

Clinical profile of tetanus in children admitted in tertiary care hospital, BJ Medical College, Ahmedabad, Gujrat

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Abstract

Background: Despite the availability of cheap, safe and effective vaccine, tetanus is still a serious health problem worldwide and in rural India, and a common cause of death in the new born. Community surveys have shown that only a small proportion of neonatal tetanus (NT) cases are routinely reported and under – reporting is often highest in areas at highest risk of NT. So, the objective of the study was to find out the epidemiological factors, clinical profile and outcome of childhood tetanus. Also to find out the preventable factors and prognostic factors in childhood tetanus. **Objectives:** to study clinical and epidemiological profile as well as outcome of tetanus in children who were admitted in Civil hospital, Ahmedabad. **Methodology:** It was a prospective single centre observational study. The data of all patients of age up to 12 years including Neonates who were admitted from August 2011 to November 2013 were collected, compiled and analysed. **Result:** Total 45 cases were included in the study with Male: Female ratio of 1.5:1. Among them 11.11% were neonatal tetanus and 40% were traumatic case. Among 45 total cases 34 patients were unimmunized, 1 immunized and 10 partially immunized. Mortality was 80% in NT cases and 32.5% in Non-Neonatal Tetanus (NNT) cases. Common complication were Hyperpyrexia [12(26.66%)], Pneumonia [10(22.23%)], Bed sore [6(13.34%)], thrombophlebitis [6(13.34%)], septicemia [4 (8.8%)], and Disseminated Intravascular Coagulation (DIC) [3 (6.6%)] of cases. **Conclusion:** Although incidence of childhood tetanus has been reduced over the years, but still tetanus is more common in rural population due to illiteracy, poor socioeconomic status, poor vaccination and superstitions. The mortality by tetanus can be reduced by improving routine immunization specifically in rural and low socioeconomic population, by recognition of disease severity and providing proper management with intensive care as early as possible.

Key Words: Tetanus, clinical profile, outcome, mortality

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INTRODUCTION

Tetanus, an infective intoxication of the nervous system by *Clostridium tetani*, is an ancient disease which is associated with a high mortality rate. Despite the widespread availability of a safe and effective vaccine against this disease, it remains a major health problem in developing countries¹. Tetanus is more common in

developing countries, where the climate is warm, and in rural areas where the soil is fertile and high cultivated, where human and animal population are substantial and live in close association and where unhygienic practices are more common and medical facilities poor. In rural India, tetanus was a common cause of death, particularly in the new born. But immunization of infants and expectant mothers has reduced the incidence to large extent². Tetanus is intimately related to poverty, illiteracy, social taboos, unhealthy conditions, lack of education, lack of knowledge of immunization, lack of medical care, ignorance about immunization and hygiene which contribute to a high incidence of tetanus which is preventable but dreadful disease.³ Community surveys have shown that only a small proportion of neonatal tetanus (NT) cases are routinely reported to notifiable disease reporting system in most developing countries and under – reporting is often highest in areas at highest risk of NT³.

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AIMS AND OBJECTIVES

- To study epidemiological and clinical profile of neonatal and non-neonatal tetanus in children up to 12 year age.
- To study the immunization status of tetanus patients.
- To observe and treat the various complications in patients of tetanus.
- To study morbidity and mortality due to tetanus

METHODOLOGY

Type of study: A prospective single centre observational study carried out over a period of 28 months by pediatric department, B.J.Medical College,Ahmedabad,Gujrat .

All eligible patients as per inclusion and exclusion criteria were selected for the study.

Inclusion criteria: All children less than 13 years old including neonates with diagnosis of tetanus admitted in pediatric department who presented with spasm suggestive of tetanus and diagnosis confirmed with independent evaluation by atleast two pediatricians were included.

Exclusion criteria: other causes of spasms like meningoencephalitis, hypocalcaemia and others were ruled out with appropriate investigations.

