

## STUDY OF AEROBIC AND ANAEROBIC BACTERIA IN CHRONIC SUPPURATIVE OTITIS MEDIA

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**ABSTRACT:** One hundred six patients with clinical diagnosis of CSOM were investigated bacteriologically using appropriate aerobic and anaerobic techniques. Positive cultures were obtained in 100 specimens. Aerobic bacteria alone were present in 51%, anaerobic bacteria alone in 10% and a combination of both in 34% of aural swabs. The anaerobes isolated were Bacteroides 30%, Peptostreptococci 26%, followed by others. Aerobic bacteriology showed the predominance of Pseudomonas 30.4% followed by Staphylococcus aureus 21.4%. Metronidazole was found to be most effective (87%) drug against anaerobes and Amikacin (98%) against aerobes.

**KEYWORDS:** CSOM (Chronic Suppurative Otitis Media), Bacteriology, Anaerobes, Aerobes.

**INTRODUCTION:** The suppurative infection of the middle ear is a common occurrence in India and is the primary focus for intra-cranial suppurative disease. The wide range of microbes, both aerobic and anaerobic, present in CSOM has been the subject of exhaustive investigation. In recent years, there has been a renewed interest in non-sporing anaerobic infections. The present study was undertaken to know the prevalence of aerobic and non-sporing anaerobic organisms in CSOM.

**MATERIALS AND METHODS:** The study material included 106 patients with diagnosis of CSOM attending the E.N.T department of Government General Hospital, Kakinada. There were 51 males and 55 females ranging from 1 year to 60 years among them.

Three ear swabs from each patient were collected under sterile precautions. One swab was kept in a sterile container, second swab in nutrient broth and third swab in thioglycollate broth and transported to the laboratory.

After overnight incubation at 37°C, subcultures were made from thioglycollate broth to Neomycin blood agar and incubated for 48hrs in anaerobic jar with cold catalyst. Anaerobiasis was ensured by Gaspack supplied by Dyna Micro Pvt. Labs Ltd. Mumbai, India. Lucas indicator and Pseudomonas inoculated plate were used as anaerobic indicators. The plates were examined for growth, checked for aero tolerance, the organisms were identified by colony characters, Gram's staining and sensitivity pattern to Kannamycin (1000mcg), Vancomycin (5mcg) and Colistin (10mcg) (supplied by Dyna Micro GR) as per Pushpa Jagtap et al,<sup>1</sup> wads worth Manual,<sup>2</sup> Bailey & Scotts Diagnostic Microbiology.<sup>3</sup> The isolates were also tested for susceptibility to Metronidazole.

Swab inoculated in nutrient broth and incubated for 6 hrs was used for aerobic cultures. Subcultures were done on Blood agar and Mac Conkeys agar and incubated at 37°C for 24 hrs.

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Aerobes were identified as per the methods given in Mackie and Macc Cartney practical medical Micro Biology.<sup>4</sup> Antibiotic Sensitivity test for aerobes done by Kirby-Bauer Disc Diffusion Method.

## RESULTS:

	Number	Percentage
Only aerobes isolated	54	51%
Only anaerobes isolated	10	9.5%
Mixed growth of aerobes and anaerobes isolated	36	34%
No growth	6	5.5%

Table 1: Analysis of 106 patients ear swab culture results

**Table 1:** Showing Analysis of 106 Patients aural swabs processed by both aerobic and anaerobic cultures. Only aerobes grown in 51% of cases, only non-sporing anaerobes in 9.5% of cases, mixed growth of aerobic bacteria and anaerobic bacteria in 34% of cases and no organism was isolated from 5.5% of cases.

Anaerobic bacteria	Number	Percentage
Bacteriodes	14	30.4%
Peptostreptococcus	12	26.1%
Fusobacterium	6	13%
Prevotella	5	10.9%
Porphyromonas	4	8.7%
Propionibacterium	3	6.5%
Veillonella	2	4.4%
<b>Total</b>	<b>46</b>	

Table 2: Distribution of non-sporing anaerobes isolated from anaerobic cultures

**Table 2:** Showing distribution of 46 non-sporing anaerobes isolated. In this Bacteriodes species 14(30.4%) followed by peptostreptococcus 12(26.1%), Fusobacterium 6(13%), Prevotella 5(10.9%), Porphyromonas 4(8.7%), Propionibacterium 3(6.5%) and Veillonella species 2(4.4%).

