

THE PREVALENCE OF MENINGITIS-INDUCED HEARING LOSS IN NORTH-EASTERN NIGERIA

Dr. A. Isa*, Dr. H. I. Garandawa*, Dr. B.M. Ahmad**

* Department of E.N.T Surgery, University of Maiduguri Teaching Hospital, Maiduguri

** National Ear Care Centre, Kaduna.

Correspondence to: Dr. A. Isa,

Department of E.N.T Surgery, University of Maiduguri Teaching Hospital,
Maiduguri

ABSTRACT

Background/Objectives: North- Eastern Nigeria lies within the meningitis belt of sub-Saharan Africa, cases of post-meningitic survivors presenting with hearing loss were often seen in the ENT clinic of the university of maiduguri teaching hospital

The study was to determine the prevalence of meningitis- induced hearing loss in post-meningitic survivors presenting to our clinic.

Patients and methods: The study was retrospective which constituted of patient's records who presented to the E.N.T clinic with hearing loss or diminished hearing as from January 1998 to December 2003. Patient's biodata, clinical findings and results of audiometric tests were documented.

Those with tympanic membrane perforations and those who could not do PTA or FFA were excluded from the study.

Results: A total of 427 patients presented to the E.N.T clinic with hearing loss or diminished

hearing, Out of this figure, 91(21.3%) were due to meningitis-induced hearing loss. In 93 (21.8%) there were no known cause. The various causes of hearing loss, in the remaining 243 patients, ranges from febrile illness with 10.5%, to cerumen auris with 0.5%.

The male to female ratio, M: F=2:1 and children 5yrs and below were mostly affected. PTA and FFA were the audiometric tests conducted on all the patients where applicable. The results showed most post-meningitic surviving patients had severe- profound bilateral SNHL.

Conclusion: The study showed that meningitis-induced hearing loss is common in the north-eastern part of Nigeria, which lies within the meningitis belt of sub-Saharan Africa. Post-infective surviving children were the most commonly affected, hence febrile illness in both children and adults should be thoroughly investigated and treated appropriately and the common use of over-the-counter drugs should be discouraged in such cases. Adequate community enlightenment as regards the

advantages of meningococcal vaccine should be done since this is freely given by the government.

Key words: SNHL: Sensory-neural hearing loss. PTA: Pure tone audiometry. FFA: Free field audiometry. CSM: cerebro-spinal meningitis.

INTRODUCTION

The World Health Organization report showed that hearing loss has been a major source of disability in the developing world, about 42 million people older than 3 years have moderate to profound hearing loss¹. Meningitis-Induced hearing loss accounts for 10% of hearing loss world wide².

The first case of cerebrospinal meningitis (CMS) in northern Nigeria was diagnosed in 1905; at that time mortality was high about 80%³. Major epidemics of CMS occur with a periodicity of 5 – 10 years and last for 2 or 3 dry seasons because of low atmospheric absolute humidity during the dry season³. In West African sub- region which lies within the meningitis belt of sub-Saharan Africa, this cyclical pattern has been replaced by annual epidemics.⁴ And in 1996 over 80, 000 cases of CSM were reported in Nigeria with several deaths. There was no national survey conducted to ascertain the prevalence of meningitis-induced hearing loss in the survivors.

The objective of this study is to determine the prevalence of post-meningitic hearing loss in patients who primarily presents with hearing loss to the Ear, Nose and Throat

(ENT) clinic of the University of Maiduguri Teaching Hospital. This clinic serves the six north-eastern states in the geopolitical sub region of northern Nigeria in addition to the neighboring countries of Chad and Cameroon`.

PATIENTS AND METHODS

Patients presenting with hearing loss to the ENT clinic between January 1998 and 2003 were retrospectively studied.

The biodata of the patients, clinical presentation and findings including audiometric tests (PTA and FFA) were documented, the extent and the severity of hearing loss in post-meningitic survivors was also documented for the purpose of this study. Patients who presented with discharging ears or those with dry tympanic membrane perforations and those who could not do the audiometric tests were excluded from the study. The results were analyzed using simple statistical methods.

RESULTS

A total of four hundred and twenty-seven (427) cases of hearing loss were seen in our clinic from January 1998 to 2003. The type of hearing loss varies from conductive, sensorineural to mixed type of hearing loss.

The leading cause of hearing loss was found to be unknown constituting 21.8% (93.0); this was followed by post-meningitic cases with 21.3% (91.0) table- I. There were 62 males and 29 females in the post-meningitic survivors with hearing loss, and the male to female ratio,

M:F=2:1. Children aged 1- 5 yrs were mostly affected and the prevalence of meningitis-induced hearing loss was found to decrease with increasing age, figure-1.

