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## CLINICAL AND BACTERIOLOGICAL STUDY OF CHRONIC SUPPURATIVE OTITIS MEDIA BY ANAEROBIC CULTURE METHODS IN A TEACHING HOSPITAL

#### Aims & Objective:

To observe the types of organisms grown in CSOM both Tubotympanic (TT) and Atticoantral (AA) type

#### Material and Methods:

This was a prospective study conducted between October 2009 to June 2011 in tertiary referral center in India. 120 chronic and actively discharging ears of 100 patients were included in study.

#### Results:

Majority of patients were in age range 26 to 35 years. 69% of patients were from low socioeconomic group. CSOM-TT was found in 81.67% and CSOM-AA in 18.88% cases. Out of 120 swabs only 113 swabs grew bacteria. Out of 120 swabs, 48.35% swabs grew monomicrobial isolates and 48.83% swabs grew polymicrobial isolates. Aerobic growth was seen in 48.33% anaerobic growth was seen in 2.5% and mixed flora was seen in 43.34% and no growth was seen in 5.83%. In CSOM-TT commonest anaerobic was Prevotella whereas peptostreptococcus was common in CSOM-AA.

#### Conclusion:

In CSOM-TT commonest anaerobic was Prevotella whereas peptostreptococcus was common in CSOM-AA.

**Keywords:** Bacteriological Study, Chronic Suppurative Otitis Media, Culture

#### INTRODUCTION:

Chronic suppurative otitis media (CSOM) is a common condition in developing nations and it is being managed by general practitioners.

The patients turn to ENT specialists only when it causes significant hearing loss or persistent otorrhoea or some complications. The organisms found in CSOM is many times a mixed flora of aerobes and anaerobes. The foetid discharge seen in CSOM is due to anaerobes. This study was mainly conducted to investigate the types of organisms both aerobic and anaerobic, in CSOM cases both Tubo tympanic (T T) and Atticoantral (A A) types and ascertain the sensitivity patterns of aerobes to commonly used antibiotics in a tertiary referral center which is a 1000 beds medical college teaching hospital in an urban setting which draws patients from mostly rural areas, tribal areas and semi urban populations.

#### MATERIALS AND METHODS:

This was a prospective study done between Oct 2009 and June 2011 as part of the dissertation of the second author submitted to NTRUHS Andhra Pradesh, India. 120 chronic and actively discharging ears of 100 patients afflicted with both TT and AA types of CSOM who attended the ENT OPD, were included in the study. Exclusion criteria included Children with age less than 5 years, patients who received antibiotics 15 days prior, in any form either systemic / topical any febrile illness, patients on renal dialysis, recent ear surgery, aural polyp and pregnancy. After taking informed consent, the external auditory canal was cleaned with betadine swab. Fresh specimen of middle ear effusion was obtained by suction with Siegle's pneumatic speculum. Two thin sterile cotton wool swabs were used to collect the pus for bacteriological study from the deeper part of the canal. One swab was inoculated in Cary-Blair transport medium for anaerobic culture and both the swabs were taken immediately after the collection, to the department of Microbiology which is situated within the same building, one floor below, without any delay. In the department of Microbiology, the swab sent in Cary-Blair medium was subcultured onto blood agar and Thioglycollate medium and were incubated at 37°C for 48-72 hours in Gaspak jar. In cases where the transport medium could not be used, the swab was inoculated directly into Robertson cooked meat medium from which it was subcultured on to blood agar and incubated anaerobically in Mc Intosh Fildes jar and Gaspak jar.

#### RESULTS:

Clinical evaluation of the patients revealed that, age range started from 5 years to 65 years, with a mean age of 29 years. Patients who