Aerobic Bacteria	Number	Percentage
Pseudomonas aeruginosa	34	30.4%
Staphylococcus aureus	24	21.4%
Klebsiella pneumoniae	19	17%
Proteus species	17	15.2%
Escherichia coli	8	7.1%
Coagulase negative staphylococci	6	5.3%
Streptococcus pyogenes	3	2.7%
Streptococcus pneumoniae	1	0.9%
<b>Total</b>	<b>112</b>	

Table 3: Different bacteria isolated from aerobic cultures

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**Table 3:** Shows distribution of 112 aerobes isolated, with the predominance of *Pseudomonas aeruginosa* 34(30.4%) followed by *Staphylococcus aureus* 24(21.4%), *Klebsiella pneumoniae* 19(17%), *Proteus* species 17(15.2%), *Escherichia coli* 8(7.1%), Coagulase negative *Staphylococci* 6(5.3%), *Streptococcus pyogenes* 3(2.7%), *Streptococcus pneumoniae* 1(0.9%).

Antibiotic susceptibility pattern of non-sporing anaerobes to metronidazole shows 40(87%) were susceptible, and 3 isolates of *Peptostreptococcus* and 3 isolates of *Propionibacterium* were resistant (13%) to metronidazole.

The overall antibiotic sensitivity pattern of aerobic organisms isolated revealed that amikacin (97.3%) is most effective followed by gentamicin (93%), ciprofloxacin (77.7%), Netilmicin (50%), cefotaxime (30%), cotrimoxazole (26.3%), erythromycin (16%) and ampicillin (5.4%).

**DISCUSSION:** CSOM is a well-known destructive and persistent disease, with an insidious onset and capable of causing irreversible sequelae. The bacteriological study of ear swabs in these cases provides evidence of specific micro-organisms responsible for the causation of disease and their contribution towards chronicity of the condition and is necessary to plan an effective treatment.

In our study mixed growth of anaerobes and aerobes was 34%. This finding is in agreement with Rajat Prakash<sup>5</sup> (33.3%), A. Ayyagiri et al<sup>6</sup> (49.6%), Kumar S.A. Jagadish et al<sup>7</sup> (48.5%) Observed a slightly higher incidence of mixed growth. In our study only 10(9.5%) specimens yielded pure anaerobes which is in agreement with the studies of A. Ayyagiri et al.<sup>6</sup>

Total anaerobic strains isolated in present study (43.4%) is higher when compared with Ravindra Singh Bisht et al<sup>8</sup> (25.9%), Rajat Prakash et al<sup>5</sup> (29.41%). Whereas A. Ayyagiri et al<sup>6</sup> reported (59.1%) higher incidence of anaerobic isolations.

In our study *Bacterioides* species (30.4%) was the predominant organism anaerobic bacterial isolations followed by *Peptostreptococcus* (26.1%) and *Fusobacterium* (13%). Similar findings were also reported by A. Ayyagiri et al.<sup>6</sup> Whereas Rajat Prakash et al,<sup>5</sup> Ravindra Singh Bisht et al<sup>8</sup> and Kumar S.A. Jagadish et al,<sup>7</sup> Itzhak Brook<sup>9</sup> reported *Peptostreptococcus* as predominant organism. Metronidazole resistance (13%) in present study was mentioned by Bailey & Scott's Diagnostic Microbiology.<sup>3</sup> Whereas Ravinder Singh Bisht<sup>8</sup> observed no resistance to Metronidazole.

In present study aerobic cultures showed *Pseudomonas aeruginosa* (30.4%) was the most predominant organism followed by *Staphylococcus aureus* (21.4%) is in correlation with Sanjaykumar et al,<sup>10</sup> Ishan E Alsaimary et al.<sup>11</sup> Whereas Rajat Prakash et al,<sup>5</sup> Ravindra Singh Bisht et al,<sup>8</sup> A Sri Vastava et al,<sup>12</sup> Itzhak Brook et al<sup>9</sup> reported *Staphylococcus aureus* was the predominant organism followed by *Pseudomonas aeruginosa*.

The present study stresses the need for careful application of readily available anaerobic methodology routinely to establish the role of anaerobes and to know the incidence of non-sporing anaerobes in CSOM. Recovery of both aerobes and anaerobes from CSOM necessitates the formulation of an antimicrobial policy against all potential pathogens taking into consideration the role played by non-sporing anaerobes in the etiology of CSOM.

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