Otologic and Audiological Evaluation among HIV patients in Ilorin, Nigeria.

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ABSTRACT

Background: HIV infection is the highest cause of death worldwide and presenting eventually with ENT regions.
Objective : This study is to determine the prevalence of hearing loss and hearing patterns among adults Nigerians with HIV and causal relationships between CD4+ counts with the degree of hearing impairments.
Methods: This prospective study was carried out among all consecutive HIV positive patients attending the clinic at the University of Ilorin teaching hospital (U.I.T.H.), Ilorin, Nigeria between January and July, 2008. They all had audiological assessments with a pure tone audiometer within the frequency range 250 to 8,000Hz to determine their hearing thresholds together with their CD+ counts estimations.
Results: 89 were evaluated in the age range of 18 to 56years (Mean 36.4years, SD of 8.82) and the modal age group was 21-39years (59.6%), 40-56years (38.2%).There were 51males (57.3%) and 38 females (42.7%) with a male/female ratio of 1.3:1.0. Otological symptoms included tinnitus (15.7%), vertigo (15.7%), otalgia (14.6%) and hard of hearing (10%).
Examinations showed bilateral serous Otitis media (glue ear) in 58patients (65.1%) with no affectation of the facial nerves. PTA showed mixed, conductive and SNHL in 32 patients (36%), 20patients (22.5%), 9patients (10.1%) respectively and only 15(16.9%) had normal hearing thresholds. The CD4+ counts ranged between 12 to 616.CD4 counts with hearing loss mostly < 300mm^3.
Conclusion: The prevalence of hearing loss is 87% among HIV infected patients, mostly mixed HL with causal relationships between reduced CD4+ counts of less than 300/mm3 with severity of hearing loss. The hearing loss can interfere with the communication and specific knowledge vital to the development of best practices towards ensuring the inclusion of hearing impaired in HIV/AIDS prevention and treatment programmes.
Key words: Hearing patterns; Pure tone Audiometry (PTA), CD4+ counts; Mixed hearing loss

INTRODUCTION

Human immunodeficiency virus (HIV) infection is the fourth highest cause of death worldwide [1].A great deal of individuals infected by the HIV develops HIV infection/AIDS, presenting eventually with features affecting the ear, nose and throat region [2]. HIV infection leads to hearing impairment which ultimately impair the individual's quality of life.
The available literature on the otological manifestation of HIV/AIDS is limited, however the common features include otitis externa, acute otitis media and serous otitis media together with sensorineural hearing loss (SNHL) [3, 4]. Palacios et al in a study among Mexican children with HIV-1 infection on Highly active antiretroviral therapy(HAART) concluded that audiological abnormalities were more prevalent in individuals with more prologed HIV infections,lower absolute CD4+ cell counts and increased viral loads [5]. The audiological effects of HIV infection is said to be due to a combination of effects of the HIV infection together with opportunistic infections and the ototoxic effects of the treatment [6,7].

Pathological studies on the temporal bones of HIV/AIDS patients show middle ear changes from mild to severe otitis media and cholesteatoma. Inner ear changes include cryptococcal and CMV infections and Kaposi sarcoma of the 7th cranial nerve [6,8].
Whilst the mastoid and petrous air cell systems show sévere inflammatory changes. Also intracellular viral like particles of HIV have been found on the tectorial membranes and connective tissue cells of the inner ear on ultra structural examinations [9].

Mata Castro et al in a study in Spain among 30 patients infected with HIV found 40% with hearing loss and 33% with abnormal pure tone audiometry [10]. Also Wang et al in a study among 350 Chinese with AIDS reported hearing loss of 45.4% among them [11].There is paucity of studies on otologic and audiological evaluations among HIV/AID patients in Nigeria. This study was undertaken in Nigeria where there is an estimated adult HIV prevalence rate of 5.4% in a study done in 2005 [12],however an unpulished report in 2008 reported a decline with a national prevalence of 4.6%.
This study is aimed at determining the prevalence, pattern of hearing loss and causal relationships between the degree of hearing loss and CD4 lymphocytes counts among HIV/AIDS patients attending the adult HIV/AIDS clinic of the University of Ilorin Teaching hospital (U.I.T.H.), Ilorin, north central Nigeria.

MATERIALS AND METHODS

This prospective study was carried out among adult HIV positive patients aged 18years and above attending

the HIV/AIDS Clinic at the UITH, Ilorin, Nigeria. These patients are on HAART anti-retroviral drug treatment. All consecutive patients were recruited irrespective of sex, and ethnicity. Informed consents were obtained from individual patients and ethical approval obtained from the hospital authority. A control group of aged / sex matched 50 adults negative for HIV/AIDS or other immunocompromised conditions without underlying otological diseases attending the general outpatient medical clinic were used and all had otological and audiological evaluations done.

