

EVALUATING THE CLINICAL CHARACTERISTICS, METHODS OF DIAGNOSIS, AND MODES OF THERAPY FOR INDIVIDUALS WITH SECRETORY OTITIS MEDIA

Dr. Lokesh Bhalot,¹ Dr. Madhvi Maheshwari,² Dr. Rajendra Bharti,³ Dr. Shirin Ansari^{4*}

¹MBBS MS, Assistant Professor, Department Of Otorhinolaryngology, Government Medical College, Ratlam, Madhya Pradesh

²MBBS, MS, Junior Resident, Department Of Otorhinolaryngology, Government Medical College, Ratlam, Madhya Pradesh

³MBBS, MS, Junior Resident, Department Of Otorhinolaryngology, Government Medical College, Ratlam, Madhya Pradesh

^{4*}MBBS, MS, Senior Resident, Department Of Otorhinolaryngology, Government Medical College, Ratlam, Madhya Pradesh

Corresponding Author: Dr. Shirin Ansari

Email id: shirinansari25@gmail.com

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ABSTRACT

Background: Otitis medium (SOM) is a frequent hearing impairment that pediatric otologists treat. It is characterized by an effusion in the middle ear cavity due to a change in the mucociliary system of the middle ear and Eustachian tube.

Objectives: The goal of the current study was to evaluate the clinical characteristics, methods of diagnosis, and available treatments for individuals with secretory otitis media.

Methods: The 60 participants in this study, all of whom had a confirmed diagnosis of secretory otitis media and were at least 13 years old, underwent a clinical examination after a thorough history and demographic assessment. In addition to radiographic examination, urine investigations, impedance audiometry, pure tone audiometry, urine examination, and blood investigations, the throat, nose, ET function, TFT, and ears were evaluated for a comprehensive otolaryngological evaluation. DNE (diagnostic nasal endoscopy) and ear effusion microbiological testing was done. All individuals received medical therapy for four weeks. Surgical procedures such as adenotonsillectomy with grommet insertion, adenoidectomy with grommet insertion, and myringotomy with grommet insertion were used to treat refractory instances.

Results: According to the study's findings, the majority of participants' secretory otitis media symptoms and indicators significantly improved. Adenotonsillectomy and adenoidectomy with grommet insertion patients showed better clinical results in terms of hearing threshold. After grommet implantation, atelectasis alterations and mucopurulent discharge were the most frequent postoperative problems seen.

Conclusion: The current study comes to the conclusion that parents' concerns about their child's hearing patterns should remain a priority, particularly for those participants who have recently had secretory otitis media.

Keywords: Hearing loss, hearing disability, secretory otitis media (SOM), otologist, tympanometry

INTRODUCTION

One of the most common causes of hearing difficulty and admission electively to the hospital for surgery during childhood is secretory otitis media (SOM). It is known by various other names including non-suppurative otitis media and serous, seromucous, exudative, catarrhal, or OME (otitis media with effusion). However, the currently acceptable terms are otitis media with effusion and middle ear effusion as discussed at the International Symposia.¹

The SOM (Secretary Otitis Media) signifies effusion presence behind the intact eardrum with no symptom of acute inflammation. SOM is commonly seen in children of age 1-5 years. Most of the subjects having secretory otitis media are asymptomatic. The factors that may predispose to MEE (Middle ear effusion) include conditions that may affect the proper functioning of the mucociliary system of the upper respiratory tract. A clear relationship has been established between hearing impairment and middle-ear fluid. However, in young child subjects, hearing loss is not always seen.²

In addition to these manifestations, Secretary Otitis Media (SOM) can also manifest as behavioral issues, learning delays, speech, language, or educational problems. When a kid is 7-9 months old, 3 years old, or older and starting school, a standard checkup and screening may reveal hearing loss for the first time. Impaired or delayed communication abilities resulting from recurrent occurrences of Secretary Otitis Media may cause behavioral or educational challenges. Tympanometry is often used to confirm secretory otitis media, and an otoscopic examination is used to diagnose the condition. A small number of individuals exhibit spontaneous remission of SOM after receiving treatment for respiratory tract infections.

