Clinical Profile and Outcome of Adult Tetanus in Oghara, Delta State.

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ABSTRACT

Background: Tetanus persists to be a global problem due to either failed immunization or poor coverage of many inaccessible populations in both developing and developed societies. Mortality is higher in the developing world with poorly organized health systems.
Aim: To report the clinical profile and outcome of tetanus admissions in Delta State University Teaching Hospital, Oghara, between June 2010 and April 2015.
Methods: The records of all patients managed for tetanus on the medical wards and the intensive care unit of the hospital were studied.

Results: Twenty-seven patients comprising of 21(77.8%) males and 6 (22.2%) females were diagnosed and managed for tetanus during the period under review. The mean age of the patients was 34.07±1.50 years.The patients were largely of low socioeconomic group. Lower extremity wounds and lesions was the commonest portal of entry,74.1%. The overall case fatality rate (CFR) was 37%. Among those managed in the intensive care unit the case fatality was 50%. The factors significantly associated with increased mortality include short incubation period (p =0.009), short onset time (p = 0.001), severity of the disease (p = 0.014) and increasing age (p = 0.03). The commonest complications recorded in this study were laryngeal and pharyngeal spasms, aspiration pneumonia and autonomic dysfunction.

Conclusion: Tetanus is life-threatening disease with high case fatality that is still a health challenge in our environment. There is need to provide better vaccination coverage for all including booster doses for adult males and to improve on medical intensive care facilities and training.

Keywords: *Clinical profile, outcome, Adult, Tetanus*

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INTRODUCTION

Tetanus is a preventable life threatening neurological disorder that constitutes a major public health challenge in developing countries. It is a cause of significant morbidity and mortality especially in developing countries. Despite several concerted efforts through immunization to contain this disorder, it persists as a global problem due to either failed immunization or poor coverage of many inaccessible populations in both developing and developed societies.[1]

Tetanus is caused by a neurotoxin produced by *Clostridium tetani,* a gram-positive, obligate anaerobic rod-shaped bacterium that forms spores. The spores are ubiquitous worldwide as constituents of soil and in the gastrointestinal tracts of humans and animals whose waste can contaminate many surfaces and substances. The spores are extremely difficult to destroy requiring autoclaving or prolonged exposure to iodine, hydrogen peroxide, formalin or gluteraldehyde.[2] The exotoxin, tetanospasmin, which is one of the most potent toxins ever known to man, with a minimum lethal dose of less than 2·5 ng/kg in humans[3] and absolute neurospecificity and enzymatic action,[4]is responsible for the clinical manifestations. The Clinical manifestations are

characterized by rigidity of muscles, painful muscle spasm, locked-jaw or trismus and clear mental status.

Unhygienic practices such as use of old or unsterilized razor blade for making tattoos, tribal marks, cutting umbilical cords; close contact of broken skin or wounds with soil and animal dung,; unsafe abortions, lack of active and passive immunization are the major risk factors.

This study described the clinical characteristics of adult tetanus in Delta State University Teaching hospital, Oghara, Nigeria.

MATERIALS AND METHODS

We retrospectively reviewed the records of all patients with tetanus admitted into the hospital and managed by the neurology unit of Delta State University Teaching Hospital, Oghara from June 2010 to April 2015. Tetanus was clinically diagnosed based on the presence of at least two of the following features trismus, risus sardonicus, painful spams and rigidity with or without opisthotonus. The demographic characteristics, portal of entry, incubation period, onset time, the severity, need for ventilator, duration of hospital stay, complications and outcome were obtained and analyzed. Incubation period was defined as the time interval in days between injury sustained and the first symptom or sign of tetanus. The onset-time was defined as the time interval in days between the first symptom and the first spasm. The disease was categorized based on severity using the Ablett's scoring system[5]. The outcome of the admission was categorized into discharged or dead. Autonomic dysfunction was diagnosed if there were two or more of: labile blood pressure (hypertension and hypotension), high grade fever in the absence of infection, tachycardia / bradycardia and diaphoresis in the absence of fever. The data was analyzed using statistical package for social sciences (SPSS) version 21

RESULTS

A total of 27cases were diagnosed and managed for tetanus out of 925 neurological admissions during the period under review giving a frequency of 2.92%. The patients comprised of 21 (77.80%) males and 6 (22.20%) females with a male to female ratio of 4.5: 1.0.*See table 1*.

