A Retrospective Clinical Study Of Factors Affecting Tetanus

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Abstract

Tetanus is a devastating disease of muscle spasm and autonomic instability with a high mortality. Despite being easily preventable with a highly effective vaccine, tetanus remains a significant source of morbidity and mortality worldwide . Our aim of the study was to review the demographic and clinical presentations of tetanus and to study the route of entry, immunization status and outcome of the disease. This study included all cases diagnosed as tetanus in a period of 6 years from 1st January 2000 to 31st December 2005. Data of the patients was retrospectively collected from the Medical Records Department of Kasturba medical college hospital, Manipal. The data included details of the patients and clinical findings. The maximum incidence was noted in the age group above 30yrs of age and males were more than females. Incidence among patients of various occupations was higher among those involved in manual work - farmers (66.66%) Common clinical manifestations included trismus with the common site of injury was lower Limb. Mortality was found to be higher with increase in severity of the disease and short Incubation period. Poor adherence to immunization schedule in adult population,low level of care administered for minor injuries by the primary health care providers, without keeping in mind the possibility of tetanus and lack of awareness among general public about the immunization schedule and the disease, was probably the reason for a higher incidence of tetanus in this country compared to the west. Severe tetanus had a higher mortality than moderate tetanus. The mortality of patients with tetanus remained phenomenally high (23.33%), the reason for which had to be elucidated with further prospective studies.

INTRODUCTION

Tetanus is a devastating disease of muscle spasm and autonomic instability with a high mortality. Despite being easily preventable with a highly effective vaccine, tetanus remains a significant source of morbidity and mortality worldwide with an incidence of about 500,000 to one million cases per year with a higher incidence among neonates, women and elderly in adult population [12] .

Tetanus is an acute, often fatal, disease caused by an exotoxin produced by the bacterium - Clostridium tetani. It is characterized by generalized rigidity and convulsive spasms of skeletal muscles. The muscle stiffness usually involves the jaw (lockjaw) and neck and then becomes generalized.

AIMS AND OBJECTIVES

- Review the demographic and clinical presentations of Tetanus
- Study the route of entry ,immunization status and outcome of the disease

MATERIALS AND METHODS

This study includes all cases diagnosed as Tetanus in a period of 6 years from 1 st January 2000 to 31 st December 2005. Data of the patients was retrospectively collected from the Medical Records Department of Kasturba medical college hospital ,Manipal which is a tertiary- care hospital. The data was compiled in proforma which included details of the patients, symptom analysis, clinical findings, investigations and management.

In total, 30 tetanus patients admitted to the Kasturba Hospital, Manipal, between January 2000 and December 2005. All patients were given antibiotics, benzodiazepine (diazepam 5 mg/kg body weight) and, when needed, chlorpromazine and muscle relaxants for control of tonic–clonic contractions. Mechanical ventilation was used when generalized spasms were not controlled. Tracheostomy and/or mechanical ventilation were also used in patients who had respiratory problems. Patients received passive immunisation with Human Tetanus Immunoglobulin (HIG) 3000-6000 IU, and active immunisation with Tetanus

Toxoid.

Patients were classified according to various factors and relation to mortality evaluated. Incubation period [a] – time period from time of injury to onset of symptoms. Period of onset **– time period from onset of symptoms to time of full blown disease / onset of convulsions ,Severity of disease – mild, moderate and severe according to the Classification of Tetanus by Bleck** [3]

RESULTS

A total of 30 patients diagnosed to have tetanus and admitted between 1 st January 2000 and 31 st December 2005. 2,32,111 patients were admitted to Kasturba Hospital, Manipal in the same period. The overall incidence of tetanus in the hospital was 0.002154% between 2000 to 2005, all of which were generalized tetanus. A total of 30 patients were analyzed. The age range of 30 patients was from 15 to 70 years with a mean age of 42.93 yrs. The maximum incidence was noted in the age group above 30yrs of age and males were more than females. Incidence among patients of various occupations was higher among those involved in manual work - agriculturist (66.66%) and manual labourer (16.66%) and house wives (16.66%) (Table 1)

Figure 1

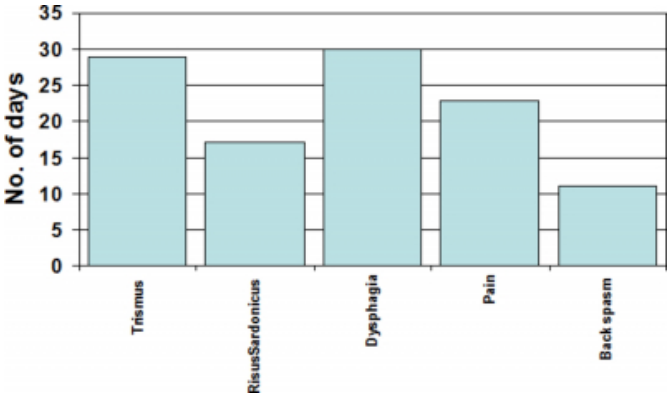
Table 1: Distribution of Male and female patients with age in years and occupation