Informed written consent was taken from legal guardian of the patients before inclusion in the study. After admission detailed history regarding presenting complain, duration of symptoms on admission and on discharge asked.History was taken to search for the sources of infection viz:Trauma (type of injury, duration , site, vaccination status, treatment),Ear discharge (duration ,type of discharge, treatment taken and symptoms of tetanus),and In neonatal tetanus: history of antenatal care, no. of tetanus toxoid doses, delivery by trained/untrained Dai, environment of delivery. Instrument used to cut cord and history of any local application was asked.

Detailed general and systemic examination was carried out

Grading of tetanus was done on admission and severity reassessed if severity increased after admission.Patients were observed for disappearance of symptoms and the time of disappearance.Patients were observed for development of complications.Grading of tetanus was done according to Patel and Joag classification.

Investigations like hemoglobin, total count, differential count, Erythrocyte Sedimentation Rate (ESR), renal function test and chest X-ray were done in all patients. In patients with chronic ear discharge, X-ray mastoid was done and ear swab were sent for culture. In neonatal tetanus patients, umbilical cord swab was sent when umbilical discharge was present.

Data analysis:

Computerized analysis of data was done with the help of **Graph pad version 5 demo**. The study variables were analyzed for their association with immediate outcome by applying Fisher's **exact test** as and when applicable. All p values were two tailed and **p<0.05** was considered statistically significant

RESULT

Over a period of 28 months among total 18300 patients admitted in pediatric ward from August 2011 to November 2013 at tertiary care hospital, BJ Medical College,Ahmedabad India,, 45 (0.24%) patients were identified as the cases of tetanus. Among them 5 were neonatal tetanus and 10 were in 1month to 3-year group. Gender wise distribution shows that 60% were male with Male: Female ratio of 1.5:1. Epidemiological distribution shows that 31 (68.89%) of patients were from rural area. Socioeconomic distribution shows that 31 (68.80%) patients were from lower socioeconomic status. Among non-neonatal tetanus, 18 (45%) were traumatic and 8 (20%) were otogenic, while others were idiopathic. [Table 1] Immunization status shows among neonatal tetanus cases one pregnant woman was partially immunized while 4 were not immunized at all. In non-neonatal cases only one patient was fully immunized, while 9 were partially immunized and 30 were unimmunized. [Figure 1]

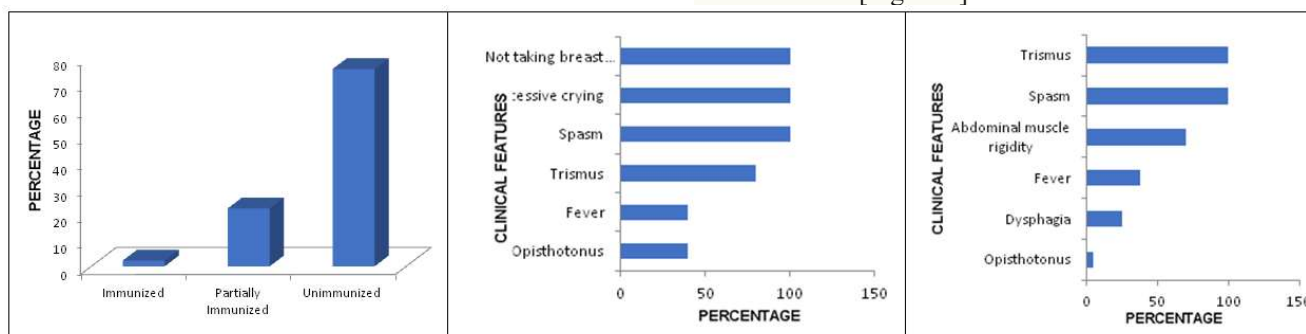


Figure 1

Table 1: Socio-demographic data of tetanus cases

Parameters	Numbers	Percentages (%)
Age		
<1 month	5	11.11
1 month – 3 years	10	22.22
4 – 6 years	12	26.67
7 – 9 years	8	17.78
10 – 12 years	10	22.22
Total	45	100
Gender		
Male	27	60
Female	18	40
Total	45	100
M:F Ratio		1.5:1
Geographic distribution		
Rural	31	68.89
Urban	14	31.11
Total	45	100
Rural:Urban ratio		2.2:1
Socioeconomic class		
1 Upper	2	4.44
2 Middle	4	26.67
3	8	
4 Lower	10	68.89
5	21	
Total	45	100
Causes of Tetanus		
Neonatal	5	11.11
Non-neonatal		
Traumatic	18	40
Otogenic	8	17.78
Idiopathic	14	31.11
Total	45	100