were in age range between 26 and 35 years were more in number (42), followed by 16 - 25 years age group (22). Least common age range was 56 - 65 years (3) as shown in Table I. There was almost equal distribution of disease between both the sexes (1.08:1). Majority of them belonged to low socio-economic group, mainly labourers (69%) as shown in Table II. Symptoms of ear discharge was less than 5 years in 69 ears (57.5%), 5 - 10 years in 40 ears (33.33%), more than 10 years in 11 ears (9.2%) as shown in Table III. Most common type of CSOM was TT in 98 ears (81.67%) and remaining 22 ears (18.88%) were AA type. Central perforation was seen in 98 ears (81.7%), attic perforation in 13 ears (10.8%) and marginal in 9 ears (7.5%) as shown in Table IV. Out of 120 ear swabs, 113 swabs grew bacteria and the remaining 7 (5.83%) swabs were sterile. Of the 113 swabs that grew bacteria, 58 (48.35%) swabs grew monomicrobial isolates and the remaining 55 (48.83%) swabs grew polymicrobial isolates [Table V, VI]. Only aerobic growth was seen in 58 ears (48.33%), only anaerobic growth in 3 ears (2.5%), mixed flora in 52 ears (43.34%) and no growth in 7 ears (5.83%). The mixed flora obtained contained both aerobic and anaerobic bacteria. A total no. of 173 (115 aerobic and 58 anaerobic) bacteria were isolated from 120 ear discharge specimens. Most common anaerobic bacterium was Peptostreptococcus (20 i.e, 34.5%) followed by Prevotella (16 i.e, 27.6%), Porphyromonas (11 i.e, 19%), Bacteroides

Tab. I: Showing Age /Sex Distribution Of Patients

| Age in Years | No and % of patients | Sex    | No |
|--------------|----------------------|--------|----|
| 5-15         | 13                   | Male   | 52 |
| 16-25        | 22                   | Female | 48 |
| 26-35        | 42                   |        |    |
| 36-45        | 14                   |        |    |
| 46-55        | 6                    |        |    |
| 56-65        | 3                    |        |    |
| Total        | 100                  |        |    |

Tab. II : Occupation Of Patients

| Occupation | No. and Percentage of patients |
|------------|--------------------------------|
| Labourer   | 69                             |
| Student    | 19                             |
| House wife | 6                              |
| Others     | 6                              |

Tab. III: Duration Of Ear Discharge

| Duration     | No. of ears | Percentage |
|--------------|-------------|------------|
| < 5 years    | 69          | 57.5       |
| 5 – 10 years | 40          | 33.33      |
| >10 years    | 11          | 9.17       |
| Total        | 120         | 100        |

Tab. IV: Type Of Perforation

| Type of perforation | No of ears | Percentage |
|---------------------|------------|------------|
| Central             | 98         | 81.67      |
| Marginal            | 9          | 7.5        |
| Attic               | 13         | 10.83      |
| Total               | 120        | 100        |

Tab. V: Type Of Bacterial Culture

| Type          | No. of ears | Percentage |
|---------------|-------------|------------|
| Monomicrobial | 58          | 48.35      |
| Polymicrobial | 55          | 45.83      |
| No growth     | 7           | 5.83       |
| Total         | 120         | 100        |

Tab.VI : Incidence Of Monomicrobial Vs Polybacterial Growths- Various Studies

| Nature of growth | Loy (2002) | Srivastava (2010) | HaiderA (2002) | VK Poorey (2002) | Present study(2011) | Jagdish (1984) |
|------------------|------------|-------------------|----------------|------------------|---------------------|----------------|
| Monomicrobial    | 63.3%      | 80.7%             | 80.7%          | 82%              | 48.35%              | 88%            |
| Polymicrobial    | 34.4%      | 19.3%             | 3.3%           | 10%              | 45.38%              | 5.6%           |
| No growth        | 2.2%       | NIL               | 16%            | 8%               | 5.83%               | 6.4%           |

Tab. VII: Anaerobic Organisms Isolated

| Organism           | No. of isolates | (%)   | No. of isolates in CSOM(TT) 98 ears | (%)   | No. of isolates in CSOM (AA) 22 ears | (%)   |
|--------------------|-----------------|-------|-------------------------------------|-------|--------------------------------------|-------|
| Peptostreptococcus | 20              | 34.48 | 11                                  | 27.50 | 9                                    | 50.00 |
| Prevotella         | 16              | 27.59 | 13                                  | 32.50 | 3                                    | 16.67 |
| Porphyromonas      | 11              | 18.97 | 8                                   | 20.00 | 3                                    | 16.67 |
| Bacteroides        | 7               | 12.07 | 7                                   | 17.50 | 0                                    | 0     |
| Peptococcus        | 4               | 6.89  | 1                                   | 2.50  | 3                                    | 16.67 |
| Total              | 58              | 100   | 40                                  | 100   | 18                                   | 100   |

(7 i.e,12%) and Peptococcus (4 i.e,7%)[ Table VII]. Amongst anaerobes, Prevotella (32.50%) was common in TT type of CSOM. In AA type, Peptostreptococcus (50%) was commonest Table VII

