 DOI: 10.18231/2455-6807.2016.0005

Mycological profile of chronic suppurative otitis media in a tertiary care center in Rajasthan

Ramesh Agrawal[1*], Riddhi Pradhan[2], P.K. Khatri[3], Harshada Shah[4], Yogyata Marothi[5]

[1,2]Assistant Professor, [3,4]Professor & Head, [5]Professor, Dept. of Microbiology, [1,2,4,5] R.D. Gardi Medical College, Ujjain, [3]S.N. Medical College, Jodhpur

***Corresponding Author:**
Email: drrameshagrawal22@gmail.com

Abstract

Introduction: Chronic Suppurative Otitis Media is a major health problem in developing countries because of poor nutrition, improper hygiene and lack of health education. Due to advent of newer and sophisticated antibiotics, the microbiological flora is changing constantly.

Aims: The present study was aimed to identify fungal isolates associated with Chronic Suppurative Otitis Media and their anti-fungal susceptibility pattern in CSOM patients. Material and Method: The study was conducted in Department of Microbiology, Dr. S. N. Medical College & associated hospital, Jodhpur Rajasthan. Two pus swabs were collected with sterile cotton swabs from CSOM patients attending ENT OPD. Isolation and identification of fungal isolates were done by standard phenotypic microbiological procedure.

Results & Observations: Out of 150 cases 91.3% was culture positive and 8.7% were culture negative. Out of total 78% patients already received antibiotic treatment while remaining 22% patients did not receive any treatment. Incidence of fungal isolates among positive culture was 10 (7.2%), Out of 10 fungal isolates 60%were identified as Aspergillus niger, 10% was Aspergillus fumigates and 30% was the Candida albicans. Candida albicans was most resistant to Fluconazole 2/3 (66.6%) followed by (33.3%) resistant to Clotrimazole, Miconazole & Voriconazole and least resistant (0%) was seen to the Ketoconazole; Nystatin & Amphotericin B.

Conclusion: Fungal agent was found the cause of CSOM in present study because prolonged use of broad spectrum antibiotics and / or steroid ear drops may cause suppression of the bacterial flora and the subsequent emergence of fungal flora.

Keywords: CSOM, Ear discharge, fungal isolates, anti-fungal sensitivity.

Introduction

Chronic Suppurative Otitis Media (CSOM) is a condition of the middle ear that is characterized by persistent or recurrent discharge of three months or more through a perforation of the tympanic membrane.(1) CSOM is a major health problem in developing countries because of poor nutrition, improper hygiene and lack of health education. In CSOM cases superimposed fungal infection has been increasing in the recent years because of the excessive use of broad spectrum antibiotics, corticosteroids and cytotoxic chemotherapy and an increase in the number of immune deficiency conditions.(2) The most commonly isolated fungi from CSOM was Candida and Aspergillus species, but they also varies between the different geographical areas.(3) The azoles are broad-spectrum anti-fungal agents with a complex ringed structure and the most effective azole drugs are; ketoconazole, fluconazole and itraconazole, which are used orally and topically.(4) Candida albicans mutations in the ergosterol biosynthetic pathway and resistance to several anti-fungal agents such as fluconazole have been reported.(5)

Consequently, this study was aimed at investigating the fungal isolates associated with CSOM and determines their susceptibility to some commercially available anti-fungal drugs.

Material and Methods

All patient specimens are collected and analyzed at the microbiological laboratory of the Dr. S. N. Medical College Jodhpur. Two ear swabs sample were collected from CSOM patients attending ENT OPD. First swab was used for Gram's staining (for observing any yeast cells) and KOH mount (for fungal hyphal structure). The second swab sample was culture on Sabouraud Dextrose Agar slopes or plates. All plates of SDA were incubated aerobically for 3-7 days at 37°C for yeast (Candida) and 22-25°C for moulds. After incubation, cultures were examined for significant growth. For confirmation of true fungal infection these plates are subcultures onto freshly prepared Sabouraud Dextrose Agar (SDA) supplemented with chloramphenicol (10µg) to act as a bactericidal agent and aerobically incubated for another 3-7 days.

Isolation, identification and characterization of fungal isolate were done by culture characterization, morphologic features, germ tube test, lactophenol cotton blue preparation, slide culture and sugar fermentation test.

