Otogenic Tetanus: Continuing Clinical Challenge in the Developing Country

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Abstract: *Background*: Otogenic tetanus is a vaccine preventable disease which continues to be of public health significance.

Objectives: To evaluate patients with otogenic tetanus and identify the factors that predisposes patients to it.

Methodology: This is a 16-year retrospective review of all patients managed for otogenic tetanus at the Department of Otorhinolaryngology, University College Hospital, Ibadan. The essential clinical data collected include demographic data, clinical presentations, tetanus immunization history, duration of hospital admission, management and outcome.

Results: There were 66 subjects made up of 45 (68.2%) males and 21 (31.8%) females. Their age ranged between 2 and 65years, mean of 7.7 years but the under 5years constituted the majority, 56.1%. All patients presented with ear discharge, lock jaw and spasms. The onset of symptoms ranged between 3 and 8 days with a mean of 4.3 ± 3.3days. Only 21.2% had history of completed childhood tetanus immunisation. No patient had booster shots. About 98% had history of use of herbs, charcoal, honey, cigarette, methylated spirit or deodorant in the discharging ear. All were managed with antibiotic ear dressing, tetanus toxoid, human tetanus immunoglobulin, antibiotic therapy and sedative but only 3% had airway management. The duration of hospital admission ranged from 18 days to 105 days and there were 12.1% death.

Conclusion: Otogenic tetanus is still a major problem in developing countries and this can be prevented if recommended childhood tetanus vaccination and booster shots regimen are properly taken. Health education on ear hygiene and care of the ear may prevent this disease.

Keywords: Preventable disease, Discharging ear, Immunization, Otogenic tetanus and developing country.

INTRODUCTION

Otogenic tetanus is a rare entity even though it has been reported long ago in the literature. First case of otogenic tetanus was reported in 1934 by Hyman *et al*. [1]. The World Health Organization planned to eradicate tetanus by 1995, but it still remains an important cause of death in developing countries such as Nigeria till today [2, 3]. In South Africa, approximately 300 cases occur each year and between 50 and 70 cases in the USA [4, 5]. Tetanus is a vaccine preventable neurological disorder caused by a *C tetani,* an anaerobic, spore-forming, motile and. gram positive non-encapsulated rod [6]. The portal entry is usually an open skin wound [7]. The cephalic part of the body normally does not readily come in contact with the soil however; inoculation becomes possible especially in situation where objects which had been contaminated with the organism are inserted into the ear, thus complicating ear infections [2].

Devitalised tissue located in the middle ear or mastoid in chronic suppurative otitis media in anaerobic environment provides a growth medium for the organisms [8, 9]. The exotoxins (Tetanospasmin) produced by these organisms gains entry into the nervous system, the cascade set up leads to the clinical manifestations which include trismus, dysphagia, muscular rigidity and Spasm [9, 10].

In spite of simple preventive measures available through immunisation, tetanus remains a major cause of mortality in the developing countries. Tetanus spores is introduced into the body by attitudes/ practices that exposes open wound to contamination from soil, street dust, water and animal feces [2, 9]. The aim of this study is to determine the prevalence of otogenic tetanus among patients with CSOM and factors that predispose to otogenic tetanus in patients with discharging ears.

MATERIALS AND METHOD

This is a retrospective study of patients diagnosed with otogenic tetanus managed in the department of Otorhinolaryngology, University College Hospital, Ibadan Nigeria, between October 1997 and September 2012. The hospital records, operation register, admission records were retrieved and data extracted included demographic data (Age, Sex), occupation, educational status, clinical presentations, duration of symptoms, duration of stay in the hospital, mode of treatment of ear suppuration, tetanus immunization history, socio-cultural factors purportedly contributing to

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otogenic tetanus, airway management and need for mechanical ventilation, complications and management outcome. Social stratification of the patients was based on occupational strata as devised by Famuyiwa *et al*. [11]. All the data were entered into the SPSS version 16.0 computer software for descriptive analysis and results presented in tables and figures.

Figure 1: Left mastoid abscess with discharging ear and external auditory canal plugged with cotton wool.

RESULTS

A total of 66 patients with otogenic tetanus out of 2071 patients with chronic suppurative otitis media were managed within the study period, consisting 45 (68.2%) males and 21 (31.8%) females with a ratio of 2:1. Their ages ranged from 2 to 66 years with a mean age of 7.7 years. Eighty three percent were in their first decade of life and 56.7% were within 5 years of age. All the patients presented with purulent ear discharge, lock jaw, rigidity and generalized spasm at presentation. The ear discharge was unilateral in 63 (95.5%) patients and 93.7% occurred in the right ear.

The duration of ear discharge ranged from 8 to 143 days with a mean of 89 days. The incubation period could not be ascertained from this study however, the period of onset of tetanus ranged from 3 to 8 days with the mean of 4.3 ± 3.4 days. Only 21.2% patients had history of completed childhood tetanus vaccination, 36.3 % were partially vaccinated while 42.5 % had no tetanus vaccination. None of the patients reported a history of previous tetanus vaccination within the last 5 years of presentation. The patients or their parents were from low socio-economic class and the duration of hospital stay range from 18 days to 105 days with an average of 21days.

