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ASSESSING THE CLINICAL FEATURES, DIAGNOSTIC APPROACHES, AND TREATMENT MODALITIES IN SUBJECTS WITH SECRETORY OTITIS MEDIA

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ABSTRCT

Background: One of the most common hearing difficulties encountered in children by otologists is SOM (secretory otitis media) which has a characteristic picture of effusion in the middle ear cavity owing to the alteration in the mucociliary system in the Eustachian tube and middle ear. **Objectives:** The present study was conducted to assess the clinical features, diagnostic approaches, and treatment modalities in subjects with secretory Otitis media. **Methods:** The present study included 60 subjects with a confirmed diagnosis of secretory otitis media of age <13 years where detailed history and demographics were noted followed by the clinical examination. For complete otolaryngological examination, throat, nose, ET function, TFT, and ear were assessed along with radiological examination, urine investigations, impedance audiometry, pure tone audiometry, urine examination, and blood investigations. DNE (diagnostic nasal endoscopy) and ear effusion microbiological testing was done. Medical treatment was given to all the subjects for 4 weeks, and refractory cases were managed with surgery including adenotonsillectomy with grommet insertion, adenoidectomy with grommet insertion, and myringotomy with grommet insertion. with grommet insertion and adenotonsillectomy with grommet insertion. **Results:** The study results showed that the majority of the subjects showed significant improvement in the symptoms and signs of the secretory otitis media. Better clinical outcomes were concerning hearing threshold were seen in subjects managed with adenoidectomy with grommet insertion and adenotonsillectomy. The most common postoperative complications seen were atelectasis changes and mucopurulent discharge following grommet insertion. **Conclusion:** The present study concludes that focus should be kept on the parental concern for hearing patterns in their child, especially in subjects with a recent history of 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 serious, 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]

Secretory Otitis Media (SOM) can also present itself as an educational problem, behavioral problem, learning delay, language difficulties, or speech difficulties. Hearing loss may first be diagnosed during routine examination and screening of child at age 7-9 months, 3 years, or later at schooling time. Behavioral or educational difficulties might result from impaired or delayed communication skills secondary to the persistent cases of Secretary Otitis Media. Secretory Otitis media is usually confirmed with tympanometry and is diagnosed by otoscopic examination. In a few subjects, SOM shows spontaneous resolution or following management of respiratory tract infections. In failure or refractory cases, surgical management is done with adenoidectomy or ventilating tube.[3]

Otitis media with effusion (OME) is the most common cause of hearing loss detected in infants. OME usually presents as a simple condition, however, if not diagnosed or remain untreated, OME can lead to long-term consequences that are preventable. Hence, high suspicion is vital along with accurate and early diagnosis and immediate treatment along with close follow-up to support the management techniques and modalities.[4] Hence, the present study was conducted to assess the clinical features, diagnostic approaches, and treatment modalities in subjects with secretory Otitis media. The study also focused on the risk factors and symptoms of the disease to avoid permanent hearing loss.

Materials and Methods

The present prospective clinical study was conducted to assess the clinical features, diagnostic approaches, and treatment modalities in subjects with secretory Otitis media. The study also focused on the risk factors and symptoms of the disease to avoid permanent hearing loss. The study was carried out at Haur, Uttar Pradesh after obtaining clearance from the concerned Ethical committee. The study includes a total of 60 subjects of both genders of age less than 13 years and with secretory otitis media.

For the present study, 1586 subjects were screened and 60 subjects were finally included who have otitis media in the age range of 13 years or less. After explaining the detailed study design, informed consent was taken from the parents of all the study subjects. After the final inclusion of the study subjects, detailed history was recorded for all the subjects followed by the clinical examination. The demographic data recorded were age, gender, clinical parameters, and history of all the study subjects on the performed structured proforma.

After detailed history recording, otolaryngological examination, systemic examination, and general physical examination were done for all the study subjects. Also, for all the subjects, lymphadenopathy, hydration, clubbing, cyanosis, icterus, and pallor were assessed along with various systemic examinations including the central nervous system, abdominal system, cardiovascular system, and respiratory system. The otolaryngological examination was done for all the subjects including throat, nose, ET function, TFT, and ear radiological examination, urine investigations, impedance audiometry, pure tone audiometry, urine examination, and blood investigations. DNE (diagnostic nasal endoscopy) and ear effusion microbiological testing was done. Medical treatment was given to all the subjects for 4 weeks. The cases that were refractory to the medical treatment were managed surgically.

