

## Research Article

# Bacteriological profile isolated from cases of otitis media diagnosed at tertiary care hospital of Gujarat, India

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## ABSTRACT

**Background:** Otitis media is commonest disease seen in children. Bacteria are responsible for majority of the cases of otitis media. The aim of the study was to speculate the aetiological bacterial flora which was responsible for the cases of otitis media.

**Methods:** The present study was conducted by Department of Microbiology, B. J. Medical College, Ahmedabad, India during 1<sup>st</sup> May 2000 to 30<sup>th</sup> April 2002. Before conducting the study approval was obtained from Institutional Ethical Committee for human research. Total 140 patients of otitis media were included after written informed consent. The ear discharge from each diseased middle ear was collected and inoculated on blood agar, MacConkey's agar and chocolate agar media and were incubated at 37°C for 24 hours. The organisms were identified by using a standard procedure. Data was analyzed using Microsoft excel software (Trial Version).

**Results:** Out of 140 samples 114 (81.43%) had positive culture. out of 114 cases, 64 (56.14%) were male. Majority of the cases (32.45%) were in the age group of 0-14 years. Out of 114 positive cases, single organism was isolated in 99 (86.8%) cases. Out of total 116 strains 44 (37.9%) were gram positive and 72 (62.1%) were gram negative organisms. Among gram positive organisms, *Staphylococcus aureus* (63.63%) was predominant organisms isolated followed by coagulase negative *Staphylococci* (20.45%) and among gram negative organism *Pseudomonas* (69.44%) was predominant organisms isolated followed by proteus species.

**Conclusions:** *Staphylococcus aureus* and *Pseudomonas* sp. were found to be the common cause of otitis media in our study.

**Keywords:** Otitis media, Bacterial flora, *Staphylococcus aureus*, *Pseudomonas*, Middle ear

## INTRODUCTION

Inflammation of the ear is one of the most common illnesses in children.<sup>1</sup> Otitis media is an inflammatory disease of the mucosal lining of the middle ear, which includes a variety of medical conditions with different signs and symptoms.<sup>2,3</sup> Otitis media is most commonly caused by the buildup of fluid behind the ear drum, as a result of a blockage to the Eustachian tube. Otitis media

is commonest disease seen in children along with tonsillitis, as their Eustachian tube is shorter and more horizontal than adults and is made up of more flaccid cartilage, which can impair its opening.<sup>4</sup> Sources of infection in otitis media are solemnly dependent on the route by which infection reaches the middle ear and the chief route by which this occurs is the Eustachian tube.<sup>5</sup> So it is necessary to identify causative organism and its susceptibility to antibiotic and to inform clinician

regarding this. Here, a very important role of microbiologist is to guide the clinician for causative organism and appropriate treatment. Then only we can reduce the rate of episode of disease and its complications.<sup>6</sup>

Many factors like Eustachian tube dysfunction and susceptibility to upper respiratory tract infection may contribute to pathogenesis of otitis media and it is many a time accompanies respiratory tract infection.<sup>7</sup> Bacteria are responsible for majority of the cases. Viruses have also been implicated in some studies. Upto 50% of isolates being viruses.<sup>8</sup> Fungus are also responsible for this infection. Ideal sample i.e. aspiration of middle ear fluid is difficult to be obtained. It has been observed that ear swab taken from middle ear is usually contaminated with the micro-organism of external ear.

So it can only be detected by carefully obtaining material from middle ear. With this background in mind this study was aimed to speculate the aetiological bacterial flora which was responsible for the cases of otitis media who attended the ENT Department of B. J. Medical College, Ahmedabad, India.

## METHODS

The present study was conducted by Department of Microbiology, B. J. Medical College, Ahmedabad, India during 1<sup>st</sup> May 2000 to 30<sup>th</sup> April 2002. Before conducting the study approval was obtained from institutional ethical committee for human research. Total 140 patients were included after written informed consent. These clinically diagnosed cases of otitis media formed the subject matter of our study. The ear discharge from each diseased middle ear was collected separately in a sterilized vial (by using a long lumbar puncture needle after creating negative pressure) and in some patients, it was collected with the help of sterile culture swabs. Only those cases were selected, who had not taken any treatment, either systemic or local, in the form of ear drops, for the last seven days. The samples were immediately sent to the microbiology laboratory for bacterial studies. In the laboratory, the ear discharges were collected and examined microscopically (in 10% potassium hydroxide) for the presence of epithelial cells, pus cells, budding yeast cells, fungal hyphae and spores, etc. For bacterial isolation, the samples were inoculated on blood agar, MacConkey's agar and chocolate agar media and were incubated at 37°C for 24 hours. The organisms were identified by using a standard procedure (Collee et al).<sup>9</sup> Thus collected data was analyzed using Microsoft excel software. (TrialVersion)

## RESULTS

Out of 140 samples 114 (81.43%) had positive culture. out of 114 cases 64 (56.14%) were male. Out of 114 positive cases 37 (32.45%) patients were in the age group of 0-14 years, 35 (30.70%) patients were in the age group

of 15-29 years, 31 (27.19%) were in the age group of 30-44 years and 11 (9.64%) patients were in the age group of 48 years and more. Maximum cases were seen the 0-14 years age group (Table 1).

