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Assessment of Incidence and Mortality of Tetanus at Sir Ronald Ross Institute of Tropical andCommunicable Diseases (Govt. Fever Hospital), Hyderabad – Five Year Study

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Abstract:
Back ground:*Tetanus is a neurological disorder characterised by increased muscle tone, spasms and autonomic instability with high a mortality .Though it is easily preventable with highly effective vaccine, tetanus is still a major health problem in India and other developing countries and is associated with high morbidity and mortality.*
Aims: *The aim of our study is to assessthe epidemiological and clinical profile of tetanus and outcome of the patients in relation to the clinical grading of the patients.*
Materials and Methods:*A total of 157Tetanus patients who were admitted in SRRITCD,Hyderabad in a period of 5 years from January 2010 to December 2014 were taken as study group. For all patients epidemiological features and mortality were assessed.*
Results:*In this study, males (56.69%) were commonly effected than females(43.31%). Only 21.66% of the patients had primary childhood immunization. None of the patients received tetanus immunoglobulins. 74.25% had a reasonably identifiable acute injury prior to the onset of tetanus and commonly involved the lower limbs(79%). All patients had generalized tetanus with 40.76% mortality. Patients with incubation period of less than7 days showed 58.06% mortality, patients with grade IIIwere with 85.24% mortality whereas grade IV patients showed 100% mortality. Theseverity of the disease was found to be significantly associated with higher mortality.*
Conclusions: *Tetanus, a vaccine preventable disease still remains as difficult disease with high morbidity and mortality. The incidencecan be reduced by implementing the preventive measures like strengthening of primary immunisation programme , implementation of effective immunisation program for adults, educating the people about booster doses of tetanus vaccine for every 5 years to maintain protective level of tetanus antibodies and proper wound care .*
Keywords*:Tetanus, trismus, outcome, immunization.*

I. Introduction

Tetanus is a neurological disorder characterised by increased muscle tone and spasm that is caused by Clostridium tetani, an anaerobic, grampositive rod and spore forming bacteria. It is found worldwide in soil, inanimate environment, in animal faeces ,occasionally in human faeces. Four clinical forms of tetanus are recognised and they include generalised, localised, cephalic and neonatal tetanus [1,2]. Spasm related respiratory compromise, autonomic instability are usually main causes of morbidity and mortality of the disease. The diagnosis of tetanus is most frequently made on clinical manifestations rather than on bacteriological findings.

The usual mode of entry is through punctured wounds or lacerations or may follow surgery, burns, gangrene, chronic ulcers, animal bites, injections, dental infections, middle ear infections, abortions and childbirth. In some patients no portal of entry of the organism can be identified. Tetanus occurs sporadically and almost always effects non immunised, partially immunised and also in fully immunised persons who fail to maintain adequate immunity with booster doses of vaccine [1,2]. Therefore, all age groupsshould have primary immunisation with subsequent maintenance of antitoxin levels by means of appropriate timely boosters [2.3].

II. Materials and Methods

This study was done at Sir Ronald Ross Institute of Tropical and Communicable Diseases, Hyderabad for a period of five years, from January 2010 to December 2014. All clinically diagnosed cases of tetanus admitted in the isolation ward were taken as study group. The data was compiled in proforma which included symptomatology, immunization status past history of an injury,occupation, suspected portal of entry of infection, prior wound management, incubation time(time from injury to the appearance of symptoms), period of onset (interval between the first symptoms and the first spasm), management, related complications,length of hospitalization, outcome and factors predicting the outcome. Thediagnosis of tetanus was made based only on clinical features like trismus, rigidity of the neck and abdomen and reflex spasms.The severity of the tetanus was classified into mild (Grade I), moderate (Grade II), severe(Grade III) and very severe(Grade IV) based on the classification done by Ablett(15)

The treatment was started immediately, the three objectives of therapy i.e, supporting care neutralization of circulating toxin by giving tetanus immunoglobulins and removal of the source of tetano spasm in(wound exploration, debridement , removal of foreign body), ----------were done to all cases . The patients were treated with antibiotics (metronidazole) wound care,passive immunization with human tetanus immune globulins, and active immunization with injection tetanus toxoid at the time of admission.The patients also received diazepam for the control of spasmand magnesium sulphate which controls both spasms and autonomic instability. Statistical analysis was done and the results were analysed.

III. Results

There were 157 cases of tetanus in the study period with a range of 25-35 cases per year and a mean of 31.4 cases per year as shown in the Table 1. In this study, most cases of tetanus occur below 40 years age (120 out of 157 cases) followed by 1 to 10 year age group(64 out of 157) as shown in the table 1.There were 89 males (56.69%) and 68 females (43.31%) as shown in the Graph 1. Out of 157 patients 34 patients had received the primary childhood immunisation .None of these 34 patients had received booster doses. The remaining 123(78.34%) patients did not receive vaccination against tetanus as shown in the table 3. Only 34 patients 21.66% of the patients had primary childhood immunization. None of the patients received tetanus immunoglobulins .74.25% had a reasonably identifiable acute injury prior to the onset of tetanus and commonly involved the lower limbs (79%)**.**Out of 157 tetanus patients 23(14.64%) patients were labourers and industrial workers 22(14.01%) were farmers, 20(12.73) were house wives and 79 (50.3%) were students and 13 (8.27) were children staying at home as shown in the table 4.

