

Original Research Article

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Bacteriological Study of Patients with Otitis Media Attending Tertiary Care Hospital

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ABSTRACT

Keywords

Otitis media, Ear swabs, Antibiogram, Antibiotic resistance

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Otitis media is a major health problem and occurs with high incidence and prevalence in both developed and developing countries. This study was undertaken to determine etiological agents of the otitis media and their antimicrobial susceptibility patterns. Ear swabs collected from clinically diagnosed otitis media were subjected to microbiological investigations. Their antibiogram was determined by Kirby-Bauer disc diffusion method. Out of 248 ear swabs processed 198 (81.8%) samples showed growth of various bacteria. 113 (53.3%) gram positive and 99 (46.7%) gram negative bacteria were isolated. This study shows the rate of isolation of various organisms from the ear swabs and their tendency towards antibiotic resistance.

Introduction

Otitis media is an inflammatory condition of the middle ear (Richard, 2015). It is the most common disease of childhood after viral upper respiratory tract infections (Paul *et al.*, 2015). These upper respiratory tract infections, often viral, are most commonly responsible for the events that lead to otitis media. Such infections impair the function of the Eustachian tube, creating a negative pressure and transduction into the middle ear (John and Duana, 2005).

Bacterial contamination results by reflux from the oropharynx and this leads to further accumulation of fluid and pus, producing an

acute or sometimes chronic illness. Acute infections are caused by respiratory viruses and by certain bacteria *Streptococcus pneumoniae*, *Moraxella catarrhalis*, *Hemophilus influenzae*. When the infection becomes chronic, facultative aerobic gram negative bacilli, anaerobic bacteria and fungi assume a prominent role in a polymicrobial infection (Elmer *et al.*, 2006).

Concern is increasing about community strains of MRSA as an emerging etiological agent (Richard, 2015). The infectious and non-infectious complications of otitis media in childhood can result in serious morbidity. These are the major cause of hearing loss throughout the world. The frequency of

etiologic agents in ear infection and their resistance pattern varies among populations.

Hence this study was undertaken to know the various etiological agents in ear infection and their antimicrobial susceptibility pattern.

Materials and Methods

This study was conducted over a period of 12 months from January 2017 to December 2017 at Alluri Sitaramaraju Academy of Medical Sciences, Eluru, on 242 clinically diagnosed otitis media cases to determine bacterial etiologies and their antimicrobial susceptibility patterns. Both inpatients and outpatients of all age groups and both sexes were included in the study.

Samples were collected aseptically using sterile swabs and transported to the laboratory without delay.

Processing of ear swabs for culture and sensitivity

The ear discharge samples were cultured on MacConkey agar, blood agar and incubated aerobically at 37 °C for 24-48 hrs. Emergent colonies of bacterial pathogen were preliminarily characterized by colony morphology, gram stain and species identification as per the standard microbiological methods. (Patricia, 2014; Gerald Collee *et al.*, 2012) Antibiotic susceptibility pattern done on MHA by Kirby Bauer disc diffusion method according to CLSI guidelines (Franklin *et al.*, 2012).

Results and Discussion

A total of 242 ear swabs were received for culture and sensitivity during the period of study, of them 64 were inpatients and 178 were outpatients. Of the total 120 (49.6%) were males and 122 (50.4%) were females. Of them 44 (18.2%) samples showed no growth of organisms and 198 (81.8%) samples showed growth of various bacteria. 81.3% of inpatients and 82% of outpatients showed culture positivity. No major difference was noted among both groups.

Distribution of samples and their positivity (Table 1)

A total of 212 organisms were isolated from 198 samples. 14 (7.1%) samples in our study showed polymicrobial etiology and 184 (92.9%) samples showed monomicrobial etiology.

