

Clinical and Bacteriological Studies on Chronic Suppurative Otitis Media in Childhood

FO OGISI*

Summary

Ogisi FO. Clinical and Bacteriological Studies on Chronic Suppurative Otitis Media in Childhood. *Nigerian Journal of Paediatrics* 1982; 9 : 111. The clinical and bacteriological findings in 59 ears of children with active chronic suppurative otitis media are presented. Fifty-six per cent of the cases were under 6 years of age and the average duration of history was 28 months. The common clinical finding (in 80% of the ears) was a central perforation. Five ears had aural polyps and 3 had cholesteatoma. Cultures from the 59 ears yielded a total number of 69 bacterial and fungal isolates. Gram negative organisms, *Pseudomonas* and *Proteus spp.*, were the most important pathogens isolated. However, the types of organisms isolated had no direct relationship with the clinical pathology of the ears.

Introduction

CHRONIC otitis media with its attendant morbidity and hearing disability is a common problem in children with recurrent upper respiratory tract infection.¹ The potential for complications such as otitic meningitis and facial palsy is much greater in infections associated with cholesteatoma and a marginal or attic perforation than in the more common type with central perforation.² The bacterial flora in chronic suppurative otitis media (CSOM) in the few studies described in children,³ have been predominantly gram negative organisms.

In the present series, we present the clinical and bacteriological findings in the ears of children

with CSOM who were seen in the ENT out-patient clinic between 1979 and 1981.

Materials and Methods

The study was based on the out-patient clinical records of children with actively discharging ears diagnosed as CSOM and the results of bacterial cultures from these ears. At their first attendance, the children had their ears examined and the gross appearances recorded. Special attention was paid to the type of perforation, the character of the ear discharge and the presence of other ear pathology. Routine examination of the nose and throat was carried out, while hearing assessment was undertaken whenever possible. A swab of the ear discharge was taken, using a sterile applicator, care being taken to avoid contamination with the skin of the ear canal. The isolated pathogens were identified using standard techniques and the sensitivity pattern was determined by antibiotic discs.

University of Benin, Benin City

Department of Surgery

*Lecturer in Otolaryngology

Results

A total of 59 ears were included in the study out of which full clinical details were available for 51 (in 36 children). Statistical analysis was performed using chi-squared tests.

Age and Sex Distribution

Of the ears studied, 33 were in children, aged between birth and five years and 26 in those aged between six and 15 years. Twenty-six cases were in females and 33 in males.

Length of History

The 36 children (with 51 affected ears) had had discharging ears for periods ranging from one month to 12 years, with an average duration of 28 months.

Ears Involved

Fifteen (42%) of the 36 children had bilateral ear involvement, while 21 (58%) had unilateral disease. Of the 51 affected ears, the right ear was involved in 26 cases and the left in 25.

Ear Pathology

The types of ear pathology are shown in Table I. Forty-one ears had simple central perforation of varying sizes; only three ears (9%) had obvious cholesteatoma.

The ear discharge was purulent in 25 (49%) of the 59 ears, mucoid in eight (15.7%) and mucopurulent in the remaining 18 (35.3%).

Conductive deafness confirmed by tuning fork tests was recorded for five of the cases in which hearing assessment was done, but it was not possible to carry out audiometric tests in most of the children in this study.

Nose and Throat Examination

Clinical evidence of rhinitis was present in five of the children, whilst two children had tonsillitis.

TABLE I

Types of Ear Pathology in 51 Ears

Pathology	No. of Ears	% of Total
Central perforation	42	82%
Aural polyp	5	10%
Cholesteatoma	3	6%
Attic perforation	1	2%
Total	51	100

Bacterial Cultures

Sixty-nine microbial isolates were obtained from cultures of 59 ears. The isolated organisms are shown in Table II. *Pseudomonas pyocyanea* (30%) and *Proteus species* (29%) were the commonest organisms isolated. Ten (17%) culture were mixed; 2 organisms were isolated in each except in one instance, where 3 organisms were isolated (*Pseudomonas*, *Proteus mirabilis* and *Candida*). Fungi were generally found in mixed growths.

In the younger age group (birth-5 years), *Pseudomonas* was the predominant organism (36%) isolated. *Proteus species* were isolated in only 15% of cultures in this group. In contrast, *Proteus* was isolated in 47% of the ears in children above 5 years (Tables III and IV). This difference was statistically significant ($p < 0.02$).