**Table 1: Distribution of positive cases according to age group.**

Age group	Male	Female	Total
0-14	19 (16.66%)	18 (15.78%)	37 (32.45%)
15-29	25 (21.92%)	70 (8.77%)	35 (30.70%)
30-44	15 (13.15%)	16 (14.04%)	31 (27.19%)
48 and above	5 (4.38%)	6 (5.26%)	11 (9.64%)
Total	64 (56.14%)	50 (43.85%)	114

Out of 114 positive cases of otitis media single organism was isolated in 99 (86.8%) cases. Two organisms were isolated in 15 (13.2%) cases. Out of total 116 strains 44 (37.9%) were gram positive and 72 (62.1%) were gram negative organisms. Gram negative organisms were more isolated as compared to gram positive organisms.

Out of 44 strains of gram positive organisms, 28 (63.63%) were *Staphylococcus aureus*, 9(20.45%) were Coagulase negative *Staphylococci*, 5 (11.36%) were *Streptococcus pyogenes*, 1 case (2.27%) was *Streptococcus pneumonia* and 1 case (2.27%) was *Clostridium tetani*. Among gram positive organisms *Staphylococcus aureus* was predominant organisms isolated followed by coagulase negative *Staphylococci* (Table 2).

**Table 2: Distribution of gram positive organism.**

Organism	Number	Percentage
<i>Staphylococcus aureus</i>	28	63.63
Coagulase negative <i>Staphylococcus</i>	09	20.45
<i>Streptococcus pyogenes</i>	05	11.36
<i>Clostridium tetani</i>	01	2.27
<i>Streptococcus pneumonia</i>	01	2.27
Total	44	100.0

**Table 3: Distribution of gram negative organism.**

Organism	Number	Percentage
<i>Pseudomonas</i>	50	69.44
<i>Proteus mirabilis</i>	10	13.88
<i>Proteus vulgaris</i>	05	06.94
<i>E.coli</i>	04	05.55
<i>Klebsiella</i>	03	04.16
Total	72	100.00

Out of total 72 number of gram negative organism isolated 50 (69.44%) were *Pseudomonas*, 10 (13.88%) were *Proteus mirabilis*, 5 (6.94%) were *Proteus vulgaris*, 4 (5.55%) were *E.coli* and 3 (4.16%) were *Klebsiella*.

Among gram negative organism *Pseudomonas* was predominant organisms isolated followed by *Proteus* species (Table 3). *Staphylococcus aureus* and *Pseudomonas sp.* together account for about 67.24 % of cases.

## DISCUSSION

In our study, Majority of the patients (30.70%) were less than 14 years of age, which is in agreement with the previous literature.<sup>10,11</sup> In contrast, Loy et al showed the increased prevalence of otitis media in 30 - 40 years age in his study.<sup>12</sup> In our study, 56.14% were males. Thus males were affected more in our study which is in accordance with Ahmed et al who showed 57.3% male and 42.7% female affected by otitis media but differ from.<sup>7</sup> Loy et al, in our study monomicrobial growth was seen in 86.8% of cases, which is similar to the previous study by Agarwal et al.<sup>12,13</sup> In our study, 26 samples (18.57%) showed no growth. This was differ from Vijaya et al who found 5.28% sterile samples in their study whereas Fatma et al (16.9%) and Chakraborty et al (12.6%) found higher percentage of culture negative samples in their studies.<sup>14-16</sup>

In our study among gram positive organisms, *Staphylococcus aureus* (63.63%) was predominant organisms isolated followed by coagulase negative *Staphylococci* (20.45%) and among gram negative organism *Pseudomonas* (69.44%) was predominant organisms isolated followed by *Proteus* species. Taneja Mansi et al had isolated *S. Aureus* as the most common organism in their study, but the percentage of isolation (33.3%) was lesser when compared to our study.<sup>17</sup> Kuchal et al also showed that in his study in 75 patients, *S. aureus* was the most common isolate followed by *Pseudomonas sp.*<sup>18</sup> Shyamala et al also has found out that these two were the predominant organisms isolated from the otitis media cases.<sup>19</sup> Sharma et al reported *Pseudomonas* in 36% cases.<sup>20</sup> In our study, *Staphylococcus aureus* and *Pseudomonas sp.* together account for about 67.24 % of cases, which is in accordance with the study by Aslam et al.<sup>21</sup>

## CONCLUSION

*Staphylococcus aureus* and *Pseudomonas sp.* were found to be the common bacterial causes of otitis media in our study.

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