Clinical presentation showed that all NT cases presented with complaint of not taking feed, excessive crying, spasm . trismus is seen in 4 cases , while fever and opisthotonos seen in 2 cases.[FIGURE 2]

In NNT cases trismus and spasm seen in all cases. Abdominal muscle rigidity seen in 28 cases, fever in 15 cases ,opisthotonos seen in 2 cases. [Figure 3]

Table 2 shows the mortality review of all neonatal and non neonatal case of tetanus. It shows that 4(80%) of neonatal tetanus patients were died and in that cases the mother were totally unimmunized. While among non-neonatal cases mortality was 32.5% i.e. (13 out of 40) with commonest mortality was in 7-9 years of age group i.e. 4 out of 8(50%) were died. Period of onset is defined as the time interval between first symptom of disease and onset of spasm. As seen in table in present study 80% mortality in cases with period of onset <24 hrs. Among non-neonatal cases the mortality was commonly seen in traumatic cases. Severity wise grading shows that 100% mortality seen in patients with grade 5 severity.

Table 2: Mortality review in NT and NNT cases

Age group	No. of patients	Mortality (%)	P value	
Neonatal (n=10)	<1 month	5	4 (80%)	-
Non-neonatal (n=25)	1 month – 3 years	10	3 (30%)	1
	4 – 6 years	12	4 (33.34%)	0.6462
	7 – 9 years	8	4 (50%)	0.3212
	10 – 12 years	10	2 (20%)	-
	Total (NNT)	40	13 (32.50 %)	
Total	45	17 (37.78 %)		
Period of onset				
< 24 hours	10	8 (80%)	0.0001	
24-48 hours	15	6(40%)		

> 48 hours	20	3(15%)	
Total	45	17 (37.78%)	
Cause of tetanus			
Neonatal	5	4 (80%)	-
Non-neonatal	18	9 (50%)	0.023
	8	0 (0%)	-
	14	4(28.57%)	-
Total	45	17 (37.78%)	
Grade of tetanus(NNT)			
1	8	0	0.0010
2	9	0	0.0010
3	8	0	0.0010
4	5	3 (60%)	0.0686
5	10	10(100%)	

The most common complication seen was Hyperpyrexia in 12 (26.66%), followed by Pneumonia in 10 (22.23%) cases, Thrombophlebitis and Bedsore in 6 each (13.34%) cases septicemia was seen in 4 (8.8)cases [Table 3].

Table 3: Complications associated with tetanus (NT +NNT)

Complication	No. of cases	%
Hyperpyrexia ⁶⁸	12	26.66
Pneumonia	10	22.23
Thrombophlebitis	6	13.34
Bedsore	6	13.34
Septicemia	4	8.8
DIC	3	6.6
Autonomic instability	2	4.4
Complication due to over sedation	2	4.4

DISCUSSION

In present study over a period of 28 months total 45 cases of tetanus were identified among 18300 cases admitted in pediatric ward of civil hospital, Ahmedabad, Gujarat. That shows incidence was 0.24%, which was quite low as compared to observation by Milind *et al.*⁴, P Poundel *et al.*⁵, Sanjeev Chetry *et al.*⁶ in which 0.73%, 0.9% and 1.5% respectively. It might be attributed to the fact that the incidence of tetanus has actually decreased or due to improvement in vaccination coverage under universal immunization program. The neonatal tetanus incidence was 0.027% in this study which is less as compared to other study like G J Bhat *et al.*⁷ in which it is 1.9%. It might be because of improvement in coverage of maternal TT immunization and proper umbilical cord care in newborns and institutional deliveries. The highest numbers of cases in present study seen were in 4 to 6 of age which is similar to the study by Sanjeev Chetry *et al.*⁶, and Mondal *et al.*⁸, i.e. 27.1% and 45.45% respectively. The male: female ratio in present study is 1.5:1. Which is comparable to other studies like P. Pondel *et al.*⁵, and Sanjeev Chetry *et al.*⁶, in which it is 1.4:1 and 2:1 respectively. It might be because of neglect of female child and not brought to the health services. Rural preponderance seen in present study similar to other studies like Sanjeev Chetry *et al.*⁶, and Hatkar N *et al.*⁹. This might be due to illiteracy, poor socioeconomic

