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CHRONIC SUPPURATIVE OTITIS MEDIA IN TANZANIAN SCHOOL CHILDREN AND ITS EFFECTS ON HEARING

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ABSTRACT

Objectives: To compare different treatment regimens of chronic suppurative otitis media (CSOM) in school children, in regard to their consequence in hearing and discharge from the ear drum perforation.

Design: Randomised controlled trial.

Setting: Randomly selected primary schools within Dar es Salaam.

Subjects: Three hundred and twenty eight children between 5-17 years of age with CSOM in one or both ears.

Results: Three to four months after the onset of treatment 31% of group 1, 54% of group 2, and 56% of group 3, had dry ears. Treatment with dry mopping and boric acid in alcohol ear drops was significantly better than dry mopping alone. Adding amoxicillin to the treatment did not improve the end results. Hearing test performed before and after treatment showed that the hearing thresholds were the same or better after the treatment. The possible risk that boric acid in alcohol ear drops should lead to sensorineural hearing loss has not been confirmed.

Conclusion: Based on the above results, the treatment of choice for CSOM in children in Dar es Salaam should be dry mopping and boric acid in spirit ear drops.

INTRODUCTION

Chronic suppurative otitis media is a common disease among children in developing countries (1-3). A common end result of untreated CSOM is hearing impairment and even deafness. CSOM may also have complications that are life threatening, such as meningitis and brain abscess.

Children with hearing impairment and deafness will have great problems in their speech, social development as well as school progress. Early and adequate treatment of CSOM will stop the disease progress and result in a healed drum perforation. Hearing may be restored to normal (4).

In industrialised countries CSOM is treated

conservatively by cleaning the ear canal (suction) and instillation of ear drops containing local antibiotics and steroids and sometimes systemic antibiotics.

In developing countries, suction facilities are scarce and quite often patients perform the cleaning themselves. It is also essential that the ear drops are affordable. Boric acid in spirit ear drops has been used successfully for decades in the treatment of cases of CSOM. This type of ear drops is still in use in most developing countries.

The objective of this study was to compare different treatment regimens of CSOM in school children regarding their consequences on hearing and on discharge from the ear drum perforation.

MATERIALS AND METHODS

Chronic suppurative otitis media is in this study defined according to internationally agreed otological definition as ear discharge through a tympanic membrane perforation for more than three months (5).

Overall 328 school children between 5 - 17 years of age, a majority being 10-14 years old with CSOM in one or both ears were included (Table 1). The mean age was 11.8 years (SD 2.7). The children were living in three different socially comparable districts in the Dar es Salaam region and they attended 24 different schools within the three districts.

Inclusion criteria and personnel: The children that were included had a history of ear discharge in one or both ears for three months or more at the first examination (visit 1). Otoscopy and pure tone hearing thresholds (audiometry) was performed at the entrance of the study (visit 1) and at the last control (visit 3). A control was performed after one month (visit 2) and all the children were then otoscopically examined. At the last control (visit 3) i.e. after three to four months the children were otoscopically examined and a pure tone audiometry was done.

The local team in Dar es Salaam included two ORL specialists, a number of local field workers and one speech and hearing pathologist. At each school one teacher was trained to dry mop the children's ear canals and to instil the ear drops. The ear drops in this study were always boric acid in alcohol. A clinical officer prescribed amoxicillin in a dosage according to body weight for the children in treatment group 3. No other treatment was given during the study than that prescribed according to each treatment group.

A form specially designed for statistical analysis was filled for each child and visits included in the study.

Treatment Groups

Treatment group 1: Dry mopping for one month

Treatment group 2: Dry mopping and ear drops for one month

Treatment group 3: Dry mopping, ear drops for one month and Amoxicillin for the first ten days in a dosage according to body weight.

All children with CSOM attending the same school were included in the same treatment group (1, 2 or 3).

RESULTS

Table 1

The total number of children and gender in the different treatment groups

Treatment group	Sex		Total
	Female (%)	Male (%)	
1	59 (48)	65 (52)	124
2	75 (58)	55 (45)	130
3	41 (55)	33 (45)	74
Total	175 (53)	153 (47)	328

Table 2

Total number of children in each treatment group at each visit

Treatment group	Visit 1	Visit 2	Visit 3
1	124	104	110
2	130	104	105
3	74	58	57
Total	328	266	272

At visit 2, Table 3 and visit 3, Table 4 children with one or two discharging ears were included in the discharge group and the children with two dry ears were included in the dry group.