Empirical treatment was done using a combination of nasal decongestants, steroids, antihistaminic drugs, and antibiotics. After the confirmed diagnosis of secretory otitis media, fluid was aspirated and sent for sensitivity and culture to the laboratory. The surgical modalities used in the refractory cases after 4 weeks were adenotonsillectomy with grommet insertion, adenoidectomy with grommet insertion, and myringotomy with grommet insertion.

The collected data were subjected to the statistical evaluation using SPSS software version 21 (Chicago, IL, USA) and one-way ANOVA and t-test for results formulation. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at $p<0.05$.

RESULTS

The present prospective clinical study was conducted to assess the clinical features, diagnostic approaches, and treatment modalities in subjects with secretory Otitis media. The study also focused on the risk factors and symptoms of the disease to avoid permanent hearing loss. The study includes a total of 60 subjects of both genders of age less than/equal to 13 years and with the secretory otitis media. The study had 43 males and 17 females. The majority of the study subjects were in the age range of 8-10 years. Symptoms in the study subjects were ear discharge, earache, bubbling sound, tinnitus, hearing difficulty, and ear fullness, whereas, the signs were flashing movements, air bubble fluid, prominent short process, the prominent handle of malleus, and fluid discharge. Type C tympanometry pattern was seen in 56.6% (n=34) subjects followed by Type B in 36.6% (n=22) subjects, and Type A in 6.66% (n=4) study subjects. Concerning tuning fork test mobility, in the right ear, the normal test was seen in 1.6% (n=1) and left ear in 3.33% (n=2) subjects. Conductive hearing loss was seen in 80% (n=48) right ear and 81.6% (n=49) in left ear, was inconclusive in 18.33% (n=11) right ear and 13.3% (n=8) in left ear, normal in 6.66% (n=4) in right ear and 5% (n=3) in right ear, absent in 10% (n=6) in right and 11.6% (n=7) in left ear, and was restricted in 83.3% (n=50) in right ear and left ear both (Table 1).

Test	Results	Percentage (%)	Number (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)

Table 1: Tympanic membrane mobility as assessed on Tuning fork test and Pneumatic Otoscopy

On assessing the distribution of the study subjects based on the culture results, it was seen that treatment modality adopted in the study subjects was medical management in 16.66% (n=10) study subjects, Myringotomy + Grommet insertion in 15% (n=9) study subjects, Adenoidectomy + Grommet insertion in 28.3% (n=17) study subjects, and Adenotonsillectomy + Grommet insertion in 40% (n=24) study subjects. Culture report assessment showed no growth in 43.3% (n=26) subjects, diphtheroids in 11.66% (n=7) subjects, Nisseria catarrhalis in 5% (n=3) study subjects, Hemophilus Influenza in 11.66% (n=7) study subjects, and Streptococcus pneumonia in28.33% (n=17) study subjects as shown in Table 2.

Parameter	Percentage (%)	Number (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

On comparing the symptoms in the study subjects based on the culture reports, it was seen that ear discharge was present in 75% (n=24) study subjects and in 60.71% (n=17) culture-negative subjects which were statistically non-significant with p=0.5, earache was seen in 50% (n=16) culture-positive and in 60.71% (n=17) culture-negative subjects which were statistically non-significant with p=0.2, bubbling sound was seen in 18.75% (n=6) culture-positive and 39.28% (n=11) culture-negative subjects which were statistically non-significant with p=0.6, hearing difficulty was seen in 12.5% (n=4) culture-positive study subjects and no culture-negative subject, and ear fullness was seen in 6.25% (n=2) culture-positive subjects which were statistically non-significant with p=0.2. 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).

Symptoms	Culture positive (n=32) n (%)	Culture negative (n=28) n (%)	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

For the assessment of Tympanostomy effect with adenotonsillectomy/adenoidectomy on air conduction pure tone mean audiometry at 0.5, 1, 2, 4 kHz, it was seen that for left ear ACdBHL, the mean value preoperatively was 26.71±6.03 which reduced significantly to 16.63±4.16[a] at 2 months postoperatively and further decreased to 16.12±3.3[a] 6 months postoperatively. This was statistically significant at both intervals with p<0.001. For the right ear ACdBHL, the mean value preoperatively was 26.56±5.91 which reduced significantly to 16.52±4.05[a] and 15.82±3.80[a] at 2 months and 6month postoperatively which was statistically significant at both the time-intervals with p<0.001 as shown in Table 4.