status, poor vaccination and superstition. Also, the incidence is more in lower economic class in present study. Similarly, study by Aggarwal *et al.*¹⁰, have 85.7% of patients from lower socioeconomic group. Clinical presentation in neonatal cases the present study and the study by Sanjeev Chetry *et al.*⁶ is similar with common complaint like not taking breast feeding, spasm, trismus and dysphagia which are seen in all cases. While in non-neonatal cases trismus and abdominal muscle rigidity was common presentation in both studies. Immunization status also shows that similar to present study other studies also observed highest numbers of patients were unimmunized^{6,8}. Thus improvement in awareness and coverage of immunization can reduce tetanus. The common causes of tetanus in present study are neonatal and traumatic. And most of the other Indian studies found traumatic to be most common cause⁶. The reason may be children are more prone to injuries and they are more neglected specifically in rural and lower socioeconomic class. Fatality rate in neonatal cases is 80% in present study, which is similar to other studies like Sanjeev Chetry *et al.*⁶, Hatkar Net *et al.*⁹, Patel J C *et al.*¹¹ who had 80%, 87.5% and 86.38% respectively. While in non-neonatal cases one third of the cases died in all these studies... Spasm was the most probable cause of death (48.9%), followed by hyperpyrexia (26.7%), pneumonia (13.4%), DIC (6.7%), Over sedation (4.5%). The study

done by Hatkar *Net al.*⁹, and P Poudel *et al.*⁵, also shows spasm as most common cause of death. Tracheostomy was performed in 60% of cases with Grade 5 tetanus in present study to relieve respiratory difficulty due to severe laryngospasm. Traumatic type tetanus has highest mortality in NNT cases in present study. As compare to study by A T Pathak *et al.*¹², shows highest mortality in idiopathic cases (31.9%). It was found that 80% of mortality was in cases with period of onset of <24 hours. Patel and J C¹¹ also observed the same. This shows that as the period of onset decreases the mortality increases and the prognosis is grave. The correlation was also significant with p value of 0.0001. Correlation of temperature and mortality shows that cases with axillary temperature $\geq 102^{\circ}\text{F}$ had higher mortality (80%). Similar finding was seen observed (95.7%) in case of A T Pathak *et al.*, study¹². Thus pyrexia adversely affects the prognosis. Cases with grade 5 severity had 100% mortality in present study. None of grade 1 and 2 and 3 patients were died. In present study most common complication is Hyperpyrexia followed by pneumonia, Thrombophlebitis. While study by Milind *et al.*⁴, had commonest complication were pneumonia and DIC, while M G Geeta *et al.*¹³, had thrombophlebitis commonest complication.

CONCLUSION

Althou incidence of NT and NNT has been reduced over the years probably due to improvement of coverage and awareness regarding routine immunization under UIP, Tetanus is more common in rural population. This may be due to illiteracy, poor socio economic status, poor awareness of immunization programme, fear of complication due to vaccination, superstition. Mortality is decreased as the incubation period and period of onset increased. Mortality is increased with temperature and grade of tetanus increased. Complications may occur as a part of disease or due to therapeutic interventions. Thus Improvement in coverage of maternal TT and institutional deliveries as well routine immunization of children by awareness and health education programmes may help in reduction of incidence and mortality of neonatal tetanus

as well as non neonatal tetanus. Early recognition by surveillance, intense and prompt management improves morbidity and mortality in childhood Tetanus.

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