Table 3

Total number of children with one or two discharging ears or two dry ears at visit 2

Treatment group	Discharge (%)	Dry (%)	Total
1	83 (80)	21 (20)	104
2	62 (60)	42 (40)	104
3	33 (57)	25 (43)	58

Table 4

Total number of children with one or two discharging or two dry ears at visit 3

Treatment group	Discharge (%)	Dry (%)	Total
1	76 (69)	34 (31)	110
2	48 (46)	57 (54)	105
3	25 (44)	32 (56)	57

Statistical calculations (Chi-Square-tests) have been done between the different treatment groups at visit 2 and at visit 3.

Visit 2

Group 1 vs. 2	<0.01
Group 1 vs. 3	<0.01
Group 2 vs. 3	p = 0.74

Visit 3

Group 1 vs. 2	p<0.001
Group 1 vs. 3	p<0.001
Group 2 vs. 3	p = 0.82

Hearing tests: Hearing tests were performed both at visit 1 and at visit 3 in 104 children in treatment group 1, 104 children in treatment group 2 and in 56 children in treatment group 3. One child in treatment group 1 had a poorer hearing test at visit 3 than at visit 1 (mean - 10,3 dB). In Table 5 the average gain in audiometry can be seen for the different treatment groups. The ears with intact drums both before and after the treatment period (bottom row of the table) gained five to eight dB. This can probably be attributed to learning effects, since none of the intact drums had discharging ear canals, i.e. an external otitis. The same gain was seen in ears that were discharging both before and after treatment (rows 4-6 in the table). A more pronounced gain was seen in the ears that dried during treatment (rows 1-3). There was no deterioration of hearing in groups 2 and 3, as compared to group 1. Thus, no signs of ototoxicity could be found.

DISCUSSION

School children with CSOM (purulent ear discharge for more than three months) in three different but socially comparable districts in the Dar es Salaam region were treated with different regimens during one month. The children in treatment group 1 were only dry mopped daily in the ear canal for one month. The children in treatment group 2 were dry mopped daily and they also got ear drops (boric acid in alcohol) instilled in the ear canal once daily for one month. The children in the third treatment group were dry mopped and got ear drops instilled daily for one month. They also got amoxicillin for the first ten days after visit 1. All the children with CSOM in same school were put in the same treatment group (1, 2 or 3). The children in one school had no contacts with the children in the other schools included in the investigation.

According to the inclusion criteria the three districts within the Dar es Salaam region were socially and economically equal. It could therefore be supposed that the children in the three different treatment groups could be comparable according to social and economic measurements.

Chronic suppurative otitis media without cholesteatoma in children has for many years been a management problem for otologists. The most common pathogens (e.g. *Pseudomonas aeruginosa*) are not sensitive to oral antibiotics commonly used in developing countries (6). Antimicrobial ear drops are often potentially ototoxic (7). Therefore, there are no

Table 5

Comparison of auditory thresholds before and after treatment for each frequency. The comparisons are made for each individual ear. T1-T3 = Treatment groups 1-3

Status before/ after treatment	Frequency (kHz)					No. of ears
	0.5	1	2	4	6	
Disch./Dry T1	11,5	13,1	11,7	12,1	12,0	47
Disch./Dry T2	10,7	11,3	11,8	12,2	12,6	81
Disch./Dry T3	11,9	13,7	16,9	15,5	15,2	45
Disch./Disch T1	7,2	7,3	8,0	8,2	7,1	101
Disch./Disch T2	5,0	6,4	5,6	5,9	6,0	60
Disch./Disch. T3	5,6	7,0	8,1	5,7	7,4	37
Intact/Intact	5,7	5,7	6,0	7,5	6,7	164
Total number of ears						535

ear drops in the WHO list of about two hundred recommended basic medicines. Thus, no ear drops ever reach the dispensary and district hospitals in developing countries. Ear drops, many of them ototoxic, are available at local pharmacies at high cost. It has been shown that cheap ear drops can be produced locally thus strengthening infrastructure and reducing the need for imported drugs.

At the end of the study after three to four months 31% of the children who only had been dry mopped, as compared to 54 and 56% in treatment groups 2 and 3, who also got ear drops, were dry in both ears. The treatment regime in the children who got ear drops were significantly better than in those children who were only dry mopped for one month. There was no difference between the children in treatment groups 2 and 3. This means that there is no reason to add amoxicillin to the treatment of CSOM. Dry mopping and instillation of ear drops seems to be the treatment of choice.

Hearing test performed before and after treatment showed that the hearing thresholds were the same and in many cases even better after the treatment. The possible risks that the ear drops (boric acid in spirit) could lead to sensorineural hearing loss has not been confirmed.

Dry mopping, as the only treatment in cases of CSOM in children is probably better than no treatment at all. However, treatment for CSOM with daily dry mopping and ear drops containing boric acid in alcohol leads to a better end result than dry mopping alone. Children with CSOM who do not get dry with dry mopping and instillation of boric acid ear drops in alcohol should be referred to ENT specialists for more sophisticated treatment.

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