

## PATTERN AND OUTCOME OF ADULT TETANUS IN ILE-IFE, NIGERIA

\*MA Komolafe, \*\*EO Komolafe, \*AO Ogundare

Departments of \*Medicine and \*\*Surgery, Obafemi Awolowo University Teaching Hospitals Complex,  
Ile-Ife, Osun State. Nigeria.

### ABSTRACT

**Objective:** This is a retrospective study of all adult patients with tetanus managed at the Obafemi Awolowo University Teaching Hospitals Complex from 1995-2004. The aim was to study the pattern of adult tetanus in Ile-Ife, Nigeria, and see what improvements could be made in the future in particular with regard to decreasing the prevalence in our environment.

**Method:** Data was obtained from the hospital records of all the patients, the admission and discharge registers of the medical wards of the hospital.

**Result:** 79 adult patients with tetanus were managed during the study period and they accounted for 44% of neurological admissions. There were 56 males and 23 females giving a M:F ratio of 2.4 to 1. 45 (57%) of the patients were under 30yrs of age and two-thirds (67%) had puncture wounds in the lower limbs. 20 patients (25%) had mild tetanus, 16 (20%) had moderate disease and 43 (55%) had severe tetanus. The patients were treated with tetanus antitoxin, antibiotics and sedatives. The mortality rate was 45% and laryngeal spasm was the most common cause of death. None of the patients was managed in the intensive care unit (ICU).

**Conclusion:** Tetanus remains a major public health problem in Nigeria. It is commonly associated with high mortality due to late presentation. Health education should be promoted to reduce the unacceptable prevalence in our practice setting.

**Key Words:** Adults, Tetanus, Immunisation, Case Fatality, Mortality (Accepted 31 January 2007)

### INTRODUCTION

Tetanus is a severe and often fatal disease caused by the clinical effects of the tetanus toxin, tetanospasmin, a potent neurotoxin. Tetanus is a global disease that affects all age groups and both sexes, and commonly follows a contaminated wound in unimmunised individuals<sup>1</sup>. The global incidence is about one million<sup>2</sup> with majority of the cases occurring in the developing countries. In the developed countries, the disease is uncommon. The annual incidence is between 50 and 70 cases in the United States<sup>3</sup>, 30 in the New Zealand<sup>4</sup> and the lowest prevalence is in Britain with only 12 to 15 cases per annum<sup>5</sup>. In Africa, unlike the developed world, there has been no improvement in the epidemiology of the disease over the years despite availability of protective immunisation<sup>2</sup>. Tetanus therefore remains a public health issue in many developing nations. At the University College Hospital (UCH) Ibadan, Adeuja and Osuntokun<sup>6</sup> observed that tetanus was responsible for 20% of neurological admissions.

Three decades later Talabi<sup>7</sup>, also at the UCH observed tetanus to account for 14. 2% of all neurological admissions in a three year review. Studies from other parts of Africa show similar dismal results. In Dakar (Senegal), 1,199 cases were reported within seven years<sup>9</sup>. Ghana has an annual prevalence of 1.06 cases/1,000,000 population<sup>10</sup> compared to 0.15 cases/1,000,000 population in the United States<sup>11</sup>. Under-reporting is a serious problem in the developing countries and these published figures represent only a tip of the iceberg<sup>12</sup>. Of the 18, 833 cases of tetanus reported to the WHO in 2000, 70 countries, many of which are in Africa, and including those at risk did not supply data and among those that did, the information was incomplete<sup>12</sup>.

Tetanus is a lethal infection more so in Africa where specialists and adequate facilities for treatment are not usually available. Eighty per cent of the deaths due to tetanus infection occur in Africa and South East Asia. The mortalities from various centres in Nigeria are not encouraging i.e. 29% from Port-Harcourt<sup>13</sup>, 37% from Lagos<sup>14</sup>, 26.2%

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Correspondence : DrMA Komolafe  
E-mail: [adeyoyin2001@yahoo.com](mailto:adeyoyin2001@yahoo.com)

from Benin<sup>15</sup>, 53.5% from Ile-Ife<sup>16</sup> and 44% from Ogbomoso<sup>17</sup>. In Ethiopia, the mortality is 27%<sup>8</sup>. This study was carried out to look at the current pattern, trend and epidemiology of tetanus in our practice setting and also to determine the factors that affect mortality. These we hope will further enhance our understanding of the disease, give insight on how to reduce the burden of the disease as well as provide ways to improve the outcome, particularly in the adult patients.