Age group In years	No. of pts (%)	Number of males	Occupation	Number of females	Occupation
11 – 20	3(10%	2	Student(1) Manual labourer(1)	1	Housewife(1)
21 – 30	2(6.6%)	2	Manual labourer(1) Teacher(1)	0	
31 – 40	8(26.67%)	8	Farmer(7) Manual labourer(1)	0	
41 – 50	9 (30%)	7	Farmer(4) Manual labourer(2) Fisherman(1)	2	Housewife(2)
51 – 60	5(16.67%)	5	Farmer(5)	0	
> 61	3 (10%)	1	Farmer(1)	2	Housewife(2)
Total	30(100%)	25(83%)	Farmer 17(56.66%) Manual laborer 5(16.66%) Teacher 1 (3.33%) Fisher man 1(3.33%) Student 1 (3.33%)	5(17%)	House wife 5 (16.66%)

Common clinical manifestations included trismus, which was seen in 29 of 30 patients (96.67%), risus sardonicus in 17 (56.67%) followed by dysphagia in 30 (100%) (Fig 1)

Figure 2

Fig 1 : Clinical manifestations



Only 23(76.67%) patients presented with history of injury. The most common site of injury over the body was noted to be the Lower Limb 17 of 23 patients [73.9%] and upper limb 5 of 23pts [21.7%] (Table 2.)

Figure 3

Table 2 : Site of entry of tetanus spores

Nature of the wound	Number of patients	Site of injury
Fall/ Minor abrasion	8	Upper limb (2) Lower limb (6)
Nail/ thorn prick	10	upper limb (2) Lower limb(8)
Snake Bite	1	Lower limb(1)
Chronic suppurative otitis media	1	Ear (1)
Lacerations	3	Upper limb (1) Lower limb (2)
TOTAL	23 (76.67%)	

History of treatment after injury and administration of Tetanus Toxoid [TT] also were important factors in prognosis of the disease with those receiving TT after injury showing better prognosis.(Table 3)

Figure 4

Table 3 : Medical treatment after injury and TT immunisation

History	Present	% Mortality	Absent	% Mortality
H/o immediate medical Treatment after Injury of 23pts	16 (69.56%)	31.25% 5 of 16	7 (30.44%)	28.57 2 of 7
H/o TT after injury of 30 pts	10 (33.33%)	10% 1 of 10	20(66.67%)	30% 6 of 20

Mortality was higher in those patients with shorter Incubation period 33.3% and those patients with shorter period of onset, mortality was 27.78%. Increased time period between onset of symptoms and admission of patient to the hospital, seen in 83.33%, shows a relative increase in

mortality, indicating the need for treatment to be administered at the earliest. Mortality was found to be higher with increase in severity of the disease.19 of 30 [63.33%] patients had moderate tetanus with a mortality of 26.32% and 6 of 30 patients [20%] with severe tetanus had a mortality of 33.3% (Table 4)

Figure 5

Table 4 : Prognostic Factors of Tetanus vs. Mortality

Parameter		No. of pts	% of 30 pts	% Mortality
Incubation Period(a)	< 4 days	6	20%	33.3% 2 of 6
	4 to 7days	8	26.67%	25% 2 of 8
	> 7days	9	39.13%	11.1% 1 of 9
	N/A	7	23.33%	28.6% 1 of 7
Interval between onset of symptoms & admission	< 24Hrs	5	16.67%	20% 1 of 5
	1 - 5 days	21	70%	23.81% 5 of 21
	> 5 days	4	13.33%	25% 1 of 4
Period of onset(b) -	< 48hrs	18	51.43%	27.78% 5 of 18
	2-4 days	9	40%	11.1% 1 of 9
	> 4 days	3	8.6%	1 of 3
Severity of the disease	Mild	5	16.67%	0%
	Moderate	19	63.33%	2 of 6 (26.32%)
	Severe	6	20%	2 of 6 (33.3%)

DISCUSSION

In the present study, a total of 30 patients were studied. 25 of 30 (83%) patients were male and 5 (17%) were female, in contrast to western literature [45]. Mean age was 42.93 years, ranging from 15 to 70 years showing a higher incidence in males. In a study by Peetermans WE et al [6] at University Hospital, Leuven, Belgium between 1983 and 1993, 27 patients were analyzed- 13 males and 14 females with a mean age of 68.5 years. In a similar study by Lee et al [7] at National Cheng Kung University Hospital, Taiwan, between Oct 1991 and 1999, 20 patients were studied 7 males, 11 females with mean age of 63 years ranging from 34 to 87 years. In a study by Pawar et al [8] at General Hospital, Solapur, between April 1995 to March 1996, records of 76 patients were analyzed of which 49 (64.5%) were below 20 years of age. In a study by JC Patel et al [9] at King Edward Memorial Hospital, Bombay, between Nov 1954 to Oct 1968, records of 8697 patients were analyzed. 4900 (56.34%) patients were below 10 years of age. 5576 (64.11%) were males while 3121 (35.89%) were females. The male preponderance in the present study is probably due to a higher number of patients being farmers and moreover the immunization females receive against tetanus during their antenatal care.

