

Acute Otitis media, malaria and pyrexia in the under five age group

*Y. B. Amusa¹, T. A. B. Ogunniyi², O. O. Onayade³ and P. A. Okeowo¹

¹ENT Unit, Department of Surgery, OAUTHC, Ile Ife

E-mail: yamusa@oauife.edu.ng.

²Department of Medical Microbiology and Parasitology, OAU, Ile - Ife.

³Department of Community Health, OAU, Ile - Ife.

Summary

Background: Acute Otitis media is one of the most common childhood infections. It is responsible for every third visit to a pediatrician in a developed world. However, in Nigeria there is scanty knowledge about the incidence of Acute Otitis Media (AOM).

Objective: This study aimed at determining the incidence of AOM among under five year old children presenting with pyrexia, and to compare the incidence of AOM as a cause of pyrexia with the incidence of malaria in pyrexial children.

Design: It is a cohort study of 200 children of between the ages of 2 weeks and five years with a rectal temperature of 38°C and above, seen over a period of 3 months.

Setting: The study was conducted at the Obafemi Awolowo University Teaching Hospital (OAUTHC) Comprehensive Health Centre, Eleiyele, and the children emergency room of the OAUTHC, Ile - Ife.

Patients and methods: A questionnaire to collect information on the demographic data was administered to each mother/guardian of the patient. Otoscopic examination using a battery-operated hand held otoscope and magnifying lenses were done in addition to general systemic physical examination. Thin and thick blood smears were made for malaria parasite. The dried slides were examined under the microscope using the X 100 objective. Sixteen of the patients' slides were lost after processing.

Results: Out of the 200 patients that were studied, 58(29%) had AOM. The highest incidence was recorded in the age group 12 - 24 months while the least age of occurrence was found to be the age group 4 - 5 years. Malaria parasitemia was found in 81(43.5%) while 21(25.9%) of those with parasitemia also had AOM. But 76(36%) of the study population had neither AOM nor malaria parasitemia.

Conclusion: Acute Otitis media was found in 29% of under five years old presenting with pyrexia. It was found to be highest in the first and second year of life, and was found to be least in the 5th year of life. Malaria was found in 81(43.5%) of the children, and 21(10.5%) of the children had malaria with a co-existing AOM.

Key-words: Acute Otitis media (AOM), Pyrexia, Under five children.

Résumé

Introduction: Otite aigue médias est l'une des infections d'enfance la plus ordinaire. Elle est provoquée par toutes les troisièmes visites à une pédiatrie dans un pays développé. Toutefois, au Nigéria, il y a une connaissance peu abondante sur l'incidence d'otite aigue médias (OAM).

Objectif: L'objet de cette étude est de déterminer l'incidence d'OAM parmi des enfants âgés au dessous de cinq ans qui

se présentent atteints de la pyrexie et de comparer l'incidence d'OAM comme provoquée par la pyrexie avec l'incidence du paludisme chez des enfants pyrexiques.

Plan: Il s'agit d'une étude cohorte de 200 enfants âgés entre 2 semaines et 5 ans avec une température rectale de 38°C et plus vue au cours d'une période de 3 mois.

Cadre: Cette étude a été effectuée au Complexe du Centre Hospitalier Universitaire d'Obafemi Awolowo (CCHUOA) centre de soins public d'Eleiyele et la salle d'urgence des enfants de CCHUOA, Ile-Ife.

Patients et méthodes: Un questionnaire visé à obtenir des informations sur les données démographiques a été administré à chaque mère/gardien du patient. Examen du conduit auditif du tympan avec l'utilisation d'une main fonctionnée sur piles qui a tenu un otoscope et une loupe ont été fait en plus d'examen physique systémique général. Des taches du sang claires et épaisses ont été faits pour le parasite du paludisme. Des plaques seches ont été étudiées au microscope à travers l'utilisation de X 100 objectif. Les plaques de seize patientes ont été perdues après traitement.

Résultats: Parmi les 200 patients étudiés 58 soit 29% avaient OAM. L'incidence élevée était notée dans la tranche d'âge de 12 - 24 mois tandis que l'incidence moins d'âge était notée d'être la tranche d'âge de 4 - 5 ans. La parasitémie malaria était trouvée en 81 soit 43,5% tandis que 21 soit 25,9% de ceux atteints de la parasitémie avaient également OAM. Mais 76 soit 36% de la population étudiée n'avaient ni OAM ni la parasitémie malaria.