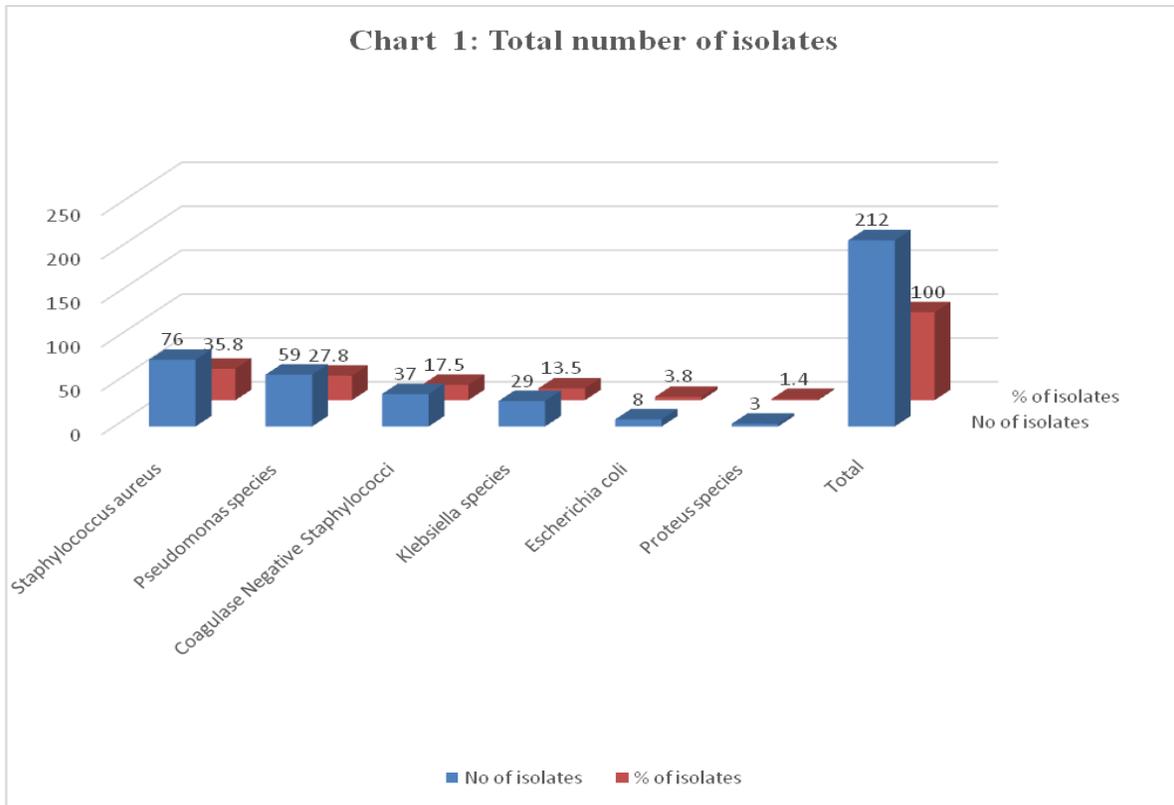
Our study showed predominance of monomicrobial etiology. Our study showed predominance of gram positive organisms 113 (53.3%) in comparison with gram negative organisms 99 (46.7%).

Rate of isolation of various organisms shown in chart -1

Otitis media is a common reason for very young children to seek medical treatment. In spite of the widespread use of antimicrobial therapy for otitis, acute mastoiditis remains the most common suppurative complication of acute otitis media.

Table.1 Distribution of samples

	Total samples	Sterile	Culture positive	% of culture positives
Inpatients	64	12	52	81.3
Outpatients	178	32	146	82.1
Total	242	44	198	81.8



Culture positivity in our study is 81.8% which is similar to the one reported by Derese Hailu *et al.*, that is 80.4%. (Derese Hailu *et al.*, 2016) Whereas Dagnachew Muluye *et al.*, reported 89.5% of culture positives, slightly higher than that reported by our study. (Muluye *et al.*, 2013) On the other hand Mohit Agarwal *et al.*, reported only 53.8% culture positivity. (Agrawal *et al.*, 2017) 7.1% samples in our study showed polymicrobial etiology and 92.9% samples showed monmicrobial etiology which is similar to the study conducted by Dagnachew Muluye *et al.*, 9.3% and 90.7% (Muluye *et al.*, 2013) and Mesfin Worku *et al.*, 7% and 94% (Worku *et al.*, 2014). Our study showed higher isolation of gram positive organisms 53.3% in comparison with gram negative organisms 46.7%. *Staphylococcus aureus* is the predominant organism in our study constituting 35.8% which is similar to the study conducted by Neeti Mishra *et al.*, that is 34.7% (Neeti Mishra *et al.*, 2014) and Humera Rashid *et al.*, that is 31% (Humera

Rashid *et al.*, 2014). *Pseudomonas* was the second common organism isolated in our study constituting 27.8% which is similar to Neeti Mishra *et al.*, that is 30.4% whereas Mohit Agarwal *et al.*, reported 65.18% isolation of *Pseudomonas* much higher than the one reported by us. Antibiotic sensitivity pattern of gram positive organisms isolated revealed linezolid, amikacin, ciprofloxacin, erythromycin, cefotaxime as the most sensitive antibiotics in that order whereas amoxicillin and clavulanic acid showed high level of resistance to these organisms. Gram negative organisms showed high level of sensitivity to amikacin followed by ciprofloxacin, piperacilin, cefotaxime, whereas amoxicillin clavulanic acid and ampicillin showed higher resistance among organisms.

In conclusion rate of isolation of bacteria was high in patients with otitis media in our study. A predominance of gram positive organisms was noted in comparison to gram negative

organisms. Isolates showed good sensitivity to amikican and ciprofloxacin. Therefore, culture and susceptibility test is vital for appropriate management of ear infection.

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