Adenoidectomy or ventilation tube are the surgical methods used in failure or refractory situations. In babies, otitis media with effusion (OME) is the most often identified cause of hearing loss. OME often manifests as a straightforward ailment; yet, if misdiagnosed or left untreated, OME might result in avoidable long-term effects. High suspicion, an accurate and timely diagnosis, prompt therapy, and attentive monitoring are therefore essential to support the management modalities and strategies.⁴ Therefore, the goal of the current study was to evaluate the clinical characteristics, methods of diagnosis, and modes of therapy used in participants suffering from secretory otitis media. In order to prevent irreversible hearing loss, the study also concentrated on the disease's risk factors and symptoms.

MATERIAL AND METHODS

In order to evaluate the clinical characteristics, diagnostic strategies, and treatment methods in people with secretory Otitis media, the current prospective clinical investigation was carried out. The study also focused on the risk factors and symptoms of the disease to avoid permanent hearing loss. The study was carried out at Department Of Otorhinolaryngology, Government Medical College, Ratlam, Madhya Pradesh. A total of sixty participants with secretory otitis media, of both genders, who are less than 13 years old, are included in the research.

After screening 1586 participants for the current study, 60 participants with otitis media who were 13 years of age or younger were ultimately enrolled. All research subjects' parents gave their informed permission after being fully told about the study's design. Following the research subjects' final inclusion, each patient had a thorough history taken, and then a clinical examination was conducted. On the completed structured proforma, the demographic

information included the age, gender, clinical characteristics, and medical history of each research participant.

Following a thorough history taking, each research participant underwent a general physical examination, otolaryngological examination, and systemic examination. Aside from the systemic tests of the central nervous system, gastrointestinal system, cardiovascular system, and respiratory system, all participants received assessments of lymphadenopathy, hydration, clubbing, cyanosis, icterus, and pallor. Every patient underwent an otolaryngological examination, which included examinations of the throat, nose, ET function, TFT, and ears. Additionally, urine investigations, impedance audiometry, pure tone audiometry, urine examinations, and blood investigations were conducted. Microbiological tests for ear effusion and diagnostic nasal endoscopy (DNE) were performed. Every subject received medical care for four weeks. Surgical intervention was used to address instances that did not respond to medicinal therapy.

A mixture of nasal decongestants, steroids, antihistaminic medications, and antibiotics were used in the empirical therapy. Once secretory otitis media was definitively diagnosed, the fluid was aspirated and submitted to the laboratory for sensitivity and culture. Three surgical modalities—adenotonsillectomy with grommet insertion, adenoidectomy with grommet insertion, and myringotomy with grommet insertion—were employed in the refractory patients after four weeks.

Using SPSS software version 21 (Chicago, IL, USA) for statistical assessment and one-way ANOVA and t-test for result formulation, the gathered data were examined. The data were presented as a mean, standard deviation, percentage, and number. At $p < 0.05$, the significance threshold was maintained.

RESULTS

In order to evaluate the clinical characteristics, diagnostic strategies, and treatment methods in people with secretory Otitis media, the current prospective clinical investigation was carried out. In order to prevent irreversible hearing loss, the study also concentrated on the disease's risk factors and symptoms. There are sixty patients in all, both male and female, with secretory otitis media and ages less than or equal to thirteen. There were 43 men and 17 women in the research. Most research participants were between the ages of eight and ten. Ear discharge, earache, bubbling sound, tinnitus, hearing impairment, and fullness in the ear were the symptoms in the research subjects, whereas air bubble fluid, air bubble motions, the prominent handle of the malleus, and fluid discharge were the indicators.

56.6% (n=34) of the research participants had a Type C tympanometry pattern, followed by Type B in 36.6% (n=22) and Type A in 6.66% (n=4). Regarding tuning fork test mobility, 1.6% (n=1) of the individuals showed the normal test in the right ear, and 3.33% (n=2) in the left ear. In 80% (n=48) right ears and 81.6% (n=49) left ears, conductive hearing loss was observed; in 18.33% (n=11) right ears and 13.3% (n=8) left ears, it was inconclusive; in 6.66% (n=4) right ears and 5% (n=3) left ears, it was absent in 10% (n=6) right ears and 11.6% (n=7) left ears; and in 83.3% (n=50) right and left ears combined (Table 1).