### PATIENTS AND METHODS

We retrospectively reviewed the hospital records of all adult patients ( $\geq 16$  years) with tetanus, admitted and managed by the neurology unit of the Obafemi Awolowo University Teaching Hospitals Complex Ile-Ife, Nigeria over a ten-year period (1995-2004).

The tetanus was clinically diagnosed and was based on the presence of at least two of the following features: trismus with or without risus sardonicus, rigidity (usually of the abdominal and/or cervical muscles), and convulsive spasms<sup>6</sup>. We also categorized the disease into a) mild disease when no spasm was provoked on admission, b) moderate disease when the spasms observed were provoked and c) severe disease when the spasms occurred spontaneously, and/or the presence of autonomic dysfunctions with or without respiratory difficulty<sup>6</sup>.

Data such as the patient's biodata, occupation, portal of entry, presenting clinical features, severity of disease on admission, the incubation period, treatment given and the documented cause of death were retrieved from the hospital case records. The data were subjected to descriptive analysis using SPSS version 11.0 and tabulated in percentages.

### RESULTS

Tetanus was responsible for 79 out of 180 neurological admissions (44%) during the period studied. The age of the patients ranged from 16 years to 65 years and the mean age was 53.0 years  $\pm$  11.0 years. The age and sex distribution of the patients is as shown in Table 1. There were 56 males and 23 females giving a male to female ratio of 2.4 to 1. There were more males in the 3<sup>rd</sup> and 4<sup>th</sup> decades of life, and over half of the patients were under 30 years of age. Majority of the patients were of the low socio-economic status and were mainly students, farmers, gardeners, artisans and petty traders.

The portal of entry was through a wound in the lower limbs in 75% of the cases. 5 patients (6%) were infected through injections given by quacks, two cases complicated malignant ulcers and one patient each had uvulectomy (by local traditional quack), gun shot injury and septic abortion. The portal of entry was unknown or not documented in 6 (8%) patients. The presenting clinical features are shown in Table 2. The complications noted in the study were autonomic dysfunctions in 26 (33%) cases, aspiration 3 (4%), and laryngeal spasm 3 (4%). On admission, 20 (25%) had mild tetanus, 16 (20%) had moderate disease and 43 (55%) had severe tetanus. All the patients had anti-tetanus serum which was given at a dose of 20,000 units after a test dose, half through the intravenous route and the remainder intramuscularly. To reduce the spasms intravenous diazepam was given, with intramuscular chlorpromazine added in severe cases. None of the patients was managed in the intensive care unit and none had mechanical ventilation. The mortality rate was 45%. The deaths were mainly due to laryngeal spasm, septicaemia, bronchopneumonia, and cardiac arrest. The cause of death was either unknown or not documented in 3 patients.

Table 1: Age and Sex Distribution of the 79 adult tetanus patients

Age Groups in Years	<20	20-29	30-39	40-49	50-59	60+	Total
MALE	11	19	10	6	5	5	56
FEMALE	10	5	0	2	3	3	23
TOTAL	21	24	10	8	8	8	79

Table 2: The Presenting clinical features of adult patients with tetanus (n=79)

Clinical Features	Frequency	%
Trismus	77	97
Neck stiffness	78	98
General spasm	62	78
Fever	25	32
Rigidity	77	97
Risus Sardonicus	35	44
Opisthotonus	45	57
Hypereflexia	47	59

## DISCUSSION

This study shows that tetanus is still a major public health problem in Nigeria. Tetanus occurs all the year round in Nigeria, but is more common in the dry season. There has been no appreciable change in the epidemiology of the disease. The frequency is still very high, being responsible for 44% of neurological admissions at our centre. This is higher than what was obtained at the University College Hospital three decades ago by Osuntokun et al<sup>6</sup> and more recently by Talabi<sup>7</sup>. The high incidence of tetanus in our series may in part be due to the locality of the hospital. The hospital is located in a semi-urban city and at least 90% of the residents are farmers, and manual labourers which constitute the group that are most at risk of developing tetanus infection unlike in the big cities where the majority of the residents may be civil servants and students.

