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Research Article

A study to establish the relation of antibiotics and steroids in fungal growth occurring in CSOM patients

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ABSTRACT

Background: Otitis media is known to be one of most common childhood infections and a leading reason for antibiotic prescriptions in the developed world. Fungal infections superimposed over chronic suppurative. Otitis media is suspected when the discharging ear does not respond to local antibiotic ear drops. The aim of the study is to analyze the relation of antibiotics and steroids in fungal growth occurring in CSOM patients.
Methods: Total 150 cases were selected from OPD of ENT department, Government Medical College, Rajindra Hospital, Patiala and divided under two groups: Control group and study group.
Results: The antibiotic drop apart from moist and alkaline medium of discharge appears to be mainly responsible for fungal growth and when steroids are added the fungal growth incidence is increased. Thus local drops should be used with great care in treating chronic suppurative otitis media.
Conclusions: Local drops with some anti-fungal agents may be the ideal treatment in chronic suppurative otitis media.

Keywords: CSOM, Antibiotic, Otitis

INTRODUCTION

Otitis media is an inflammation of the middle ear cleft, with or without intact tympanic membrane. Otitis media is known to be one of most common childhood infections and a leading reason for antibiotic prescriptions in the developed world.[1] It is estimated that about 90% of the people have at least one episode of otitis media by their second birthday. For children less than fifteen years old, the most frequent diagnosis made in clinical practice is otitis media.[2] Fungal infections superimposed over chronic suppurative otitis media is suspected when the discharging ear does not respond to local antibiotic ear drops.[3] In the recent year, prevalence of fungal infections including the middle ear and inner ear is on the increase dramatically because of increased use of broad spectrum antibiotics, cytotoxic chemotherapy, increased incidence of diabetes, corticosteroids, immunosuppressants, tuberculosis and AIDS. In addition to these factors, poor socio-economic status, swimming habits, water supply, scratching the ear canal with infected nail with fungus may also lead to superadded fungus infection.[3]

The most important overall mechanism appears to be limitation of recruitment of inflammatory cells at local site. Steroid are only palliative, do not remove the cause of inflammation, the underlying disease continues to progress while manifestations are dampered. They favour spread of infections as capacity of defensive cells to kill the organism is impaired. They also interfere with healing thus susceptibility to infections with low grade pathogen and opportunistic pathogen like fungus infections increases.[4]

The purpose of this study is to analyze the relation of antibiotics and steroids in fungal growth occurring in CSOM patients.

METHODS

Total 150 cases were selected from OPD of ENT department, Government Medical College, Rajindra Hospital, Patiala and divided under two groups: 1. Control group- 50 cases of CSOM who haven't used any local antibiotic or steroid ear drops for at least one month prior. 2. Study Group included 2 subgroups A. 50 cases of CSOM who have used only local antibiotic ear drops. B. 50 cases of CSOM who have used local steroids with antibiotic ear drops.

Material used were long needle, air tight vial with one inlet & one outlet, a rubber bulb to create a negative pressure, tubes of I/V set to be attached with needle & rubber bulb with vial, ear speculum & syringe.

Patient was in supine position. Under all aseptic conditions, rubber bulb is squeezed, the needle is put in middle ear & rubber bulb is released. Secretions are sucked into the sterilized vial & sent for fungal culture to microbiology department of GMC, Patiala. If secretions are scanty in amount, may not come in vial, then needle is detached from tube & secretions are pushed on sterilized swab with syringe. If needed, small amount of saline pushed through needle to make pus come out of swabs.

RESULTS

Present study comprised of 150 cases of chronic suppurative otitis media selected from amongst patients attending the Ear, Nose and Throat Outpatient Department of Rajindra Hospital attached to Government Medical College, Patiala.

In Control Group: Ages ranged from 3 years to 64 years. Highest incidence was found in second decade (32%) and formed about 1/3 of cases. Average age being 22.96 years.