Table 1: Age and Sex Distribution of Patients with Tetanus

AGE GROUP IN YEARS	</=20	21-30	31-40	41-50	51-60	>60	FREQ(%)
Males	3	6	8	0	2	2	21 (77.8)
Females	0	2	2	1	0	1	6(22.2%)
Total	3	8	10	1	2	3	27 (100%)

The mean age of the patients was 34.07±1.50 years with age range of 13years to 65 years. The mean age for males was 33.04±1.50 years and mean age for females was 37.67±1.52 years The patients were made up of artisans 9(33.3%), traders and business men and women 6(22.2%), farmers 4(14.8%), students 4(14.8%), civil servants 3(11.1%) and retired personnel 1(3.7%).

The portal of entry was puncture wounds and lacerations (including 2 cases of matchet cuts) in 24 (88.9%), diabetic foot ulcer was recorded in a patient(3.7%) and no obvious portal of entry was found in 2 patients (7.4%). Lower extremity lesions constitute portal of entry in 20 (74.1%) of cases.

The mean incubation period was 6.70±2.83 days with a range of 3 to 14 days. The mean

onset time was 2.04 ±0.85 days , ranging from 1 day to 4 days. Those who survived had longer incubation period of 7.6±3.1 days compared to those who died with incubation period of 5.2±1.3 days. The onset time was also shorter among those who died (1.2±0.42 days) compared to those who survived with onset time of 2.5±0.62 days. The mean dose of diazepam received was 216.2mg ±112.04mg per day. There was no significant difference between the mean dose received by those managed in the intensive care unit and those managed in the open ward p=0.234.

All the patients(100%) presented with lock-jaw and painful spasms while 25 (92.6%) had risus sardonicus. Rigidty with opisthotonus posturing was recorded in 22 (81.50%) and 20(74.10%) had board-like rigidity of the abdomen. *See table 2.*

The severity grading showed that none (0%) had mild tetanus, 4(14.8 %) had moderate, 9(33.3 %) had severe and 14(51.9%) had very severe tetanus. Generalised tetanus was present in 26(96.3%) and localized tetanus was seen in only one patient (3.7%). *See table 2.*

Table 2: Presenting Clinical Features & Complications of Tetanus among the Patients

Clinical features	Frequency	Percentage (%)
Portal of Entry		
Puncture wounds & lacerations	24	88.9
Diabetic foot ulcer	1	3.7
No obvious portal	2	74
Presenting symptoms & signs		
Trismus	27	100
Painful spasms	27	100
Neck rigidity&Opisthotonus	22	81.5
Risus Sardonicus	25	92.6
Abdominal rigidity (board like)	20	74.1
Complications		
Laryngeal/Pharyngeal Spasms	14	51.9
Aspiration pneumonia	11	40.7
Sepsis	5	18.5
Acute kidney injury	2	7.4
Autonomic dysfunction	8	29.6
DVT	1	3.7
Abllett's Severity grade		
I Mild	0	0
II Moderate	4	14.8
III Severe	9	33.3
IV Very Severe	14	51.9

DVT= Deep vein thrombosis

Out of the 27 patients 17 (63%) survived and were discharged home while 10 died constituting case fatality rate of 37%. The mean age for the survivors was 31.3±1.3years while the mean age for those who died was 38.6±1.7years. For those that were managed in the intensive unit, the case fatality rate was 50%. Out of the twenty-one patients who were managed in the emergency room or the wards there were 7 deaths with a case fatatilty rate of 33.3%. The cause of death of those who died in the emergency room or on the ward was mainly from respiratory failure secondary to laryngeal spasm.

The factors significantly associated with increased mortality included short incubation period less than 7 days (p =0.009), short onset time less than 2 days (p = 0.001) , severity of the disease (p = 0.014) and increasing age (p = 0.03). See table 3. Those with bad outcome tended to have shorter duration of hospital stay but there was no significant difference between severity of the disease and the duration of hospital stay (p = 0. 37) . Also there was no significant difference between the sexes with respect to outcome.

Table 3. Comparison of mean variables between outcomes

Variable	Discharges	Deaths	p-value
Age (years)	31.30±1.30	38.6±1.70	0.030
Incubation period (days)	7.60±3.10	5.20 ±1.30	0.009
Onset time	2.50±0.62	1.20±0.42	0.001
Duration of hospital stay	23.76±1.20	7.10±6.24	0.370

DISCUSSION

This study showed that despite concerted efforts to curb the burden of the disease through immunization coverage in the country, tetanus is still a cause of morbidity and mortality in Nigeria. Tetanus tend to occur in the younger working population in developing countries compared to the developed nations.[17] The mean age of occurrence in our study was 34.1±1.5 years. This supports the observations of most studies in the country and outside the country.[6-10] Komolafe et al in Ife however, found a mean age of 53 years in their patient population.[11] The frequency of tetanus in this survey is lower than most studies in the country.[9-13] This is likely a reflection of immunization coverage. A lower frequency of tetanus was recorded among females with a male to female ratio of 4.5: 1. This has also been reported in some previous local and foreign studies.[6-17]. There is no known biological reason in males or in the pathobiogy of the disease that can explain the sex difference. The observed discrepancy may be linked to lack of protective immunity against tetanus ocasioned by lack of boster doses of the tetanus vacination among men in comparison to the improved immunization coverage with boster doses for women especially during pregnancy.[17,18] Ogunrin et al however , reported slight preponeance in females.[19] The reason for this finding is not well understood.

