Tetanus: still a public health problem in India — observations in an infectious diseases hospital in Kolkata

Alakes Kumar Kole, Rammohan Roy, Dalia Chanda Kole

ABSTRACT

Background: Tetanus is a major health problem in many developing countries, including India, with significant morbidity and mortality due to lack of environmental hygiene and health education, incomplete vaccination, high case prevalence and inadequate intensive care facilities.

Objectives: To observe the demography, clinical profile and outcomes of tetanus patients.

Materials and methods: A total of 282 tetanus patients were screened and closely observed prospectively from January 2010 to December 2011.

Results: The mean age of the study patients was 31.15 years (± 14.26) and the majority were unvaccinated or incompletely vaccinated against tetanus. Patients were mainly farmers (140, 49.64%) and children (102, 36.17%). The sources of infection identified were mainly thorn/pin prick in 129 cases (45.7%), cut/lacerated injury in 83 cases (29.4%) and ear infection in 47 cases (16.7%), while definite injury was not detected/remembered in 42 cases (14.8%). The average duration of hospital stay was 17.2 ± (4.7) days and autonomic nervous system dysfunction was the most common complication observed in this study. Death was the outcome in a total of 58 patients (20.6%) mostly due to aspiration pneumonia-induced sepsis, respiratory failure or cardiac complications.

Conclusion: Environmental hygiene, basic health education, increased in immunization coverage, proper wound care – even following minor injuries – and more facilities for intensive care units, may reduce the overall incidence of tetanus and mortality following onset of the disease.

Key words: tetanus, complications, outcomes.

INTRODUCTION

Tetanus is still a public health problem in many developing countries, including India, despite the availability of a highly effective vaccine. Moreover, mortality from tetanus remains high among neonates, pregnant and elderly populations. Worldwide, annual deaths due to tetanus were estimated to be 800 000 to 1 000 000 with a case–fatality rate of 20–50%.1 Adults and the elderly are particularly susceptible to tetanus because of gradual waning of immunity with age along with a lack of booster vaccination; it has been reported that about 53% of healthy adults in New Delhi, India had no protective antibodies against diphtheria or tetanus.2,3 In India, the case prevalence of tetanus is still high, probably due to lack of environmental hygiene and basic health education, inadequate vaccination (including boosters), ongoing unhygienic ritual practices (nose and ear pricks, shaving of heads, especially in neonates), septic abortion, improper wound care following injuries, as well as contamination of almost all roads and fields with animal excreta (cow dung).

Persistent high mortality from tetanus in developing countries is mainly due to delayed medical attention, limited access to an intensive care facility and associated comorbidity. By contrast, tetanus mortality has decreased strikingly in developed countries because of better environmental hygiene and health education plus high vaccination coverage and implementation...
of appropriate health-care services. Notably, management of patients with tetanus in an intensive care unit significantly reduced mortality, with deaths mainly due to cardiovascular complications as a result of autonomic nervous system dysfunction.4,5 Magnesium sulfate, a novel antispasmodic agent, is nowadays increasingly used as a part of multimodal therapy in the treatment of tetanus.6 Magnesium sulphate can be used alone or in combination with benzodiazepines, not only to control spasm, but also to control autonomic instability, which continues to be a major cause of death even with the use of ventilation.7,8

The objectives of this study were to determine the demography, clinical profile and outcomes of tetanus patients in an infectious disease hospital in West Bengal.

PATIENTS AND METHODS

This prospective observational study was carried out in the Infectious Diseases Hospital, Beliaghata, Kolkata, India from January 2010 to December 2011. All tetanus patients/family members gave verbal informed consent to participate and data regarding their demographic profile, vaccination status, type of injury, complications and outcomes were recorded. Tetanus severity was classified according to the criteria reported by Ablett.9 Patients were treated with either intravenous diazepam (for grade 1 and 2) or diazepam and magnesium sulfate in combination (for grade 3 and 4) to control spasms. Dosages were in line with guidance of the World Health Organization.6

RESULTS

A total of 282 patients (including two neonates) diagnosed with tetanus were enrolled. The mean age was 31.2 years (± 14.3) with a male:female ratio of 2.1:1. The study observed that 245 (86.9%) patients were from lower socioeconomic groups, 156 (55.3%) were illiterate and 148 (52.5%) had poor nutritional status. Regarding occupation, 140 (49.6%) patients were farmers, 102 (36.2%) were children, 30 (10.6%) were industrial workers and 10 (3.5%) patients were housewives. In respect to the vaccination status, only 25 children were able to produce an immunization card. This revealed that vaccination for tetanus/boosters was incomplete. The vaccination status of the remaining children was unknown, and not all of the adult patients received any tetanus vaccine within the past 10 years.