In this study 9 of 30 (20%) patients had received Tetanus Toxoid (TT) immunization after injury, 16 of 23 (69.56%) patients had taken treatment after injury. In the study by Peeterman et al, 8 patients received Injection (TT) after injury, 10 patients had taken treatment after injury. In the study by Lee et al 4 of 20 (20%) patients had received tetanus TT in the past while only 6 of 20 (30%) patients sought medical help after injury. In the study by Pawar et al, only 4.2% of patients had a history of TT, immunization. Lack of awareness of the disease, its immunisation schedule [2322] [4] and poor primary health care are contributory factors to decreased levels of immunisation among general population.

In the present study, 23 of 30 (76.67%) patients had a history of injury with a mortality of 21.74%. The most common site of injury was the lower limb, seen in 17 (73.9%) patients. In the study by Peeterman et al 24 of 27 patients (88.89%) had a wound 13 of 24 patients (54.17%) with a wound in the lower limb. In the study by Lee et al, 17 of 20 (85%) patients had an injury with lacerations in 8 (47%) patients and puncture wounds in 7 (41%) patients. 10 of 17 (58.83%) patients had an injury over the lower limb. Pawar et al study showed 46 of 76 (60.5%) patients had an injury and there was an otogenic cause in 18 (23.7%) patients. Study by JC Patel et al showed that 3362 (46.64%) patients had an injury and 1580 (21.92%) patients had otorrhoea. 2304 (63.54%) patients had an injury over the lower limb.

In the present study, presenting complaints of patients were: Trismus in 26 of 30 pts (86.67%), dysphagia in 5 (16.67%), neck stiffness in 5 (16.67%) patients. In comparison the study by Peeterman et al, trismus, dysphagia and muscle rigidity were seen in all 27 patients, pain in 23 patients and risus sardonicus in 13 patients. In the study by Lee et al, trismus and dysphagia were seen in all 20 pts (100%), stiff neck in 85%, muscle spasm in 80%, abdominal rigidity in 90% and opisthotonus in 50% of patients. In study by Pawar et al trismus was seen in 58 of 76 pts (81.7%), spasms in 6 (8.5%), fever in 5 (7%) patients.

In the present study, 14 of 30 pts (46.67%) had an incubation period of less than 7 days, having a mortality of 28.57%; 7 pts could not be assessed. In the study by Peeterman et al [6], mean incubation period was 10.8 days with a range of 3-28 days, of which 5 patients had an incubation period of less than 7 days. Study by Pawar et al [8] showed 75% mortality in those patients with an incubation period of less than 7 days. JC Patel et al [9] study showed 1163 of 1490 (78.05%) neonates had an incubation period of less than 7 days and showed a mortality of 94.15%. 1859 of 7207 (25.79%) non-neonates had a mortality of 58.26% with an incubation period of less than 7 days.In this study, 18 of 30 patients (60%) had a period of onset less than 48 hours with a

mortality of 27.78% [5patients]. Pawar et al [8] study showed 100% mortality for those patients with a difference less than 48 hours and 20% mortality in those patients with a difference greater than 48 hours. In JC Patel et al [9] study, 1224 (82.15%) neonates had a period of onset less than 24 hours, showing a mortality of 90.28%. 1879 of 7207 (26.07%) non-neonates had a period of onset of less than 24 hours, showing mortality of 75.46%. Incubation period and period of onset are good indicators along with other factors such as age [12] in evaluating the prognosis of the disease.

CONCLUSION

A higher incidence in males is seen, in contrast to western literature [78] because males more often go for outdoor manual labour and a lower incidence in females may be due to strict adherence to a good immunisation schedule against tetanus during pregnancy.

Poor adherence to immunisation schedule has been noted in adult population, which may explain the higher incidence in the older age group.

Absence of neonatal tetanus may be attributed to good antenatal care wherein all the expectant mothers are immunized against tetanus.

Low level of care administered for minor injuries by the primary health care providers, without keeping in mind the possibility of tetanus and lack of awareness among general public about the immunisation schedule and the disease, is probably the reason for a higher incidence of tetanus in this country compared to the west.

Incubation period less than 4 days and a period of onset less than 48 hours, are factors that have a higher mortality rate.

Severe tetanus has a higher mortality than moderate tetanus.

All the patients with mild tetanus recovered and were discharged without any complications.

Compared to western literature (mortality 11.1%) [6], in spite of our institution being a tertiary referral centre, the mortality of patients with tetanus remains phenomenally high (23.33%), the reason for which has to be elucidated with further prospective studies.

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