Conclusion: Otite aigue médias était trouvée en 29% des enfants âgés de moins de cinq ans atteints de la pyrexie. Elle est notée d'être la plus élevée dans la première et la deuxième année de la vie, et était notée d'être le moins pendant la cinquième année de la vie. Malaria est trouvée en 81 soit 43,5% des enfants, et 21 soit 10,5% des enfants avaient la malaria qui coexiste avec OAM.

Introduction

Otitis media is one of the most common childhood infection and it has been found to account for every third office visit in pediatric practice,¹ Teele et al reported their experience in following more than 2,500 children from birth to age 3 years in Boston. Forty seven percent had their first Otitis media episode by one year and 71% by the age of 3 years.²

Knowledge of the prevalence of AOM is scanty in developing countries. However, in Nigeria some studies have been done to attempt determining the incidence of the disease. Elton and Cornell reported 28% incidence of AOM among children who were under-five years presenting with pyrexia in a malaria endemic community.³

This study focused on infants and young children because they are normally unable to complain of earaches but

*Correspondence

would rather simply go off their food, or become irritable at the onset of the disease, Malaria being the most common disease and the fourth principal cause of death in Nigeria, is still an important public health problem.⁴ It is customary to blindly treat any child, presenting with fever in this environment with an anti-malaria drug as it is assumed that the child must have malaria. This study is an attempt to find out how many of the under-five year old febrile children that would have been treated for malaria could actually have been suffering from AOM.

Materials and method

The study is a cohort study of 200 children of between the ages of 2 weeks and 5 years with rectal temperature of $\geq 38^{\circ}\text{C}$. Diagnosis of AOM was based on clinical history, physical examination (general and systemic) and otological examination, especially, otoscopy. Information on relevant demographic data and medical history were collected from mothers or guardians of the patients. These and the findings from physical examinations were entered into a questionnaire.

The study was conducted at Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Comprehensive Health Centre (CHC), Eleiyeye, Ile - Ife and the children emergency (CE) room of the OAUTHC, Ile-Ife from September 1996 - February 1997. Ile - Ife is in the tropical rain forest belt of South Western Nigeria and the majority of the population is made up of artisans, farmers and traders belonging to the low socio-economic group.

Other inclusion criteria are: residence within the location, and expressed consent from parents or guardians after receiving relevant information about the objective of the study.

Exclusion Criteria

- Those for which the onset of fever was greater than 5 days
- Severely ill patients.
- Prior treatment of the pyrexia before presentation at the study location.
- Current therapy with anti-malaria or antibiotics.
- Patients with obstructive wax or foreign body in the external auditory meatus.
- Patients with Otitis external.

Methods

A structured questionnaire was administered to each patient (by the first author). Otoscopic examinations were

done with a hand held otoscope with battery and magnifying lenses. At otoscopy finding of any of the following signs singly or in combination were considered diagnostic of AOM in this study: (i) dull membrane (ii) hyperaemia of the membrane, (iii) bulging membrane (iv) loss of light reflex and presence of perforation with ear discharge.⁵

Diagnosis of Plasmodium infection

History of malaria paroxysms, joint aches and pains, fever and irritability were charted for each patient. This was followed by physical examination and a blood film examination for malaria parasite under the microscope. Following finger prick with lancet blade, three drops of blood were collected from each patient on glass slides. A drop at one end of the slide was made into a thin smear and two drops close to the opposing end were made into a thick smear such that 2 smears were made per patient.

The smears were air-dried and the dried slides were stained with 10% and 3% Giemsa stain (respectively for thin and thick smear) diluted with 1/10 buffer water at pH 7.2. The stains were allowed to remain in contact with the slide for about 60 minutes and then rinsed off with water. The washed slides were then air dried and examined under the microscope using the X10 eyepiece and oil immersion lenses. The slides of 14 patients were lost to breakage and staining error.

Results

The total number of pyrexia under five year old children studied was 200.

The data collected were all analysed with EPI INFO-Version 5. The age distribution of the studied population is as shown in table 1.

There were 91(45.5%) females and 109(54.5%) males in the population under study giving a male: female ratio of

Table 1 Age distribution of pyrexia patients studied

Age (Year)	No. of patient (%)
0 - 0.9	93(46.5)
1 - 1.9	70(35.0)
2 - 2.9	20(10.0)
3 - 3.9	15(7.5)
4 - 5	2(1.0)
Total	200(100)

Mean age = (1.81 \pm 0.07) years

Age range of patients = 2 weeks to 5 years

Table 2 Incidence of acute otitis media (AOM), malaria and other undiagnosed cause of pyrexia according to age