The source of infection observed was thorn, bamboo or stick/pin prick in the majority of cases (87, 30.8%). Other sources were cut/laceration injuries in 73 cases (25.9%); chronic suppurative otitis media in 47 (16.7%); unhygienic ritual practices (ear/nose prickling, scalp shaving and circumcision) in 29 (10.3%); septic abortion in 2 cases (0.7%); and no definite injury was detected or remembered by patients in 42 cases (14.9%).

The mean incubation period of tetanus cases was 8.2 (± 1.3) days whereas the mean onset time was 3 (± 1.3) days. Autonomic nervous system dysfunction was observed in 131 (46.5%) cases and observed sometimes in combination with sinus tachycardia in 80 cases (63%), hyperhidrosis in 78 (65%), excess trachea-bronchial secretion in 56 (44%), acute urinary retention in 25 (19%), persistent hypertension in 11 (8%) and cardiac arrhythmias in 6 cases (4.5%). Other major complications observed were aspiration pneumonia in 47 cases (17%), urinary tract infection in 38 (13.5%) and respiratory failure in 17 (6%) of cases (Figure 1). The mean duration of reflex spasm observed was 7.4 (± 2.3) days and the mean duration of hospital stay was 17.2 (± 4.7) days.

Deaths occurred in 58 patients (21%), mainly due to aspiration pneumonia-induced sepsis in 26 cases (45%), respiratory failure in 18 cases (33%) and acute cardiac complications in 14 cases (25%).

DISSCUSSION

This study observed that about half of the tetanus patients were farmers, most of whom were malnourished and illiterate, and none of whom sought any medical advice (especially tetanus prophylaxis) even days after sustaining an injury. The next common group affected was children (36%), most of whom had a history of untreated ear infection in the form of chronic suppurative otitis media.

The most common type of injury observed was prick injuries (31%) and the most important observation was that in 15% of these cases, no definite injury was identified or could be remembered by the patient in the recent past. This was probably due to micro-injuries/trauma, unnoticed or ignored by the patient, but epidemiologically significant. Unsafe abortion practices were a source of tetanus in two patients observed in this study, both of whom died due to delayed presentation with severe tetanus and sepsis. Thus, female patients with a history of unsafe or illegal abortion practice should receive immediate

![Figure 1: Complications in tetanus patients](image-url)

**Figure 1:** Complications in tetanus patients

AMI: acute myocardial infection; ANS: autonomic nervous system; ARF: acute renal failure; UTI: urinary tract infection.

*Patients may have a combination of complications.
anti-tetanus immunoglobulin, including immunization and information on how to avoid getting tetanus. It must be remembered that pregnancy-abortion must be excluded in suspicious cases.

Our study observed that overall mortality due to tetanus was much lower compared with other Indian studies. This may be due to the use of magnesium sulfate in combination with diazepam in severe cases (which reduces both cardiovascular instability and the requirement of a high dose of diazepam) and good nursing care, though there was no significant decrease in the incidence of tetanus cases attending the hospital. As the farming population and children were the main population groups observed in this study, it is suggested that they should be targetted for complete tetanus immunization. In addition, farmers should be discouraged to work bare foot, and school health programmes should be intensified to detect early ear infection in children so that tetanus can be prevented.

As per the Expanded Programme on Immunization (EPI), single tetanus booster is recommended in infants between 1 and 6 years of age. However, because of the pervasive presence of cow/horse dung in the country, and the fact that many people still walk bare foot (with unnoticed minor injuries causing a significant number of tetanus cases), it may be efficient and cost-effective for a tetanus toxoid (TT) booster dose to be given every 5 years instead of the 10-year interval currently recommended.

**CONCLUSION AND RECOMMENDATIONS**

As prevention is the only way to reduce the overall incidence of tetanus and subsequent deaths, the following measures are recommended: (1) Unhygienic ritual practices should be discouraged and all illegal/unsafe abortions strictly controlled; (2) Health education should be promoted regarding personal protection and proper wound care, including active and passive immunization against tetanus (in cases where the last dose of tetanus toxoid was given more than 5 years before); (3) Vaccination coverage should be increased and more emphasis given to completion of immunization schedules; and (4) Priority should be given to more intensive care facilities.

**REFERENCES**