After analyzing the distribution of the study subjects according to the culture results, it was observed that the study subjects' chosen treatment modality was medical management in 16.66% (n=10) of the cases, myringotomy + grommet insertion in 15% (n=9) of the cases,

adenotonsillectomy + grommet insertion in 28.3% (n=17) of the cases, and medical management in 40% (n=24) of the cases. As indicated in Table 2, the examination of the culture report revealed no growth in 43.3% (n=26) of the participants, diphtheroids in 11.66% (n=7) of the subjects, *Nisseria catarrhalis* in 5% (n=3) of the research subjects, *Hemophilus influenza* in 11.66% (n=7) of the study subjects, and streptococcus pneumonia in 28.33% (n=17) of the study subjects.

When the study subjects' symptoms were compared based on the culture reports, it was found that 75% (n=24) of the study subjects and 60.71% (n=17) of the culture-negative subjects had ear discharge, 50% (n=16) of the culture-positive subjects and 60.71% (n=17) of the culture-negative subjects had earache, 18.75% (n=6) of the culture-positive subjects and 39.28% (n=11) of the culture-negative subjects had bubbling sounds, 12.5% (n=4) of the study subjects and no culture-negative subjects had hearing difficulties, and 6.25% (n=2) of the culture-positive subjects had ear fullness.

Tinnitus was reported in 46.87% (n=15) culture-positive study subjects and in 42.85% (n=12) culture-negative study subjects. This was statistically significant with higher in culture-positive subjects with $p=0.02$ (Table 3).

In Table 4, it is evident that the assessment of the Tympanostomy effect with adenotonsillectomy/adenoidectomy on air conduction pure tone mean audiometry at 0.5, 1, 2, and 4 kHz showed that, for the left ear ACdBHL, the mean value preoperatively was 26.71 ± 6.03 and that it significantly decreased to $16.63\pm 4.16a$ at 2 months postoperatively and further decreased to $16.12\pm 3.3a$ 6 months postoperatively. This was statistically significant at both intervals with $p<0.001$. In addition, the right ear ACdBHL had a mean value preoperatively of 26.56 ± 5.91 , which significantly decreased to $16.52\pm 4.05a$ and $15.82\pm 3.80a$ at 2 months and 6 months postoperatively.

DISCUSSION

In order to evaluate the clinical characteristics, diagnostic strategies, and treatment methods in people with secretory Otitis media, the current prospective clinical investigation was carried out. In order to prevent irreversible hearing loss, the study also concentrated on the disease's risk factors and symptoms. There are sixty patients in all, both male and female, with secretory otitis media and ages less than or equal to thirteen.

There were 43 men and 17 women in the research. 56.6% (n=34) of the research participants had a Type C tympanometry pattern, followed by Type B in 36.6% (n=22) and Type A in 6.66% (n=4). Regarding tuning fork test mobility, 1.6% (n=1) of the individuals showed the normal test in the right ear, and 3.33% (n=2) in the left ear.

In 80% (n=48) right ears and 81.6% (n=49) left ears, conductive hearing loss was observed; in 18.33% (n=11) right ears and 13.3% (n=8) left ears, it was inconclusive; in 6.66% (n=4) right ears and 5% (n=3) left ears, it was absent in 10% (n=6) right ears and 11.6% (n=7) left ears; and in 83.3% (n=50) right and left ears combined. These findings aligned with the research conducted by Boonacker CW et al. (2014) and Atkinson H et al. (2015), whose authors observed comparable tympanometry patterns in their individuals.

Regarding the evaluation of the research participants' distribution according to the cultural findings, Medical management was used as the study subjects' primary treatment modality in 16.66% (n=10) of the cases, followed by myringotomy + grommet insertion in 15% (n=9), adenotonsillectomy + grommet insertion in 28.3% (n=17) of the cases, and adenotonsillectomy + grommet insertion in 40% (n=24) of the cases. A review of the culture reports revealed that 43.3% (n=26) of the individuals had no growth, 11.66% (n=7) had diphtheroids, 5% (n=3) had *Neisseria catarrhalis*, 11.66% (n=7) had *Hemophilus influenza*, and 28.33% (n=17) had *Streptococcus pneumonia*. These outcomes corroborated those of Griffin G et al.⁷ (2011) and Kucur C et al.⁸ (2015), whose authors reported comparable treatment techniques and cultural practices as those of the current investigation.

Based on the culture reports, the study subjects' symptoms were compared. It was found that 75% (n=24) of the study subjects and 60.71% (n=17) of the culture-negative subjects had ear discharge, 50% (n=16) of the culture-positive subjects and 60.71% (n=17) of the culture-negative subjects had earache, 18.75% (n=6) of the culture-positive subjects and 39.28% (n=11) of the culture-negative subjects had bubbling sound, 12.5% (n=4) of the study subjects and no culture-negative subject had hearing difficulties, and 6.25% (n=2) of the culture-positive subjects had ear fullness. These findings were statistically non-significant with $p=0.2$.