A pretested study proforma was administered to each patient and the following otological responses were documented: Ear ache (Otalgia) by symptom and presence of tenderness over the tragus; Otorrhoea, Tinnitus, aural fullness, hearing loss, symptoms relating to the nose and throat, head and neck regions.

Vertigo of cardiovascular by ECG and cardiologist's review ,metabolic by fasting blood sugar estimations and hormonal profiles and clinical examinations with rotational tests and nystagmus observed with Frenzel's glasses if present . Excluded were those with evidence of ear infections, past history of hearing impairment, individuals on hearing aids, past history of ear surgery and trauma. The biodata recorded included : Age, Sex, ethnicity, HIV risk groups, date of first positive tests, social and family history.

Detailed Ear, Nose and Throat examinations were done by the ENT consultants and senior registrars. Audiological evaluation carried out included pure tone audiometry (PTA) between frequency 250 Hz to 8 kHz with a diagnostic audiometer Damplex AS 67 calibrated into ISI standard and expressed in decibels (dB) in an audiometric booth . Responses were plotted on a chart (Audiogram).

Sensorineural hearing loss(SNHL) is that due to defects in the inner ear or acoustic nerve while conductive hearing loss(CHL) is that due to a defect of the sound-conducting apparatus, i.e. of the external auditory canal or middle ears and mixed hearing loss (MHL) is hearing loss of both conductive and sensorineural hearing loss .The degree of hearing loss were classified as mild 25 to 40dB; moderate HL 41 to 55dB, moderate to Severe 56 to 70dB,severe HL 71-90dB and profound are those with HL greater than 90dB,normal being those less than 25dB according to Clark JG(1981)[Uses and abuses of hearing loss classification,Asha,23,493-500]. All had tympanometric evaluations with AT 235DK 5610 Assens diagnostic tympanometer and responses documented according to Jerger's classification.

Otitis media with effusion (OME) is based on : History of hearing loss, ear blockage; otoscopic findings of dull tympanic membrane(TM), retraction pockets with loss of light reflex; PTA findings of CHL and a type B tympanogram (Jerger's classification).They all had their CD4+ counts estimation done using the Dynal T4Quant from Dynal Biotech ASA, Oslo, Norway. Causal relationships would be determined between the degree of hearing loss and CD4+ lymphocytes counts using statistical analysis(Chi-square tests) according to a statistician's advice . Data were analyzed descriptively using EPIINFO 2005 version 3.

RESULTS

100 patients were seen over the study period, however 89 had completed data for analysis, 51 males and 38 females with a male: female ratio of 1.3:1.0 in the age range of 18 to 56 years (mean 36.4years) as in table I. In the control group, there was one less than 20years of age, 30 between the age range of 21 to 39 years and 19 in the age range 40 to 64years all attending the general medical outpatient clinic with 29 males and 21 females in the sex ratio of 1.38 to 1.0 .

The risk factors for HIV transmission included heterosexual contacts in 90%, blood transfusions in 5% and others sources in 5% of cases respectively. The average period of commencement of HAART after diagnosis was 3 to 6months with 21% over a year and 15% were yet to start anti-retroviral drugs.

Tinnitus and vertigo were present in 15.7% of patients respectively, otalgia in 14.6%, and aural fullness in 13.5% of the patients(Table II). Hearing loss (HL) was present in 87.8% of the patients (mixed HL in 38.2%, conductive HL in 37% and sensorineural (SNHL) in 12.4% of the patients (Table III). Vertigo, tinnitus and aural fullness were present amongst 4%, 3% and 2% of the controls.

In the control group of 50 adults without HIV/AIDS attending the outpatient medical clinic, 38% had evidence of hearing loss with 20%,10% and 8% being SNHL,CHL and mixed HL respectively.

The degree of HL showed mild in 22 , moderate in 32, moderate to severe in 19, normal in 15 patients respectively and severe in only a patient (table IV).There was evidence of serous otitis media (OME) in 65% of the patients and 55% of the control group. 11 patients (12.4%) had bilateral ear wax impactions which were cleared and only a patient had otomycosis. None had Herpes zoster oticus. Only 6 patients (6.7%) had hearing impairment and none had facial nerve palsy or mastoiditis or previous ear surgery. Middle ear pressure evaluations (Tympanometry) tracings according to Jerger's classification showed type B in 40%, type A_s in 20% and type A_D in 5% of the patients with type A (normal) in only 35% of individuals while in the control types B,As and A_D in 30%, 20% and 5% respectively.The CD4+ counts ranged from 12 to 820 (Mean 269.7) with a mean of 263.1 for males and 276.2 for females but not statistically significant (P-vlue > 0.05). The CD4+ counts was greater than 500/L in 9 patients, between 200 to 499/L in 22 patients and less than 200/L in 58 patients and there was causal relationship between the levels of CD4+ counts with the degree of hearing loss, the Chi-square tests showed a Chi square of 14.99 with 4 degree of freedom and a P value of 0.00471hence statistically significant. Both audiometric and tympanometric findings cut across the otological complaints and age with no significant effect on the ear. Right and left ear data were combined and the mean hearing threshold at 250Hz (11.0dB HL), 1.00 KHZ (11.5dBHL) and 2000Jz (12.dBHL) were not significantly different from each other. There were no statistical differences between the mean hearing thresholds for 250HZ to 8000 HZ for HIV positive patients with otological complaints of hearing loss, otalgia, aural fullness, and vertigo compared with those without.