The patients in this survey were largely from the lower socioeconomic strata of the society and the portal of entry for the disease was largely lower extremity injuries and lesions. The commonest clinical manifestation of tetanus among them were trismus and painful spasms (100%) followed by rigidity of the neck and risus sardonicus. This clinical profile has similarly been reported in the literature by several authors.[6-16]

Tetanus is a dreaded disease with records of high mortality. The overall case fatality rate (CFR) et al

from this study was 37%. Ojini and Danesi reported a similar case fatality rate of 36.96% in a study of 349 cases between 1990 and 1999 from Lagos, [15] but Sanya et al reported 64% in a review of 202 cases between 1990 and 2001 from Ibadan[20] and in Benin City, Ogunrin et al reported a mortality rate of 26.2% with an age-adjusted fatality rate of 16.2% for those less than 40 years of age in a review of 66 cases between 1990 and 2000.[19] Higher mortality rates of 57.1%, 53.5%, 44% were also reported from in southwest Nigeria by different authors. [7,11,16,] Owolabi et al reported mortality of 46% from Kano in a 10-year review[8] whereas Chukwubike and God'spower reported a case fatality rate of 42.9% among 86 cases from PortHarcout. [6] In Ethiopa Amanuel et al reported a case fatality rate of 35.3% [13]whereas in India , Anuradha reported 37.78%. [21]

Intensive care facilities have been found to reduce mortality from tetanus and mortality rates as low as 10% have been reported from units with facilities for intensive care.[23,24]The case fatality recorded in this study is however 50% percent mortality among the patients managed in the intensive care unit. One of the mortality cases in the intensive care unit was caused by failure to regain consciousness from the effect of anaesthesia after being weaned off from ventilation two weeks after cessation of spasms. The second patient died from overwhelming sepsis and ensuing renal failure. The third patient developed severe hypotension following intubation and died of cardiac arrest . Interestingly one patient managed in the intensive care unit had tracheostomy without ventilator support and performed excellently well despite the presence of complications. It is not very clear why intensive care services did not improve the outcome as expected among the patients. Plausible reasons include severe hypotension induced by induction agents and oversedation. Ojini et al also found that intensive care did not reduce mortality.[15]

The poor prognostic indicators in our study included short incubation period less than 7 days, onset time less than 2 days, severe tetanus especially with autonomic features and the presence of complications like aspiration pneumonia, severe sepsis and acute kidney. These observations have been documented in other studies. [15,16,19,21]

No case of post-abortal or puerperal tetanus was recorded during the period under review. This is in sharp contrast to findings in previous studies [11]and may also reflect an improvement in maternal and child health care services in recent years in the region.

The complications commonly seen among our patients included aspiration pneumonia, laryngeal spasm and respiratory failure, autonomic dysfunction with marked diaphoresis, labile hypertension, arhythmias (tachy- or bradycardia), acute kidney injury and sepsis. These observations support the findings in both local and foreign studies.[8-16,19]

The specific objectives of tetanus treatment are to stop the production of toxin at the site of infection with appropriate wound care and antibiotic use; to neutralize circulating toxin with anti-tetanus immunoglobulin; and to provide effective management of muscle spasm, respiratory failure, autonomic dysfunction, and complications. The patients in our study received wound care where present and metronidazole with or without any other antibiotic, anti-tetanus serum /immunoglobulin and high doses of diazepam to control spasms. The average dose of diazepam received was 216.2mg ±112.04mg per day. The use of these treatment modality have been reported to reduce mortality and morbidity of tetanus patients admitted to hospital.[15] Even in settings with limited resources, if basic medication, experienced medical supervision, and high-quality nursing can be provided, mortality can be reduced.[25] In the author's experience the greatest impediment to improved survival of tetanus patients in our environment is the lack of access to appropriate medical care.

Conclusion

Tetanus is a preventable life threatening illness that is still a significant cause of morbidity and mortality in Delta State as observed in this

hospital, especially among young working class males in their prime of life. There is need to increase efforts at awareness creation and providing protective tetanus immunization especially for men in form of booster doses during preschool and pre-employment medical examination programs. Also improvement in hygienic practices and increased nursing care and medical supervision will go a long way to reduce the attendant mortality in patients with tetanus.

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