Age (Year)	Malaria *Alone (%)	AOM Alone (%)	Malaria Co-existing with AOM	Undiagnosed cause of pyrexia	Total for age (%)
0 - 0.9	28(15.1)	13(6.5)	11(5.5)	41(20.5)	93(46.5)
1 - 1.9	20(10.8)	19(9.5)	6(3.0)	25(12.5)	70(35.5)
2 - 2.9	8 (4.3)	2 (1.0)	2 (1.0)	8 (4.0)	20(10.0)
3 - 3.9	3 (1.6)	2 (1.0)	2 (1.0)	8 (4.0)	15 (7.5)
4 - 5	1 (0.5)	1 (0.5)	0 (0.0)	0 (0.0)	2 (1.0)
Total	60(32.3)	37(18.5)	21(10.5)	82(41.0)	200(100)

* 186 slides were available for analysis.

about 1.2: 1.

Out of the 200 cases investigated, 58(29%) were found to have AOM. Table II shows the distribution of AOM, malaria and other undiagnosed causes of pyrexia according to age. Sex incidence of AOM shows a slight female preponderance with 30.7% of the females having AOM and 27.5% of the males having the disease.

Malaria parasites were found in the blood films of 81(43.5%) of the 186 cases for which specimens were obtainable.

Discussion

Fifty-eight (29%) of the 200 pyrexia children were found to have AOM. This is in agreement with an incidence of 28%⁴ reported in a similar survey carried out by Elton and Cornell on febrile under-five children at Wesley guild hospital, Ilesha in Nigeria. This suggests that the pattern of this disease in our environment has not changed appreciably over the years.

The incidence of AOM reported in this study is lower than the reports of studies carried out in the developing countries according to Teele et al.²

The incidence of AOM was found to be higher in the first two years of life and to be highest in the age interval 12 - 24 months.

The study population has a sex distribution of 54.5% males and 45.5% females. AOM was found to have a slightly higher incidence (30.8%) among females than in males for whom the incidence was found to be 27.5%. This result contrasts with those of Giebrink and Quie⁷ who reported preponderance of AOM among male children.

Out of the sampled population for which result was obtainable, 43.5% were found to have acute malaria based on clinical findings and positive blood film for Plasmodium parasite. Malaria was found to be more prevalent within the first two years of life, reaching a peak in the age 0 - 12 months. This could be explained by the fact that the children in this age group are yet to acquire immunity to this disease and that the protection conferred on children by maternal immunoglobulin tend to wear off at about the age of 6 months. The incidence of malaria in this study was found to be higher than the rate found by Elton and Cornell in a similar work in 1974.⁴

It was observed that 29 out of the 105 children who

tested negative for Plasmodium parasitemia actually had AOM. The significance of this result is that in most clinics and hospitals, in Nigeria these children would have been routinely treated for malaria. It is also to be noted that 21 of the 81 children who actually tested positive for malaria parasitemia also had AOM. It is evident from this result that their pyrexia would not have resolved solely by the routine application of anti-malaria drugs alone, and probably contributes to the development of resistance by the species of plasmodium, which predominates in this part of the world.

Given the fairly high incidence of AOM (29%) in our study population and in some earlier work, in our environment, we think otoscopic examination on all pyrexia children is indicated.

References

1. Schhwatc R H, Schwatz D M. Acute Otitis media: diagnosis and drug therapy; drugs 1980; 19: 107.
2. Teele D W, Rosner B A, Klein J O. Epidemiology of Otitis media in children. An Otol Rhinol laryngol 1980; 89 (Suppl. 68); 5 - 11.
3. Caceres Udina M J, Alvarez Martinez J A, Argente del Castillo J, Chumilla Valderas M A, Fernandez Alvarez E, Garrido Romera A, Sanchez Gascon F, Garcia Marcos L. Incidence, air pollution and risk factors of acute otitis media in the first year of life: a prospective study: An pediatri (Barc). 2004; 60: 133 - 8.
4. Elton P, Cornell J. Incidence of Otitis media in the under five children presenting with pyrexia of 100°F at Wesley Guild Hospital, Ilesha. Journ. of trop. med and hygiene 1978; June ed.: 110 - 112.
5. Groves J, Gray R F. A synopsis of ORL. 4th edition: p. 8 G. Wright - publisher. 1980; pp. 91 -96.
6. Dean A G, Dean J A, Burton A H, Dicker R C. Epi info, version 5: A word processing, database and statistics program for epidemiology on microcomputers. USD, Incorporated stone mountain, Georgia, USA 1990.
7. Giebrink G S, Quie P G. Otitis media: The spectrum of middle ear inflammation. Ann. Rev. Med. 1978; 29: 306.