Ear Pathology and Microbial Isolates

The relationship between bacteriological findings and the type of gross ear pathology was evaluated. The bacterial isolates in the ears with cholesteatoma and aural polyps were similar (with predominant gram negative organisms) when compared with the cases that had central perforation. *Proteus species* or *Proteus mirabilis* was found in four of these cases, *Pseudomonas* in three and *Staph aureus* and *Candida* in one case.

TABLE II
Organisms Isolated from 59 Ears

Organism	No. of Isolates	% of Total
<i>Pseudomonas pyocyanea</i>	21	30.4
<i>Proteus</i> spp.	20	29
Coliforms	8	11.6
<i>Escherichia coli</i>	3	4.4
<i>Staph. aureus</i>	5	7.2
B-Haem. streptococcus	1	1.5
<i>Providencia</i> spp.	2	2.9
<i>Klebsiella</i> spp.	2	2.9
<i>Alkaligenes</i> spp.	2	2.9
<i>Candida</i> /Fungus	5	7.2
Total	69	100

TABLE III
Organisms Isolated from 33 Ears in Children, aged 0-5 years

Organism	No. of Isolates	% of Total
<i>Pseudomonas pyocyanea</i>	14	36
<i>Proteus</i> spp.	6	15
Coliforms	4	10
<i>Escherichia coli</i>	3	8
<i>Staphylococcus aureus</i>	3	8
B-Haem. streptococcus	1	3
<i>Klebsiella</i> spp.	2	5
<i>Alkaligenes</i> spp.	2	5
<i>Candida</i> /Fungus	4	10
Total	39	100

TABLE IV
Organisms Isolated from 26 Ears in Children, aged 5-15 years

Organism	No. of Isolates	% of Total
<i>Proteus</i> spp.	14	47
<i>Pseudomonas pyocyanea</i>	7	23
Coliforms	4	13
<i>Staph. aureus</i>	2	7
<i>Providencia</i> spp.	2	7
<i>Candida</i>	1	3
Total	30	100

Discussion

To our knowledge, no study has addressed itself specifically, to the problems of CSOM in Nigerian children. Our findings have shown a preponderance of cases in the very young. Furthermore, significant differences exist in the bacteriological isolates from the ear cultures in this group of children.

The history of discharging ears in the majority of cases dated back to early infancy and childhood, which corresponds to the peak age of incidence of recurrent upper respiratory infection. Most of the children in the present study were in the age group, between birth and 5 years. There was no difference in sex incidence.

In the studies by Brook³ and by Brook and Finegold,⁴ sampling of middle ear discharge was carried out by direct needle aspiration (tympanocentesis) through the eardrum perforation or through unperforated tympanic membrane in order to eliminate contaminants from the external auditory canal. It is interesting therefore, that the aerobic isolates found in these reports^{3 4} did not differ significantly from the culture results

obtained in our patients using a simple sterile swab technique. Gram negative organisms were the predominant pathogens isolated. This is in consonance with the results of previous studies.^{3 4 5}

A direct relationship between flora and the clinical pathology of the ears was not demonstrated in this study. However, anaerobic bacteria are more commonly associated with cholesteatoma and granulation polyps,^{5 6} presumably because of the poorer ventilation in these ears.

Cholesteatoma was a complicating pathology in three cases. This finding contrasts with that reported by Brook⁶ who found no cases of cholesteatoma in 68 children studied. This condition may lead to serious complications. We recently reported an 8-year old girl whose CSOM was complicated by cholesteatoma, cerebro-spinal fluid otorrhoea, meningitis and facial palsy.⁷

Pseudomonas (30.4%) and *Proteus* (29%) were the two important organisms isolated in this study. Significantly, *Proteus species* were the most common pathogens in children aged, 6-15 years. The reason for the preponderance of these two organisms as the causative agent in CSOM is not clear. However, *Pseudomonas* and *Proteus* are known to inhibit, by production of bacteriocins the growth of other organisms such as *Streptococcus pneumoniae* and *Haemophilus influenzae*, both causative organisms found in acute otitis media⁸

This therefore, may partly explain why both organisms constitute the major bacterial isolate in CSOM in childhood.

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