Study Group A: Comprised of ages ranging from 5 years to 61 years. Highest incidence was found in second and third decade (48%) which formed about half of the cases.

Study Group B: Showed highest incidence in first decade (40%), average age being 16.2 years.

The majority of cases belonged to poor socioeconomic status (Table 1) in all the three groups, control group showed 56% and study group A and study group B showed 56% and 52% respectively. This formed about more than half of cases. Only about 1/8 of total cases belonged to upper socio-economic status.

Table 1: Socio-economic status.

Socio-economic status	Control group		Study group A		Study group B	
	No of cases	%	No of cases	%	No of cases	%
Rich	6	12.0	8	16.0	6	12.0
Moderate	16	32.0	14	28.0	18	36.0
Poor	28	56.0	28	56.0	26	52.0
Total	50	100.0	50	100.0	50	100.0

Table 2: Incidence of residential distribution.

	Control group		Study group A		Study group B	
	No of cases	%	No of cases	%	No of cases	%
Urban	14	28 .0	16	32. 0	12	24. 0
Rural	36	72.0	34	68.0	38	76.0
Total	50	100.0	50	100.0	50	100.0

72% in control group, 68% in study group A and 76% in study group B belonged to rural areas. Rural urban ratio being 3:1 approximately.

Majority of the patients were found to be Agriculturists, Labourers, Housewives and students in different study groups (Table 5). This constituted about 2/3 of total patients.

Number of patients with safe type of chronic suppurative otitis media was about 3 times than with unsafe pathology. Number of safe ears in control group was 80%, whereas in study group A & B was 72% and 76% respectively.

Otorrhoea was a constant feature among all the cases studied (Table 5). Diminishing of hearing was noted in about 4/5 of cases i.e. control group (76%), study group A (80%), study group B (84%). Itching was common symptom observed in about 2/5 of cases as compared to otalgia, urc, vertigo and tinnitus.

Out of total 150 cases, 6 cases were known diabetics and were taking regularly oral hypoglycemics which were confirmed by blood sugar levels. Two patients

was on anti-tubercular treatment for the last 3 months, 4 cases had past history of pneumonias, 10 cases had nasobronchial allergy and 12 cases had history of measles in the childhood (Table 6).

In our series majority of patients were using local drops for the last 3 months i.e. 60% in study group A and 68% in study group B. Four cases in study group A and two cases in study group B, was using topical treatment more than one year though intermittently.

In control group, fungus was positive in 8 cases (16%). In study group A and study group B, incidence was 24% and 32% respectively (Table 8).

Table 3: Occupational incidence.

Occupation	Control group		Study group A		Study group B	
	No of cases	%	No. of cases	%	No. of cases	%
Agriculturist	16	32. 0	18	36. 0	14	28. 0
Labourer	8	16.0	8	16.0	10	20.0
Housewives	6	12 .0	8	16 .0	6	12. 0
Students	6	12.0	2	4 .0	4	8 .0
Businessmen	4	8.0	4	8.0	6	12.0
Shopkeepers	4	8.0	4	8.0	6	12.0
Govt. employees	6	12 .0	4	8 .0	4	8 .0
Infants & Toddlers	0	0.0	2	4.0	0	0.0
Total	50	100. 0	50	100.0	50	100.0

Table 4: Type of chronic suppurative otitis media.

Sex	Control group		Study group A		Study group B	
	No of cases	%	No. of cases	%	No. of cases	%
Safe	40	80.0	3600	72.0	36	76. 0
Unsafe	10	20.0	14	28.0	12	24.0
Total	50	100.0	50	100.0	50	100.0

Table 5: Symptomatology.

Symptom	Control group		Study group A		Study group B	
	No. of cases	%	No. of cases	%	No. of cases	%
Otorrhoea	50	100.0	50	100.0	50	100.0
Diminishing of hearing	38	76.0	40	80.0	42	84.0
Recurrent pain	4	8.0	6	12.0	4	8.0
Itching	20	40.0	22	44.0	18	36.0
URC	4	8.0	2	4.0	4	8.0
Vertigo	2	4 .0	2	4 .0	0	0.0
Tinnitus	4	8 .0	4	8.0	2	4.0

Table 6: Past history.