Results & Observations

Out of total 150 cases 91.3% were culture positive and 8.7% was culture negative. Out of these 58% were male and 42% female. The age of the participants ranged from1 to 60 years. Out of 150 cases 117 (78%) patients

already received antibiotic treatment while remaining 33 (22%) patients did not receive any treatment. Among culture positive cases 104/137 (75.9%) patients received prior antimicrobial treatment and 33/137 (24.1%) cases not receive any antimicrobial treatment. The incidence of receiving Antibiotic for CSOM was highly significant statistically (p = 0.0004). A total of 139 (129 bacterial & 10 fungal isolates) organisms were obtained from 137 culture positive samples. Most of isolates were mono-microbial (90%) and only 2 (1.34%) was polymicrobial, Out of which 1 culture revealed combination of two bacteria and 1 culture possessed mixed growth one bacterium with one fungus. The combination being that of Staphylococcus aureus with micrococcus and another one is Staphylococcus aureus with Aspergillus Niger. Incidence of fungal isolates among positive culture was 10 (7.2%), Out of 10 fungal isolates 6 (60%) were identified as Aspergillus Niger, 1 (10%) was aspergillus fumigates (Fig. 2) and 3 (30%) was the Candida albicans (Fig. 1). Candida albicans was most resistant to Fluconazole 2/3 (66.6%) followed by (33.3%) resistant to Clotrimazole, Miconazole & Voriconazole and least resistant (0%) was seen to the Ketoconazole; Nystatin& Amphotericin B (Table 2 & Graph 2). It was revealed that Amphotericin B, Itraconazole, Ketoconazole and Nystatin were the most effective anti-fungal drugs and Fluconazole had the poorest activity against Candida species isolated in our study.

Table 1: bacterial and fungal isolate among total isolated microorganism

Microorganism	Number	Percentage
Bacterial	129	92.8%
Fungal	10	7.2%
Total	139	100%

Table 2: Antifungal resistance pattern of the fungus isolated from CSOM cases

Antifungal agent	Candida species (n=3)	
	No.	%
Amphotericin B	0	0
Clotrimazole	1	33.3
Fluconazole	2	66.7
Itraconazole	0	0
Ketoconazole	0	0
Miconazole	1	33.3
Nystatin	0	0
Voriconazole	1	33.3

Graph 2: Antifungal sensitivity of Candida albicans

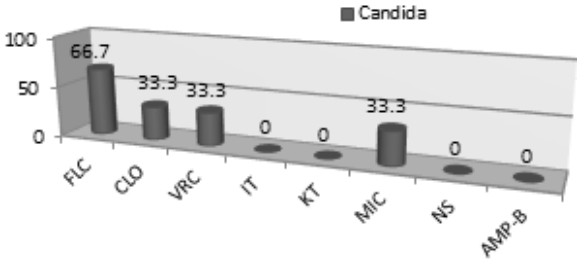

Fig. 1 :Gram Staining showing Candida albicans

Fig. 2: LPCB showing Aspergillus fumigatus

Discussion

In our study 8.7% of the cultures did not yield any microbial growths this was accordance with Bansal et al.[6] In our study Mono-microbial growth was seen in 90% of cases, which was similar to the previous studies done by Muluye et al.[7] Availability and use of topical and Systemic broad spectrum antibiotics in the period before consultation was probably responsible for the lower incidence of mixed infection. In our study fungus was isolated in 7.2% of the cases; this is consistence with the previous study by Rao et al.[8] Aspergillus was isolated in 7 cases (70%), of which maximum number 6 (60%) of strains being Aspergillus Niger and 1 (10%) were aspergillus fumigatus and Candida albicans was in 3 (30%) cases, similar finding observed in study done by Prakash et al.[9] This may be attributed to the

environmental effect (hot and humid) on the cases of otitis media which were studied in this area. Evaluation of Microbiological pattern in local area becomes helpful in prescribing empirical antibiotics for successful treatment of Otitis Media and thus minimizing its complications and emergence of resistant strains. Unusual prevalence of fungi in this study could be explained by an excessive and uncontrolled use of antibiotics.

The sensitivity pattern of fungal isolates obtained from CSOM patients showed variable percentages of sensitivities. In our study Fluconazole was the most resistance antifungal agent for Candida species this was consistence with the Cruenca-Estrella et al[(10)] whereas Amphotericin B, Itraconazole, Ketoconazole and Nystatin was the most susceptible agent.