The highest disease frequency occurred in males under 30 years of age in contrast to the developed countries where majority of the cases were elderly patients over 60 years of age who had lost protective antibodies<sup>4</sup>. This is similar to the findings of Hesse et. al.<sup>10</sup> who observed a peak incidence in the 20- 29 year age group in Ghana. The lower frequency in females and in this age group might be due to tetanus immunization of pregnant mothers during antenatal clinic attendance. The clinical features and the prognostic factors are similar to those described by previous workers<sup>6</sup> and the adverse prognostic factors include advanced age, severity of disease, the presence of coma, and the available facilities such as a well equipped and adequately staffed intensive care unit. We did not record a single case of tetanus due to puerperal sepsis and this is an improvement when compared to 18. 6% in the series by Osuntokun et al.<sup>6</sup> in the sixties, indicating improvement in maternal health care services over the years.

The most common complication observed was autonomic dysfunction in 33% of the patients. This is marked by a hyperkinetic circulation with tachycardia, sustained labile hypertension, vasoconstriction and sweating. At times profound bradycardia and hypotension may occur but this is seen mostly as a pre-terminal event. Other major complications noted in this review were laryngeal spasm and aspiration pneumonitis. A patient with tetanus requires the best possible intensive care. In a review of 335 patients treated before intensive care unit (ICU) became available compared to 306 patients treated after development of ICU, mortality decreased from 44% to 15% mainly due to the prevention of acute respiratory failure<sup>12</sup>. In addition meticulous mouth care, chest physiotherapy and

regular tracheal suctioning are essential to prevent complications like atelectasis and pneumonia since salivation and bronchial secretions are greatly increased in severe tetanus<sup>12</sup>. Also adequate sedation, anticonvulsant, muscle relaxant and enteral feeding are vital due to the high energy demands in tetanus. There were no osteoarticular complications noted in this study in contrast to the findings of Diop et al<sup>9</sup> in Senegal who observed that 1. 89% of their patients had vertebral fractures.

Laryngeal spasm was the commonest cause of death occurring in 80% of the mortalities and cardiac arrest was responsible for 3% of the deaths in this review. Cardiac arrest has been noted by previous workers to be due to loss of sympathetic drive; catecholamine induced cardiac damage and increased parasympathetic tone<sup>18</sup>. Mortality rate from tetanus varies between 14 and 44%.<sup>4,6</sup> Case fatality rates and causes of death also vary dramatically according to facilities available. Trujillo and colleagues<sup>12</sup> reported a reduction in mortality from 44% to 15% after the introduction of intensive care treatment. Al - Kaabi et al<sup>19</sup> in Saudi Arabia also observed reduction in mortality rate to 10% with early and aggressive treatment in the intensive care unit. In developing countries, without facilities for prolonged ICU care and ventilatory support, deaths from severe tetanus exceed 50% with airway obstruction, respiratory failure, and renal failure as prominent causes of death. In our series, none of the patients had ICU care and this may have contributed to the high mortality rates recorded. The socio-economic status of the patients, the immunisation status, the incubation period, the age of the patient, the severity of the spasms, the duration of hospital stay, the type of treatment received and the onset time have also been reported to affect the outcome of the patients with tetanus<sup>20</sup>. In the United States of America, mortality in adults aged below 30years, with tetanus is very low while it is 52% in those over 60years. A similar trend has been noted in Nigerian patients where 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, and an increase to 75% for those patients above 70 years of age.

## CONCLUSION

Tetanus, a disease entirely preventable by immunization, unfortunately, is still a common disease in our environment and a major cause of morbidity and mortality in the productive segment of the population of many developing nations. There has been no remarkable improvement in the pattern of the disease as the frequency and mortality rates have worsened over the years. Implicated factors f

or these unacceptable and persistently high rates include late presentation with associated septicaemia, portal of entry in the neck, face and mouth areas, incubation period less than a week, early period of onset of 24 hours or less, severe disease, impaired consciousness on admission, and associated autonomic features such as labile hypertension, unexplained tachycardia and hyperpyrexia. Aggressive treatment in the intensive care unit is unlikely to be widely available because of lack of funding, hence it is recommended the health authorities promote the immunization of the groups at risk. The priorities must be in prevention, universal vaccination and the development of simpler immunization schedules with longer protection. In agreement with Ogunrin et al,<sup>20</sup> we also recommend that health care providers should take every opportunity to review the vaccination status of their patients and provide tetanus vaccine when indicated, and recall when treating injured patients that many middle-aged and older adults are not adequately immunised against tetanus.

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