88 out of 157 (56.04%) parents had a reasonably identifiable acute injury like thorn prick, nail prick, puncture wound or lacerations , prior to the onset of tetanus. 22 (14.01%)patients had chronic or acute suppurative otitis media . Other risk factors identified were surgery (1.27%),burns (0.63%). Animal bites (0.63%), injection abcess(0.63%). In 26.75 % of patients there were no identifiable portal of entry .112(71.33%) patients out of 157 did not consider the injury severe enough to be treated either by themselves or by doctors.

45 patients who sought medical help were given TT injection and antibiotics. Out of these 45 patients only 25 patients got wound cleaning and debridement. None of the patients received tetanus immunoglobulins in prophylactics treatment of the wound. Clinical features were discussed in Table 5. Incubation period is the time between the inoculation of the wound and the onset of the symptoms could be evaluated in 88 patients. 31 patients had an incubation period of less than seven days with 58.06% mortality.57 patients had an incubation period of more than 7 days with 26.31% mortality as shown in Table 6.All patients had generalized tetanus with 40.76% mortality. The severity of the disease was found to be significantly associated with higher mortality. Severity of the disease: assessment of severity of Tetanus according to Ablett classification system revealed that out of 151 patients 29 patients had mild or grade 1 disease with 0% mortality.57 patients had moderate or grade 2 with 14.03% mortality.61 patients had grade 3 or severe tetanus with 85.24% mortality 4 patients had grade 4 or very severe tetanus with 100% mortality as shown in the table 6.

Out of 157 patients 87 patients(55.41%) survived 6 patients were(3.82%) LAMA (left against medical advice) the case fatality rate was 40.76% out of 87 survivors 86 patients were discharged in good condition and 1 patient developed foot drop. Majority of deaths occurred in first few days . 40% died in the first 3 days 60% died in first 10 days.

Table 1: Age distribution of tetanus patients (n= 157)

Year	Neonate	Upto1 year	1 - 10	11- 19	20- 39	➢ 40
2010	0	1	11	12	5	10
2011	1	1	12	6	8	7
2012	0	0	12	4	8	6
2013	0	0	19	3	5	3
2014	0	0	10	4	5	4

Graph 1: Gender distribution of tetanus cases (n= 157)

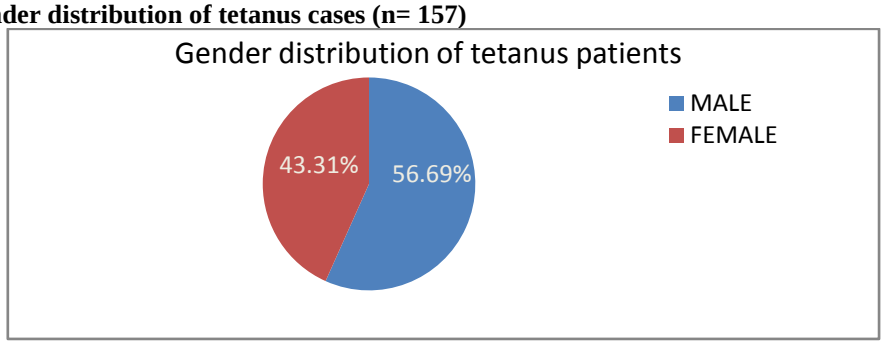

Table 3: Immunization status of the Tetanus patients (n=157)

History of Immunization	No of patients	Percentage
Immunized	34	21.66%
Non immunized	123	78.34%

Table 4: Distribution of patients in relation to the Occupation

Occupation	No. of cases	Percentage
Industrial workers /labour	23	14.64%
Farmers	22	14.01%
House wires	20	12.73%
Students	79	50.30%
Children not going to school(staying at home)	13	8.27%

Table 5: Clinical presentation of Tetanus patients (n= 157)

Clinical presentation	Number of patients	Percentage
Trismus	157	100
Body stiffness	157	100
Dysphagia	110	70.06
Abdominal pain	80	50.95
Spasm	114	72.86
Shortness of breath	61	38.85
Urinary retention	12	7.6
Fever	89	56.68
Body aches	110	70.06

Table 6: Prognostic Factors of Tetanus in relation to mortality

Parameter		No of patients	No of patients expired	%Mortality
Incubation period	< 7days	31	18	58.06%
	>7days	57	15	26.31%
Severity of the disease	Mild	29	0	0%
	Moderate	57	8	14.03%
	Severe	61	52	85.24s%
	Very severe	4	4	100%

IV. Discussion

Despite of increasing mortality of Tetanus in the countries like India, Tetanus is still considered as low public health priority. Awareness of the facts about preventive measures like effective immunization, regular booster doses, proper wound management and also risk factors can help people protect themselves from Tetanus.