42.85% (n=12) of the research participants who were culture-negative and 46.87% (n=15) of the study subjects who were culture-positive reported having tinnitus. At $p=0.02$, this was statistically significant and greater in those who tested positive for culture. These findings were in line with research by Kasemodel ALP et al.⁹ in 2020 and Zhang X et al.¹⁰ in 2019, which found that study participants had symptoms that were similar to those reported in culture reports, as the current study does.

Regarding the evaluation of the impact of tympanostomy combined with adenotonsillectomy/adenoidectomy on air conduction pure tone mean audiometry at 0.5, 1, 2, and 4 kHz, it was observed that the mean value for left ear ACdBHL was 26.71 ± 6.03 prior to surgery, which significantly decreased to $16.63\pm 4.16a$ at two months after surgery, and then to $16.12\pm 3.3a$ at six months.

With $p<0.001$, this was statistically significant at both periods. The mean value of the right ear ACdBHL was 26.56 ± 5.91 prior to surgery. It dramatically decreased to $16.52\pm 4.05a$ and $15.82\pm 3.80a$ at 2 and 6 months after surgery, respectively. Both time intervals showed statistical significance with $p<0.001$. These results were equivalent to those of research conducted in 2017 by Tahtinen PA et al. and in 2013 by Paradise JL et al., when kid participants underwent pure tone audiometry (PTA) and produced results similar to those of the current study.

CONCLUSION

The present study had a few limitations including a small sample size, shorter monitoring period, and geographical area biases. Hence, more longitudinal studies with a larger sample size and longer monitoring period will help reach a definitive conclusion. The current study, although acknowledging its limitations, comes to the conclusion that parents should continue to be

concerned about their child's hearing patterns, particularly in cases when the patient has recently had secretory otitis media.

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TABLES

Test	Results	%	N
Tympanometry pattern	Type A	6.66	4
	Type B	36.6	22
	Type C	56.6	34
		Right ear n=60 (%)	Left ear n=60 (%)
Tuning fork test Mobility	Normal	1 (1.6)	2 (3.33)
	Conductive hearing loss	48 (80)	49 (81.6)
	Inconclusive	11 (18.33)	8 (13.3)
	Normal	4 (6.66)	3 (5)
	Absent	6 (10)	7 (11.6)

	Restricted	50 (83.3)	50 (83.3)
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Table 1: Tympanic membrane mobility as assessed on Tuning fork test and Pneumatic Otoscopy

Parameter	%	N
Treatment modalities		
Medical management	16.6	10
Myringotomy + Grommet insertion	15	9
Adenoidectomy + Grommet insertion	28.3	17
Adenotonsillectomy + Grommet insertion	40	24
Culture reports		
No growth	43.3	26
Diphtheroid	11.66	7
Nisseria catarrhalis	5	3
Hemophilus Influenza	11.66	7
Streptococcus pneumonia	28.33	17

Table 2: Distribution of the study subjects based on the culture results

Symptoms	Culture positive (n=32) (%)	Culture negative (n=28)(%)	p-value
Ear discharge	24 (75)	17 (60.71)	0.5
Earache	16 (50)	17 (60.71)	0.2
Bubbling sound	6 (18.75)	11 (39.28)	0.6
Tinnitus	15 (46.87)	12 (42.85)	0.02
Hard of Hearing	4 (12.5)	0	0.6
Ear fullness	2 (6.25)	0	0.2

Table 3: Comparison of symptoms based on the culture results in the study subjects

ACdBHL	Preoperative	2 months postoperative	6 months postoperative	p-value at 2 months	p-value at 6 months
Lt. Ear ACdBHL (Mean± SD)	26.71±6.03	16.63±4.16 ^a	16.12±3.3 ^a	<0.001	<0.001
Rt. Ear ACdBHL (Mean± SD)	26.56±5.91	16.52±4.05 ^a	15.82±3.80 ^a	<0.001	<0.001

Table 4: Tympanostomy effect with adenotonsillectomy/adenoidectomy on air conduction pure tone mean audiometry at 0.5, 1, 2, 4 kHz