Table 1: Age distribution of HIV Positive Patients

Age group	Frquency	Percentage (%)
>20	2	2.25
21-39	53	59.55
40-64	34	38.22
Total	89	100.0

Table 2 Otological Symptoms among HIV positive patients.

Symptoms	Frequency	Percentage (%)
Hearingloss	74	87.8%
Tinnitus	14	15.7%
Vertigo	14	15.7%
Otalgia (Ear ache)	13	14.6%
Aural fullness	12	13.5%

Table 3: Pure tone Audiometri (PTAevaluations of HIV positive patients

Type of Hearing loss	Frequency	Percentage (%)
Mixed HL	37	41.6
Conductive HL	24	27.0
SNHL	13	14.6
Normal	15	16.8

Table 4- CD4 positive T cell Lymphocyte count categories: CD4 + T cell categories

	CDC-A	CDC-B	CDC-C
>500k	A1	B1	C1
200-499k	A2	B2	C2
<200l	A3	B3	C3

DISCUSSION

The World Bank's recent Global Survey on HIV/AIDS and Disability identifies people with disabilities as a significantly overlooked high risk population with lack of data on disabled populations and HIV throughout the developing World [13]. HIV infection, at any stage of the disease could be associated with impairment of hearing resulting in complications to the external, middle, inner ears. Audiological manifestations of HIV/AIDS can be a direct consequence of the virus, secondary to the pharmacological treatment agents or viral complications [4].

Our findings showed over four- fifth of individuals who are positive for HIV had otological complaints.This is much higher than other series [10,11,14], but consistent with William et al where otological complaints occur in 80% of cases [15]. Nearly 90% complained of various degrees of hearing loss, the commonest being mixed hearing loss followed by conductive and sensorineural hearing losses in slightly over a tenth of the studied population. However in our series, degree of hearing loss was associated with worsening levels of CD4+ counts. Also the degree of hearing loss is mostly of the mild to moderate degree probably due to the young average age of the studied population. Over four fifith of the patients had CD4+ counts of less than 300/L and it is in this category that have the worsening degree hearing loss with severe forms being slightly over 100/L.There was significant correlation between the degree of hearing loss with reducing levels of CD4+counts. Over two third had evidence of Otitis media with effusion(OME) accounting for the degree of mixed HL and CHL.

There was causal relationships between reduced CD4+ counts of less than 300/mm3 with severity of hearing loss. This high rate of hearing loss is believed to be due to the high rates of cerebral malaria, meningitis, poor antenatal care and lack of adequate clinical care, particularly for young children in Nigeria [16].

Khoza et al in Guanteng , South Africa [14] reported a prevalence rate of 23% with CHL and SNHL as the common forms of hearing loss among adults infected with HIV/AIDS with the degree of severeity from slight to profound as in our series but the degree of severeity did not seem to worsen with the progression of HIV/AIDS. Sensorineural hearing loss associated with HIV infection is said to occur in 20.9% to 49% of cases [17] , this is consistent with findings in our series considering those with mixed and SNHL.

The degree of hearing loss among the contro group is nearly in the ratio of 1 to 2.5 compared to those with HIV/AIDS,though the incidence of sudden HL is said not to be increased among HIV patients when compared to the non-infected [18,19].

Seborrheic dermatitis of the ear, face and scalp is said to occur in up to 85% of HIV-infected patients, however only a case of otitis externa was seen in our series which was in an early phase of the infection.

A third of the patients had normal middle ear pressure . OME among HIV/AIDS patient is said to be due to nasopharyngeal hyperplasia which is common amongst them [20]. This incidence is much higher than other series due probably to other underlying lesions causing OME in addition to HIV/AIDS [21].

CONCLUSION

There is causal relationships between reduced CD4+ counts of less than 300/mm3 with severity of hearing loss. Routine audiological evaluation should be done among HIV positive patients to quantify and qualify the degree of hearing loss which can interfere with the communication and specific knowledge vital to the development of best practices towards ensuring the inclusion of hearing impaired in HIV/AIDS prevention and management programmes.Hearing evaluation of HIV/AIDS patients will also determine when to change the drugs or intervene due to drug ototoxicity.More studies are needed on the causal relationships between the severeity and thresholds of hearing loss in HIV/AIDS positive persons.

No conflicts of interests declared.

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