Most of the post-meningitic cases were found to have severe – profound bilateral sensori-neural hearing loss. Pure tone

audiometer type DA 931(KIND) was used in measuring the pure tone average (PTA) and free field audiometry of the patients. The tabulation below shows the degree of hearing loss among 72 out of 91 patients with post- meningitic hearing loss that had PTA done.

Grade.	PTA, db	no of patients.
Normal	<25	0
Mild	26-40	4
Moderate	41-60	11
Severe	61-80	17
Profound	>80	40

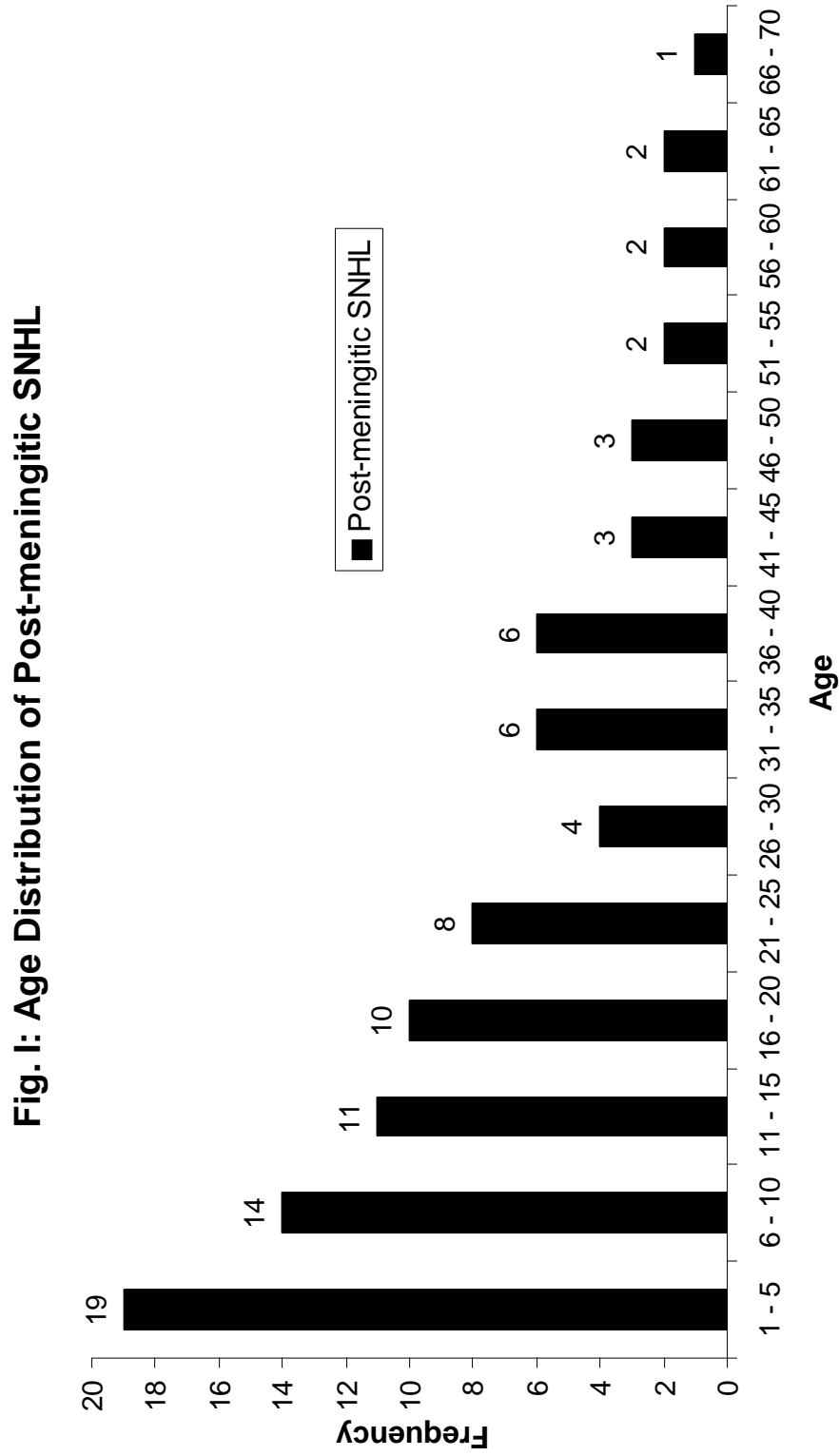
Nineteen children aged 1-5 yrs had Free Field Audiometry (FFA) done at 500 Hz, 1000 Hz, and 2000 Hz to determine the hearing threshold; residual hearing at higher frequencies

was detected in 10 of the children. The remaining 9 children showed no response to FFA at higher frequencies indicating profound hearing loss.