In this study,most cases of tetanus occur below 40 years age. 120 cases out of 157 are below 40 years. Out of these 127 cases 64 cases are 1 to 10 year age group children. The incidence of tetanus in the developed world is markedly low and is no longer responsible for significant mortality, this has been attributed to high

level of health awareness in terms of immunization and availability of human and material resources to manage the disease [4].In developed countries tetanus occurs mainly in elderly due to decline in antibodies [5,6] and in developing countries tetanus is common in young due to lack of effective immunization program and appropriate treatment of injuries [7,8].

In India like in most of the developing countries in the world tetanus is endemic and it remains a public health problem even today. Few studies which were done in India have revealed the prevalence of tetanus and the mortality which is caused by tetanus to be high [7-15]. In developing countries tetanus is common in the young due tolack of effective immunisation program.Whereas in developed countries most of the cases of tetanus occur in elder people. Waning immunity is the cause of more incidents of tetanus in this age group [5-7] .

The male preponderance (57.69%)in this study was in accordance with the findings of other Indian studies [7-9] and with that of other studies which were done in the developing world [10]. This can be explained by the fact that men spend more time in farming activities and other field works.They are more likely to be exposed to Clostridium tetani spores which are ubiquitous on the soil and that the females are protected against tetanus by TT immunisation which is given during the antenatal period.91.5% patients were from rural areas and urban slums and 8.5% patients are from urban areas. It reflects the lack of immunisation against tetanus in rural populations, sub urban areas. They have high risk of injury in terms of occupation and poor environmental conditions.

The majority of victims (78.34%) neither had received primary immunization nor effective immunization. This reflects gross negligence on the part of both the victim as well as the healthcare system.
In the present study, 21.66% received childhood immunization andnone of them received booster doses.78.34% patients not received immunization.28.66% sought medical help after injury. 15.92% got wound cleaning and debridement. None of them received tetanus immunoglobulins in the prophylactic treatment of the wound. In the study by Vanadevara Girirayapura etal [11] , none of the patients had primary immunization against tetanus. In the study by AHM Feroz etal [12] , none of the patients received prophylactic immunoglobulins.

In the present study presenting complaints of the patients were trismus 100% , neck stiffness 100%, body stiffness 100%, spasms 72.8%, dysphagia 55%. In comparison the study byPeeterman etal trismus , dysphagia 100% . In the study by LEE etal [13] trismus and dysphagia 100%, muscle spasm 80%. In the present study the most common site was lower limb seen in 79% patients. In the study by Peeterman etal 54% [14] . .
In spite of significant improvement in overall healthcare in this country, prevention and control of Tetanus has been a low priority for the health authorities. Simultaneously, extensive public education for both rural and urban community is equally important for reducing Tetanusmortality. It is recommended that all patients with injuries should receive the life saving tetanus immunoglobulin from the health institutions. It is very important to educate the people about the need for immunization program in order to prevent deaths due to Tetanus.
It is well known that availability and affordability of modern tetanus immunization still needs to improve, and that the facilities and services are poor in various health centers.

Surveillance systems needs to be strengthened in thecountries like India in order to obtain accurate data before taking appropriate control measures. Epidemiological surveys to estimate the burden of Tetanus and its mortality rate were done in few countries based on the past history of injuries. This type of hospital based studies can help in developing the new strategies to reduce the number of Tetanus and to plan for its elimination.Hence we made an attempt, this kind of study in our hospital mainly to estimate the burden of Tetanus and its endemicity. The results were compared to other similar hospital based studies. But the present study has some limitations. Most importantly there was no laboratory confirmation of the disease in any case. The cases were diagnosed based on clinical features of past history of injury, trismus, rigidity of neck and abdomen and reflex spasms.

Thus diagnosis based on epidemiological and clinical findings should be sufficient. Large scale surveys as well as hospital based studies are needed to provide the valuable data for prevention and control of tetanus in future.

V. Conclusions:

Though tetanus is a vaccine preventable illness its prevalence is high in our country . It still remains a difficult disease to treat with high morbidity and mortality. The incidence of tetanus can be reduced by strengthening of primary immunisation programme. Implementation of effective immunisation program for adults.Educating the people about boosterdoses of tetanus vaccine for every 5 years to maintain protectivelevel of tetanus antibodies.Proper wound management immediately after the injury by doing wound debridement , removal of the foreign bodyand by giving prophylactic tetanus immune globulins along with tetanus vaccine.

Tetanus continues to be a dreadful disease in India.This study provides strong evidence that Tetanus is still a disease with high mortality. This is mainly due to lack of awareness about proper Immunization.Improved coverage with modern Tetanus vaccine, control of Tetanus due to injuries by giving

immunoglobulin and proper wound care and also intensifying public education about the disease play main role in the reduction of the disease.

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