## DISCUSSION:

CSOM and its complications are among the most common conditions seen by the otologist, paediatrician and the general practitioner. Anaerobes are commonly implicated in otogenic brain abscess cases. It was observed from the present study that majority of the patients belonged to the age group of 26-35 years (42%) [Table I] with an overall increase in incidence between 11 to 45 years. These findings were consistent with the findings of Loy et al<sup>3</sup> and Srivastava et al<sup>4</sup>. The basis for delayed presentation may be due to the ignorance of and / or the economic restraints on the patients with regard to their seeking health services at an early stage of the complaint and general poverty. Incidence of CSOM was almost same in males as compared to females (M: F- 1.08:1) [Table I]. A similar conclusion was made by Loy et al<sup>3</sup>. Who found an almost equal distribution between both sexes. Duration of ear discharge was <5 yrs in 58%, 5-10 yrs in 33%, and > 10 yrs in 9% [Table-III] Type of perforation was central in 81.67% , marginal and attic types in 18.33% ears in this study. CSOM was seen to be more common in labourers (69%) [Table-III] who belong to low socioeconomic group and indulge in outdoor work. These findings were in accordance with other researchers like Poorey et al and Gul

et al<sup>6</sup>. The difficulty to treat comes from the fact that most of the times the treatment is inadequate and there is failure of compliance. This leads to the emergence of resistant organisms. Out of 100 cases (120 ears) studied, mono-microbial growth was obtained from 58 (48.35%) ears, poly-microbial growth was seen in 55 (45.38%) ears and no growth in 7 (5.83%) ears [Table V and VI]. A combination of the different aerobes and anaerobes varied and there was no consistent pattern of combinations. Only 3 ears showed pure anaerobic culture (5.17%), out of which 2 were peptostreptococci and one was Peptococcus. Most of the anaerobic organisms isolated were in combination with aerobes (94.82%), the most common was Peptostreptococcus (34.49%) followed by Prevotella (27.58%), Porphyromonas (18.96%), Bacteroides (12.06%) and Peptococcus (6.89%). These results were similar to Jonsson et al<sup>9</sup>, who observed that Peptostreptococci (55%) were common as compared to Bacteroides (33%). Anaerobes have been isolated in a few studies. 61% of patients in the study by Erken et al in 1994 showed anaerobes<sup>10</sup>. Improved bacteriological methods may be said to be the reason for this high yield. In the study as above by the principal author<sup>11</sup>, Anaerobes were grown in 46.66% (14 out of 30) ear swabs. The sample may be less and hence difficult to comment. Also, in the same study<sup>11</sup>, it was observed the importance of transport medium for anaerobic bacteriological study. Out of 60 samples of ear swabs, 15 were sent through CARY-BLAIR transport medium, in which 12 out of 15 (80%) were positive, whereas 45 samples were sent directly, but inoculated within a few minutes, into Robertson's cooked meat medium, in which only 9 out of 45 (20%) swabs were positive for anaerobes. Hence it is important to use transport medium for anaerobic cultures. Anaerobes were not significant pathogens in their study according to Srivastava<sup>4</sup> (2010) and Loy<sup>3</sup> (2002). In classical text books, it is described that anaerobes are seen mostly in CSOM (A A) type. But in our study we found that they were seen in both types. Among anaerobes, Prevotella was common in TT disease (32.50%) and Peptostreptococcus in AA disease (50%) [Table VII]. There was no significant data in the literature describing the commonest anaerobic organisms in both types of CSOM.

## CONCLUSION:

In this study, age of the patients ranged from 5– 65 years. Majority were in 26-35 years age group. Male: Female ratio was 1.08:1. Labourers (low income group) were found to be affected more. 69 % had ear discharge for less than 5 years, 40% had discharge between 5-10 years and 11 % had discharge for more than 10 years. The present study is one of the extensive reports on aerobic and anaerobic bacteria. In this study, bacteria from the ear discharge in chronic suppurative otitis media were grown, obtained from the middle ear aspirate. Peptostreptococci followed by Prevotella were the most frequently isolated anaerobic organisms as compared to previous studies. Anaerobes were seen equally in both TT and AA types of CSOM, contrary to common belief that anaerobes are seen mostly in CSOM (AA) type.

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