Table- 1: Cause of Hearing loss

S/No.	Cause of Hearing loss	No. (%)
1.	Unknown	93 (21.8%)
2.	Meningitis	91 (21.3%)
3.	Febrile illness	45 (10.5%)
4.	Measles	37 (8.7%)
5.	Ototoxicity	27 (6.3%)
6.	Congenital	27 (6.3%)
7.	Otitis media (treated)	24 (5.6%)
8.	Presbycusis	18 (4.2%)
9.	Eustachian dysfunction	16 (3.7%)
10.	Trauma	14 (3.3%)
11.	Mumps	11 (2.6%)
12.	Otosclerosis	10 (2.3%)
13.	Menier’s disease	9 (2.1%)
14.	Tumours	3 (0.7%)
15.	Wax	2 (0.5%)

Figure I



SNHL

DISCUSSION

Meningitis has been found to be one of the leading causes of sensori-neural hearing loss (SNHL) in Africa. World wide, meningitis accounts for 10% of the aetiology of hearing loss². In West Africa, it accounts for 31% in Gambia, 18% in Nigeria and 8.5% in Ghana²

The North-east sub region of Nigeria, as part of the meningitis belt of sub-Saharan Africa has been experiencing high prevalence rate of meningococcal meningitis annually. In 1996 over 80, 000 cases of cerebrospinal meningitis were reported in Nigeria with several deaths. Studies have shown that SNHL of greater than 30db hearing loss occurs in up to 30% of patients after acute bacterial meningitis⁵.

The impact of hearing loss in post-meningitic surviving children is severe since many cases are pre-lingual and are commonly associated with neurological complications which include the auditory nerve. This limits the scope of speech and hearing rehabilitation. The advent of broad-spectrum antibiotics has significantly lowered the case fatality rate and thus attention has been increasingly focused on those survivors with neurological sequelae⁶. It has been observed that the hearing loss is typically sensorineural, severe – profound, bilateral and in most cases irreversible⁷

In this study, children were mostly found to be affected; this is consistent with the studies conducted by G. W. Brobby⁸ and Wright et al⁹, except that measles and not meningitis has been found to be the leading cause of sensori-neural hearing loss in children. In north-eastern Nigeria, the decreasing cases of post-measles sensorineural hearing loss could be attributed to the wide spread acceptability of measles vaccine

and the consistency at which it is carried out, as compared to other vaccines in the region.

Studies have shown that, the prevalence of meningitis decreases from age 30 and above, this is consistent with the general trend of patients afflicted with meningococcal meningitis in the north east¹⁰, there were no studies done to correlate same with meningitis-induced SNHL in the region.

Unknown causes of bilateral SNHL constituted the majority in our studies; this is consistent with the reported studies in some African countries⁸, and the UK¹¹.

Chromosomal studies were not done in the patients with the causes unknown due to lack of facilities but family predisposition was possible in 7 of the patients, this is because all the seven were discovered to have one or more of their first-degree relations with a history of hearing loss since birth. The low incidence of mumps in our studies could be attributed to the fact that, mumps is known to cause unilateral SNHL, which is not usually noticed in children by parents because of the other functional ear, this is consistent with the studies done elsewhere⁸. Malaria, which is endemic in the West African sub-region of sub-Saharan Africa, may have been a significant aetiological factor in those who presented with febrile illness, since fever with or without convulsions were the only significant factors highlighted in the history.

Studies have shown that many children have a reversible loss of hearing during the first two days of the illness¹². Hence early diagnosis and prompt treatment may be associated with a lower incidence of hearing loss. Also mass vaccination with bivalent polysaccharide vaccine given three months before a predicted outbreak

of CSM has been found to be effective in curtailing outbreaks of meningococcal meningitis². The audiometric test done on all the patients was PTA and FFA where applicable. PTA is defined as the pure tone average of the air conduction hearing loss threshold at 500 Hz, 1000 Hz, and 2000 Hz and it is tested separately for each ear¹³. Similar frequencies were used in testing each ear separately for the FFA.

In conclusion, this study highlighted the high prevalence of meningitis-induced hearing loss among survivors of meningitis in the north-east sub-region of Nigeria. Age group 1-5 yrs was the most affected, although the prevalence was seen to decrease with increasing age. It is hence suggested that vaccination, which is provided free by the government should be encouraged among the community. Early diagnosis and treatment of suspected cases should be undertaken so as to reduce the post-meningitic sequelae in the most vulnerable surviving age group.

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