



# Epidemiological trends of tetanus from East Delhi, India: A hospital-based study

Manish Narang\*, Aman Khurana, Sunil Gomber, Nidhi Choudhary

Department of Pediatrics, University College of Medical Sciences & Guru Teg Bahadur Hospital, University of Delhi, Delhi, India

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## KEYWORDS

Tetanus;  
Immunoglobulin;  
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## Abstract

**Objective:** To study the demographic profile, prognostic indicators, and mortality of tetanus patients and treatment outcomes following intramuscular anti-tetanus immunoglobulin (ATG) alone or combined intrathecal and intramuscular ATG.

**Design:** Retrospective study.

**Setting:** Inpatients from a tertiary care hospital.

**Subjects:** One hundred children under 12 years of age diagnosed with tetanus and admitted from January 2003 to December 2007 were included in the study.

**Methods:** Case records of patients with neonatal tetanus ( $n = 30$ ) and post-neonatal tetanus ( $n = 70$ ) were evaluated retrospectively. The diagnosis of tetanus was based on World Health Organization (WHO) criteria. The outcomes of patients treated with either intramuscular ATG or both intrathecal and intramuscular ATG were separately compared in the neonatal and post-neonatal groups.

**Results:** Our study revealed difficulty in feeding, trismus, spasms, rigidity, and opisthotonus posturing as the predominant clinical manifestations. The survival rate for children receiving tetanus immunoglobulin by the dual route was significantly higher than for children receiving the immunoglobulin via the intramuscular route. Seizures and tremors were poor prognostic factors associated with tetanus.

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## Introduction

Tetanus is one of the most deadly diseases. It continues to cause approximately 213,000–293,000

deaths worldwide each year, 180,000 of which have been reported in neonates [1,2]. In India, tetanus is endemic and remains an important health problem. The annual incidence of neonatal tetanus is 1.74/1000 live births [3]. The exact incidence of non-neonatal tetanus in India is not known. Tetanus is the only vaccine-preventable disease that is not communicable; rather, it is acquired through environmental exposure to the spores of

\* Corresponding author at: Department of Pediatrics, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi, India. Tel.: +91 9868399659.

E-mail address: [manish\\_2710@yahoo.com](mailto:manish_2710@yahoo.com) (M. Narang).

the bacterium *Clostridium tetani*. The incidence of the disease has been decreasing in the developed world, mainly due to effective immunization programs [1,2]. Presently, neonatal tetanus has been eliminated in 15 states and union territories in India [4]. Still, the complete eradication of neonatal tetanus is still a long way away. With increasing immunization coverage, the chances of eliminating tetanus have increased greatly. However, literature pertaining to the epidemiology of tetanus in Delhi is limited. Our study was designed to study the demographic profile, prognostic indicators, and mortality of tetanus and the treatment outcomes following intramuscular anti-tetanus immunoglobulin (ATG) alone or combined intrathecal and intramuscular ATG over a 5-year period.

## Methodology

This retrospective, descriptive study was conducted in the pediatric department of a tertiary care hospital of East Delhi over a 5-year period between 1 January 2003 and 31 December 2007. Clearance was obtained from an institutional ethics committee. The study conformed to local regulation, Good Clinical Practices (GCP), applicable International Conference on Harmonization (ICH) guidelines, and the ethical principles of the Declaration of Helsinki.

The case records of 100 consecutive patients diagnosed with tetanus who were admitted to our hospital during this period and met the World Health Organization (WHO) case definition of tetanus were reviewed to gather information regarding demographic and clinical data, giving a mean of 20 cases per annum. Thirty cases of tetanus occurred in the neonatal age group, and 70 cases were post-neonatal tetanus. A case of neonatal tetanus was defined as one that had the following signs and symptoms occurring in sequence: history of normal suck and cry for the first 2 days of life, history of onset of illness between 3 and 28 days of age with inability to suck, stiffness, and/or convulsions. The diagnosis of post-neonatal tetanus was based on clinical features (i.e., presence of trismus, risus sardonicus, and/or provoked or unprovoked spasms). A structured proforma was used to record information. A brief history pertaining to maternal details of gestational age [as per last menstrual period (LMP)], mode of delivery, and delivery by an unskilled health professional was obtained for neonatal tetanus. Birth details regarding immunization, portal of entry, incubation period, period of onset, clinical features, treatment,

complications, and outcomes were recorded in the case record form. Outcomes were based on whether the patient survived or expired. Patients who left against medical advice were excluded from the study. The objective of the study was to determine the demographic profiles, prognostic indicators, and mortality of tetanus patients, along with treatment outcomes following intramuscular ATG alone or combined intrathecal and intramuscular ATG.

The data were analyzed using SPSS version 13. All quantitative variables were compared using Student's *t*-test, and categorical variables were analyzed using the Chi-square test or Fisher's exact test.  $P < 0.05$  was considered significant.

## Results

Records of 30 cases of neonatal tetanus [20 (66%) males] and 70 cases of post-neonatal tetanus [44 (62.8%) males] were retrieved. Mortality outcomes were observed in 10 (33%) cases of neonatal tetanus and 9 (12.8%) cases of post-neonatal tetanus. The median age of presentation was 5.6 days in neonatal tetanus. Risk factors were identifiable in 28 (93.3%) cases of neonatal tetanus. The possible risk factors included unimmunized mothers, 22 (73.3%); unsterilized material used to cut the umbilical cord, 16 (53.3%); substance placed on the cord, 16 (53.3%); home delivery, 25 (83.3%); and delivery by an untrained professional, 26 (86.6%). Among 70 patients with post-neonatal tetanus, 64 (91.4%) had an identifiable acute injury (puncture wound or laceration [22 (31.4%)] and ear discharge [42 (60%)]).

Clinical presentations in neonatal tetanus ( $n=30$ ) included trismus [30 (100%)], spasms [29 (96.6%)], rigidity [25 (83.3%)], refusal to feed [13 (43.3%)], and tremors [10 (33.3%)]. Similarly, presentations in the post-neonatal group included trismus [65 (92.8%)], difficulty in feeding [55 (78.6%)], opisthotonus posturing [51 (72.8%)], risus sardonicus [36 (51.4%)], seizures [8 (11.4%)], and unconsciousness [63 (90%)]. Among the 30 cases of neonatal tetanus, 13 (43.3%) patients received the entire dose of human ATG (500 IU) as an intramuscular injection, whereas 17 (56.6%) patients received 50% of the human ATG dose via the intrathecal route and the other 50% of the dose via the intramuscular route. Among children with post-neonatal tetanus ( $n=70$ ), 5 children (7.1%) required mechanical ventilation, 22 (31.4%) underwent wound debridement, 28 (40%) received the entire dose of ATG via the intramuscular route, and the other 42 (60%) received half of the dose via the intramuscular route and the other half of the dose via the intrathecal route. We observed

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