepileptic medications were progressively discontinued. Following ten days of mechanical ventilation and intensive supportive care, the child demonstrated gradual improvement with a reduction in spasms and rigidity. She was successfully extubated. With vigorous rehabilitation, we could subsequently discharge her after fifteen days of hospitalisation with moderate functional disability (GMFS grade 4). Physiotherapy was continued at home with fortnightly follow-up. By day thirty of onset of illness, the child had achieved near complete functional recovery with no residual neurological deficits.



FIG-3 showing near complete recovery on follow-up

Discussion

Generalised tetanus remains an important differential diagnosis in incompletely immunised children presenting with otitis media and dystonic posturing. The diagnosis can be particularly challenging when clinical features overlap with central nervous system infections. Inflammation of the middle ear cleft is a common childhood infection, affecting diverse racial and cultural groups, predominantly in developing countries with limited resources.⁽¹⁵⁾

In this patient, the combination of fever, otorrhoea, altered sensorium, and meningeal signs strongly suggested meningoencephalitis. Consequently, treatment was initially directed towards infectious and inflammatory neurological disorders. The absence of abnormalities on neuroimaging and cerebrospinal fluid examination, together with failure to respond to multiple antiepileptic agents, prompted reassessment of the diagnosis. Trismus and recurrent opisthotonic posturing proved to be crucial clinical clues. These manifestations are characteristic of generalised tetanus and should prompt a detailed review of immunisation status, which in this case played a pivotal role. Even after routine and regular immunisation programs in developing countries, cultural, educational and regional constraints remain. The child required prolonged intensive care support, with mechanical ventilation and high-dose diazepam therapy. Early recognition of generalised tetanus and institution of targeted therapy resulted in a favourable outcome despite severe disease, although administration of

the tetanus immune globulin was a concern due to lack of availability.

This case highlights the continuing occurrence of vaccine-preventable diseases among incompletely immunised children. This was emphasised in a cross-sectional study done by Rajpal et.al among 125619 children aged 12 to 23 months in India; it was seen that the prevalence of children who did not receive a single dose of the diphtheria-tetanus-pertussis vaccine decreased from 33.4% to 6.6% between 1993 and 2021, with Uttar Pradesh, Bihar, and Maharashtra accounting for 53.0% of the burden. While interstate inequalities converged notably toward lower prevalence levels, states like Punjab, Telangana, and Andhra Pradesh experienced an increase in prevalence from 2016 to 2021⁽¹⁶⁾.

Another study by Petrus et.al highlighted that the diagnosis of generalised tetanus in children remains a diagnostic challenge, as the classic symptoms may be absent at presentation, which was the case in this study. Early recognition and immediate initiation of advanced critical care are necessary to prevent rapid clinical deterioration. Therefore, the differential diagnosis of non-immunised children with an acute onset of dysphagia and trismus should always include generalised tetanus.⁽³⁾ Hence, a high index of suspicion for tetanus should be maintained when evaluating children with unexplained rigidity, trismus, and recurrent opisthotonic posturing, even when initial features suggest meningoencephalitis.

Conclusion

Generalised tetanus may closely mimic meningoencephalitis and refractory seizure disorders in unimmunized children. Persistent opisthotonic posturing, trismus, normal cerebrospinal fluid findings, and failure to respond to conventional antiepileptic therapy should prompt consideration of tetanus. Careful review of vaccination history remains essential for timely diagnosis, especially in developing countries where social and cultural restraints continue to impede vaccine uptake. Not to forget, despite the widespread implementation of national immunisation initiatives, gaps in vaccine uptake continue to exist, particularly in geographically inaccessible areas and among communities with low levels of health education.

Early intensive care support and appropriate antitetanus therapy can result in complete recovery even in severe cases. Early access to pediatric intensive care services remains a significant challenge in many parts of India, particularly in remote and rural regions where specialised healthcare facilities and trained personnel are limited. The favourable outcome in this case may be attributed, in part, to the early presentation and prompt initiation of intensive care management.

Learning Points

1. Generalised tetanus may present as a diagnostic mimic of meningoencephalitis or refractory status epilepticus, leading to delays in diagnosis.
2. Trismus and opisthotonus are important clinical clues that should prompt consideration of tetanus in an unimmunized child.
3. Chronic otitis media may serve as a potential portal of entry for *Clostridium tetani* in the absence of an obvious traumatic wound.
4. Incomplete immunization remains the most important preventable risk factor for tetanus, particularly in developing countries such as India, despite the implementation of national immunization programs.
5. Early recognition, prompt administration of appropriate therapy, and aggressive intensive care support can result in favourable outcomes even in severe generalised tetanus.

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