In present study Voriconazole was susceptible to 66.7% this finding was accordance to O.J. Akinjogunla et al.[(11)]

Therefore evaluation of Mycological profile and antifungal sensitivity pattern in local area becomes helpful in prescribing empirical successful treatment of otitis media and thus minimizing its complications and emergence of resistant strains.

Conclusion

Fungal agent was found the cause of CSOM in present study because prolonged use of broad spectrum antibiotics and/ or steroid ear drops may cause suppression of the bacterial flora and the subsequent emergence of fungal flora. Aspergillus species was the mostly isolated fungal isolates of which A Niger predominated. Fluconazole was the most resistant anti-fungal agent of our study because it is prescribing routinely.

Ethical Consideration

Ethical committee approval was received for this study from the Institutional Review Board of Ethical committee.

References

1. Yousuf A, Malik M, Shamas IU, Beigh Z, Kumari S, Pampori PRA. Bacteriological profile of ear discharge and their antibiotic sensitivity in chronic suppurative otitis media in Kashmir, India. Bangla J of Med Sci2012;11(03):212-216.
2. Saraswati Jayanthi R1, Venkatesh R2, Jeya M3-Study of aerobic bacterial and fungal etiology of chronic suppurative otitis media in tertiary care hospital in out skirts of Chennai, India, international journal of research in health science. Oct–Dec 2013 Volume-1, Issue-3.
3. Srivastava A, Singh RK, Varshney S, Gupta P, Bist SS, Bhagat S and Gupta N. Microbiological evaluation of an active tubotympanic type of chronic suppurative otitis media. Nepalese Journal of ENT Head and Neck Surgery 2010;1(2):14-6.
4. Talaro, K.P., Talaro, A., 2002. Foundations in Microbiology. (4th edn). McGraw-Hill companies, Inc, New York. Pp899.
5. Sanglard, D., Ischer, F., Parkinson, T., Falconer, D., Bille, J.,2003. Candida albicans mutations in the ergosterol biosynthetic pathway and resistance to several antifungal agents. Antimicrob. Agents Chemother. 47,2404-241.
6. Bansal Sulabh, OjhaTarun, Kumar Suresh, Singhal Amit, Vyas Pratibha, Changing Microbiological Trends In Cases Of Chronic Suppurative Otitis Media Patients, Int J Cur Res Rev, Aug 2013/ Vol 05(15)Page76.
7. DagnachewMuluye,YitayihWondimeneh,GetachewFered e,FelekeMogesandTesfayeNega, Bacterial isolates and drug susceptibility patterns of ear discharge from patients with ear infection at Gondar University Hospital, Northwest Ethiopia, BMC Ear, Nose and Throat Disorders 2013,13:10 doi:10.1186/1472-6815-13-10.
8. V.Rama Chandra Rao, K. Srilatha, S. Visweswara Rao, K. N. Manohar. "Microbiological Study of Ear Discharge and their Antibiotic Sensitivity Pattern in Chronic Suppurative Otitis Media". Journal of Evolution of Medical and Dental Sciences 2014;Vol. 3, Issue 49, October 02; Page: 1169811705, DOI: 10.14260/jemds /2014/3537.
9. Rajat Prakash, Deepak Juyal, Vikrant Negi, Shekhar Pal, Shamanth Adekhandi, Munesh Sharma, and Neelam Sharma, Microbiology of Chronic Suppurative Otitis Media in a Tertiary Care Setup of Uttarakhand State, India, N Am J Med Sci. Apr 2013;5(4):282–287. doi: 10.4103/1947-2714.110436.
10. Cruenca-Estrella, M., Ruiz-Diez, B., Martinez-Suarez, J.V., Monzon, A., Rodriguez-Tudela, J.I., 1999. Comparative In-Vitro Activity of Voriconazole (Uk-109, 496) and six other antifungal agent against clinical isolates of Scedosporium prolificans and Scedosporium apiospermum. J. Antimicro Chem. 43,149-151.
11. O.J. Akinjogunlaa,* and N.O. Eghafonab, Mycological investigation in patients with acute otitis media, Scientific Journal of Microbiology (2012)1(1)19-26.