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

DISCUSSION

The present prospective clinical study was conducted to assess the clinical features, diagnostic approaches, and treatment modalities in subjects with secretory Otitis media. The study also focused on the risk factors and symptoms of the disease to avoid permanent hearing loss. The study includes a total of 60 subjects of both genders of age less than/equal to 13 years and with the secretory otitis media. The study had 43 males and 17 females. Type C tympanometry pattern was seen in 56.6% (n=34) subjects followed by Type B in 36.6% (n=22) subjects, and Type A in 6.66% (n=4) study subjects. Concerning tuning fork test mobility, in the right ear, the normal test was seen in 1.6% (n=1) and left ear in 3.33% (n=2) subjects. Conductive hearing loss was seen in 80% (n=48) right ear and 81.6% (n=49) in left ear, was inconclusive in 18.33% (n=11) right ear and 13.3% (n=8) in left ear, normal in 6.66% (n=4) in right ear and 5% (n=3) in right ear, absent in 10% (n=6) in right and 11.6% (n=7) in left ear, and was restricted in 83.3% (n=50) in right ear and left ear both. These results were consistent with the studies of Boonacker CW et al[5] in 2014 and Atkinson H et al[6] in 2015 where authors reported similar tympanometry patterns in their study subjects.

For the assessment of the distribution of the study subjects based on the culture results, it was seen that the treatment modality adopted in the study subjects was medical management in 16.66% (n=10) study subjects, Myringotomy + Grommet insertion in 15% (n=9) study subjects, Adenoidectomy + Grommet insertion in 28.3% (n=17) study subjects, and Adenotonsillectomy + Grommet insertion in 40% (n=24) study subjects. Culture report assessment showed no growth in 43.3% (n=26) subjects, diphtheroids in 11.66% (n=7) subjects, Neisseria catarrhalis in 5% (n=3) study subjects, Hemophilus Influenza in 11.66% (n=7) study subjects, and Streptococcus pneumonia in28.33% (n=17) study subjects. These results were in agreement with the findings of Griffin G et al[7] in 2011 and Kucur C et al[8] in 2015 where similar treatment

modalities and culture reports were shown by the authors as in the present study.

For comparison of the symptoms in the study subjects based on the culture reports, it was seen that ear discharge was present in 75% (n=24) study subjects and in 60.71% (n=17) culture-negative subjects which were statistically non-significant with p=0.5, earache was seen in 50% (n=16) culture-positive and in 60.71% (n=17) culture-negative subjects which were statistically non-significant with p=0.2, bubbling sound was seen in 18.75% (n=6) culture-positive and 39.28% (n=11) culture-negative subjects which were statistically non-significant with p=0.6, hearing difficulty was seen in 12.5% (n=4) culture-positive study subjects and no culture-negative subject, and ear fullness was seen in 6.25% (n=2) culture-positive subjects which were statistically non-significant with p=0.2. 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. These results were comparable to the studies of Kasemodel ALP et al[9] in 2020 and Zhang X et al[10] in 2019 where similar symptom prevalence was seen in the study subjects related to culture reports as depicted in the present study.

Concerning the assessment of Tympanostomy effect with adenotonsillectomy/adenoidectomy on air conduction pure tone mean audiometry at 0.5, 1, 2, 4 kHz, it was seen that for left ear ACdBHL, the mean value preoperatively was 26.71±6.03 which reduced significantly to 16.63±4.16[a] at 2 months postoperatively and further decreased to 16.12±3.3[a] 6 months postoperatively. This was statistically significant at both intervals with p<0.001. For the right ear ACdBHL, the mean value preoperatively was 26.56±5.91 which reduced significantly to 16.52±4.05[a] and 15.82±3.80[a] at 2 months and 6month postoperatively which was statistically significant at both the time-intervals with p<0.001. These findings were similar to the studies of Tahtinen PA et al[11] in 2017 and Paradise JL et al[12] in 2013 were in child subjects for PTA (Pure tone audiometry) child subjects showed comparable results in the present study.

CONCLUSION

Within its limitations, the present study concludes that focus should be kept on the parental concern for hearing patterns in their child, especially in subjects with a recent history of secretory otitis media. 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.

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