The socio-cultural health risk factors practiced by these patients included delayed presentation in hospital, the use of herbs, charcoal, honey, cigarette foil paper for ear treatment, abuse or misuse of antibiotic ear drops (self-medication), application of methylated spirit and body deodorants (perfume) into the discharging ear. Other health risk practices include plugging the ear canal with cigarette stick, cotton wool and piece of cloth to prevent outflow of the ear discharge. All these patients were managed with tetanus toxoid, human tetanus immunoglobulin, antibiotic therapy, ear toileting and topical antibiotic ear dressing after antibiotic sensitivity pattern. Three percent of the patients were managed with muscle relaxants, sedatives and artificial ventilation *via* endotracheal intubation and tracheostomy in intensive care unit for 20 – 31 days with the average of 14 days ± 4.2 before they were discharge to the ward. The duration of tracheostomy ranged from 4 weeks to 4 years. Eight (12.1%) patients died.

DISCUSSION

Tetanus is a vaccine preventable disease and WHO has projected eradication by 1995. However, the disease is still present in most developing countries causing morbidity and deaths [4, 12, 13]. From this study, 56.7% of the patients with otogenic tetanus had age 5 or below while 83% had age 10 years or below. This finding is similar to what had earlier been reported by a similar study in this environment [8]. Complete childhood vaccination with Tetanus toxoid is expected to confer immunity against tetanus infection on these children. Since childhood vaccination does not confer long life protection against tetanus, it is recommended that adolescent should receive a booster shot between 11 and 18 years of age and adult should receive it once in 10 years [2, 6].

Although 21.2% of the study population had history of completed tetanus vaccination, they still developed tetanus infection. This may be due to a problem of defective cold chain system in Nigeria during the study period. Vaccines are supposed to be kept at temperature range of 0-4˚C to retain their potency from source to the consumer. In Nigeria where there is regular power outage, keeping these vaccines within this temperature range is difficult. Also, some of the

primary health workers dispensing the vaccines carried them in a box devoid of ice pack and walked through the sun-heat to the consumers. Heat denatures the vaccine and affects its potency. There is therefore need to maintain the recommended cold chain system for the vaccines to retain their potencies at the consumer end. In addition, the reason might also be because the patients did not actually complete the vaccinations regimen as there were no records of immunization to verify this at presentation.

About 36% of the study population received partial tetanus vaccination. The reason for this incomplete vaccination is not known. However, it might be due to health centers being located several miles away from the consumers making it not readily accessible. There might be problem of fund for transportation and to pay for the vaccination. In addition, the unfriendly attitude of health workers might discourage parents from taking their wards to complete the vaccination. The high level of poverty and low educational status in our environment might make the parents not to see the need to complete the vaccination, especially that their wards are not ill. About 43% did not have tetanus vaccination at all. There is therefore a need to improve on the enlightenment campaign geared towards health education on the importance of immunization against tetanus and other communicable diseases. The health workers must always demonstrate good attitudes towards patients.

All these patients presented with ear discharge which has been present for average of 89 days. About 57% of the study population were 5 years old and below. It is the belief in our environment that ear discharge is a common occurrence in a teething child and requires no medical care at a health facility. This belief is common among the people of low socioeconomic class which constitute about 66% of the study group. It is only when the discharge is foul smelling or impairs hearing that their parent seeks assistance which most of the time, with quacks or traditional healer. The traditional treatment involves instillation of concoction made from leaves and animal dander with feather into the ear. This process is usually not clean and serves as a source of inoculation of *Clostidium* tetanus. Insertion of contaminated object picked from the bare floor to clean the discharge from the ear is also a possible source of infection. Therefore, health education that will condemn the traditional believes on the cause of ear discharge and the traditional treatment that promotes inoculation of C. tetanus. The patients should be educated on the need to present at hospitals with facilities for managing ear discharge so as to prevent complications.

Another significant finding in this study was that otogenic tetanus appears to be on the increase in our environment; about half of the cases reviewed in 16 years occurred in the last 5 years. This is quite different from the study in Thailand where the cases of tetanus has dropped significantly in the last decade [14]. This may be a reflection of defect in the planning and execution of immunization programme among other primary care policies. Thus there is a need to improve access to the vaccines in Nigeria.

All the patients in this study had initial daily ear toileting and dressing with topical antibiotic based on the organism sensitivity pattern. Twenty three (34.8%) of the patients had mastoidectomy to remove the ear disease. However, all the patients had anti tetanus therapy but only 3% of them were managed with muscle relaxants, sedatives and artificial ventilation *via* endotracheal intubation and tracheostomy at the intensive care unit.

We conclude from this study that otogenic tetanus appears to be an emerging clinical condition especially in the last half decade and a combination of defective vaccination and harmful traditional practices were the factors identified. This suggests the need to re-evaluate the execution of some of the primary health care policies in Nigeria among other developing countries.

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