Past history	Control group		Study group A		Study group B	
	No. of cases	%	No. of cases	%	No. of cases	%
Diabetes mellitus	0	-	4	8.0	2	4.0
Tuberculosis	2	4.0	0	0.0	0	0.0
Hypertension	-	-	-	-	-	-
Pneumonias	-	-	2	4.0	2	4.0
Allergy	4	8.0	4	8.0	2	4.0
Typhoid	2	4.0	2	4.0	0	0.0
Measles	4	8.0	6	12.0	2	4.0
Meningitis	-	-	-	-	-	-
Operation	-	-	-	-	-	-
Radiation or chemotherapy	-	-	-	-	-	-

Table 7: Duration of local treatment.

Duration (months)	Study group A		Study group B	
	No. of cases	%	No. of cases	%
	30	60.0	34	68.0
1-3	12	24.0	6	12.0
4-6	4	8.0	8	16.0
7-12	4	8.0	2	4.0
>12	50	100.0	50	100.0
Total	30	60.0	34	68.0

Table 8: Isolated fungal growth.

	Control group		Study group A		Study group B	
	No. of cases	%	No. of cases	%	No. of cases	%
Asp. niger	4	8 0	6	12.0	6	12.0
Asp. flavus	4	8.0	4	8.0	8	16.0
Candida albicans	-	-	2	4.0	2	4.0
Total	8	16.0	12	24.0	16	32.0

DISCUSSION

Chronic suppurative otitis media is one of the common conditions encountered in the clinical practice of Otolaryngology. Baruah (1969) noted the highest incidence of CSOM in the first and second decade (>80%). The highest incidence in the present study was seen in the first three decades i.e. 94%. The same observation was made by Baruah in 1969 although the incidence was much higher i.e. 71%.5 The incidence of fungal infections was higher in third and fourth decade (50%). Majority of cases of chronic suppurative otitis media in present study were agriculturists (32%), labourers (17.33%) and house wives (13.30%).

This constituted about 2/3 of total patients. Incidence of fungal infections was also more common in agriculturists, housewives and labourers. High incidence in labourers and agriculturists can be explained on the fact that they come in contact with soil and dust more often and work in humid conditions.

In fungal positive cases, most of patients belonged to rural areas (72%), only in 28% cases urban patients were involved. Ratio being U: R 2:5. Most of patients (88%) belonged to average (32%) and poor (56%) socioeconomic status. Only approximately one-fifth cases belonged to rich socio-economic status. Unhygienic conditions, poverty, illiteracy, lack of treatment, overcrowding, malnutrition, and way of life style have been suggested as basis and predisposing factors for chronic suppurative otitis media. No doubt, all these above said factors also predisposed to super added fungal infection. Safe type of chronic suppurative otitis media constituted 76% as compared to unsafe pathology 24%. In our study, more of the cases with central large and subtotal perforation were fungal positives. Out of total 36 fungal positives, 30(83.3%) were of safe pathology and 6(16.7%) were with unsafe pathology. No study is available for comparison. This attributes to more exposure of middle ear cavity to exterior.

Almost all the patients had profuse otorrhoea. Patients presented with various permutations and combinations of symptoms. Otorrhoea was present in 100% of cases, deafness 80%, otalgia 9.3%, itching 26.6%, vertigo 2.6%, tinnitus 6.6% and urc 6.6%. Sen Gupta reported that all cases of Asp. niger had pain in the ears and itching was related to fungal infections. These symptoms (otalgia and itching), according to him, indicated the presence of fungus invasion in chronic suppurative otitis media. In the present study, out of total 40 cases, who complained of itching, 24 cases (60%) found to fungal positives and 14 cases who complained of pain, 8 cases (57%) grew to be fungus.Thus itching and pain is an important symptom of fungal infections in cases of chronic suppurative otitis media.

Six cases were taking treatment for diabetes mellitus. Two cases had started antitubercular treatment two months back. Ten cases had history of allergy and four cases history of pneumonias. But none of the above cases proved to be fungal positive. In the literature

studies show that fungal infection is seen more in diabetes, but in the present study, no positive case was found.

There was a definite correlation between the duration of use of local drops and fungal positive cases. Patients using local drops for longer duration grew more fungal positives as compared to short duration of treatment. There were only four fungal positive cases out of 30 cases where the duration of treatment was 1-3 months, whereas half of the cases were fungal positives when the duration was more than 4 months.

In our studies, patients used Gentamycin, Chloramphenicol, Norfloxacin, Ciprofloxacin, Neomycin, Ofloxacin and Neosporin as antibiotic drops, Steroids in combination with antibiotic drops used were Dexamethasone, Hydrocortisone, Betamethasone. Most of the patients had used these drugs repeatedly. Mycological investigations of 150 discharging ears, under three different groups had revealed that in Control group Eight cases out of 50 (16%), in Study group A Twelve cases out of 50 (24%) and in Study group B Sixteen cases out of 50 (32%).

It has been found that incidence was much higher in study group B (using antibiotic-steroids drops) than study group A (using only antibiotics drops) which was again higher than the control group (no topical drops). Average incidence of fungal positives (without taking into consideration the topical treatment) was found to be 24%. Baruah (1969) conducted study of 100 cases of CSOM and found fungal positive in 18 cases (18%).[5] Pasternale (1973) who conducted systematic study of 215 cases of chronic suppurative otitis media, found fungal positives in 42 cases (19.53%).[6] Sen Gupta et al (1978) in his study reported bacterial and fungal growth in 13.6% and pure fungal growth in 11.2% making total fungal positives 24.8%.[3] Talwar P et al (1988) isolated 168 (49%) of the fungal positive cases out of total 344 cases.[7] Ashok Mittal et al (1997) isolated 42 (40.77%) fungal positive cases out of total 103 cases of CSOM.[8] Nigeria EO Nwankwo et al (2005) conducted study of 501 cases of CSOM and found 20 (3.9%) cases as fungal positive.[9] Irfan Ali Mirza et al (2008) in his study reported 14 (11%) fungal positive cases out of total 178 cases.[10] Khanna V et al (2010) conducted study of 110 cases of CSOM and found fungal positive in 26 cases (23.63%).[11] Comparison shows that incidence of fungal infections is on rise. This may be attributed to use of systemic broad spectrum antibiotics, steroids, cytotoxic drugs and topical applications of antibiotic- steroid drops.

Incidence of fungal infection in patients not using any topical drops was much less (16%) as compared to the patients using local drops (28%). Further the incidence was much higher in patients using steroid drops (32%) as compared to the cases using only antibiotic drops (24%). Thus the higher incidence was obtained in patients using antibiotic and steroid drops as compared to antibiotic drops or without any local treatment.

Statistically the difference between the 3 groups was not significant while applying the test of significance for difference in two binominal proportions, although the number of cases increased significantly in the three groups i.e. 8, 2 and 6 respectively in Control Group, Study Group A and Study Group B. This may be because of the total number of the cases studied in each group is less. But it appears certain from this study that if large numbers of cases were to be studied, the difference would definitely be statistically significant.

Similarly, Kunelskaya (1969) reported that in most cases, the fungal process in middle ear developed as a result of topically treatment with antibiotics and steroids.[12]

Sen Gupta (1978) concluded in his study that all the cases of fungal otitis media received topical antibiotic ear drops previously.[3]

CONCLUSIONS

The antibiotic drop apart from moist and alkaline medium of discharge appears to be mainly responsible for fungal growth and when steroids are added the fungal growth incidence is increased. Thus local drops should be used with great care in treating chronic suppurative otitis media. Local drops with some anti-fungal agents may be the ideal treatment in chronic cases which certainly requires further study.

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