Original Article

Clinical Profile, Predisposing Factors, and Management Outcomes of Serous Otitis Media in Children: A Prospective Observational Study

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Abstract

Background: Serous otitis media (SOM), or otitis media with effusion, is a common cause of conductive hearing loss in children. It is often linked to eustachian tube dysfunction and recurrent upper respiratory tract infections (URTI). Early diagnosis and appropriate management are crucial to prevent long-term auditory and developmental sequelae. The objective is to evaluate the demographic profile, clinical characteristics, predisposing factors, and treatment outcomes of serous otitis media in children attending a tertiary care hospital. **Material and Methods:** A prospective observational study was conducted among 50 children (≤15 years) diagnosed with serous otitis media (SOM). Detailed clinical history, otoscopic examination, pure tone audiometry, and tympanometry were performed for all participants. Based on clinical assessment, patients were managed either medically or surgically, and outcomes were evaluated through improvement in symptoms, normalization of otoscopic findings, and closure of the air–bone gap to less than 15 dB. **Results:** The mean age of participants was 9.48 ± 2.43 years, with female predominance (56%). Hearing loss (72%) was the most common symptom, and the predominant otoscopic finding was tympanic membrane immobility (92%). The major predisposing factors were recurrent URTI (64%) and adenoid hypertrophy (48%). Type B tympanogram was observed in 64% of cases. Medical management yielded improvement in 48%, whereas surgical intervention achieved a success rate of 94.1% with adenoidectomy and grommet insertion. Younger age and allergic predisposition were significantly associated with better outcomes ($p < 0.05$). **Conclusion:** SOM predominantly affects school-aged children and is strongly associated with recurrent URTI. Adenoidectomy with grommet insertion provides the best therapeutic outcome, particularly in younger children and those with allergies.

Keywords: Serous otitis media, Eustachian tube dysfunction, Adenoid hypertrophy, Grommet insertion, Hearing loss, Tympanometry, Recurrent URTI.

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Introduction

Serous otitis media (SOM), with effusion (OME), is among children's most frequent causes of conductive hearing loss worldwide. It is defined by the accumulation of sterile serous or mucoid fluid within the middle ear cavity behind an intact tympanic membrane, without evidence of acute infection.[1,2] The pathogenesis primarily involves Eustachian tube dysfunction resulting from upper respiratory tract infections (URTI), allergic rhinitis, or adenoidal hypertrophy, leading to impaired aeration and negative middle ear pressure.[3,4]

Globally, the prevalence of SOM varies between 1.3% and 31.3%, affecting an estimated 42 million individuals at any given time.[2,5] Its prevalence ranges from 2% to 3% in India, though this is likely underestimated due to limited screening and diagnostic resources. The condition is most common among preschool and early school-aged children because of the anatomical immaturity and horizontal orientation of the Eustachian tube, recurrent infections, and frequent allergen exposure.[3,5]

Clinically, affected children may present with hearing impairment, ear fullness, or intermittent otalgia; however, many remain asymptomatic, contributing to delayed diagnosis and potential developmental consequences. Chronic middle ear effusion can impair speech, language, and cognitive skills, leading to educational and social difficulties.[2,4] Therefore, early detection and appropriate management through medical or surgical interventions such as adenoidectomy and tympanostomy are essential to prevent complications like tympanic membrane retraction, ossicular damage, or cholesteatoma formation.[1,4,5]

The present study aims to evaluate the epidemiological profile, clinical spectrum, predisposing factors, and treatment outcomes of serous otitis media in children attending a tertiary care hospital, thereby contributing to a more evidence-based approach in its diagnosis and management.

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Materials and Methods

Study Design: A prospective observational study was conducted to evaluate the clinical profile, predisposing factors, and serous otitis media management outcomes (SOM).

Study Setting and Duration: The study was conducted in the Department of Otorhinolaryngology, Government General Hospital, Nalgonda, Telangana, from 15th July 2024 to 30th June 2025.

Study Population: Children aged ≤15 years presenting with symptoms suggestive of SOM were included after detailed evaluation.

Sample Size: 50 patients fulfilling the inclusion criteria were enrolled.

Inclusion Criteria:

Patients with complaints of hearing loss, ear blockage, or discomfort persisting for over three months.

The otoscopic findings are consistent with SOM (amber/dull tympanic membrane, air–fluid level, or retraction).

Impedance audiometry shows a Type B or C tympanogram.

Exclusion Criteria:

Patients with acute otitis media or ear discharge.

Congenital deafness or family history of hereditary hearing loss.

Patients with cleft palate or nasopharyngeal tumors.

Data Collection Procedure: After obtaining Institutional Ethical Committee approval and informed consent from guardians, each participant underwent detailed history taking and clinical examination.

Otoscopic evaluation: Performed using a pneumatic otoscope to assess tympanic membrane color, position, and mobility.

Audiological assessment: Pure tone audiometry and tympanometry were done for all cases.

Diagnostic nasal endoscopy (DNE) and X-ray nasopharynx (lateral view) were performed to identify adenoid hypertrophy or nasopharyngeal obstruction.

Management Protocol: For three weeks, medical management included antibiotics, antihistamines, nasal decongestants, and Valsalva manoeuvre exercises.

Surgical intervention (myringotomy with grommet insertion ± adenoidectomy) was performed in non-responders after medical therapy.

Outcome Assessment: Treatment outcome was defined by:

Symptomatic improvement.

Normalization of tympanic membrane appearance.

Closure of the air-bone gap (<15 dB) on postoperative audiometry.

Statistical Analysis: Data were analyzed using SPSS version 20.0. Descriptive statistics were expressed as mean, standard deviation, and percentages. Associations between variables were tested using the Chi-square test, and $p < 0.05$ was considered statistically significant.

Results

Fifty patients aged ≤15 years with serous otitis media (SOM) were included in the study. The demographic, clinical, and management profiles are presented in [Table 1–5].

Demographic Characteristics

The mean age of the study participants was 9.48 ± 2.43 years, ranging from 4 to 15 years. Most cases (62%) were observed in the 6–10 years of age group, while only 6% were below five. Females constituted 56% of the cohort, indicating a mild female preponderance [Table 1].

Table 1: Demographic Characteristics of Study Participants (N = 50)

Parameter	Category	n	%
Age group (years)	≤5	3	6
	6–10	31	62
	11–15	16	32
Gender	Male	22	44
	Female	28	56
Mean age (±SD)	—	9.48 ± 2.43	—

Majority (62%) were aged 6–10 years; females constituted 56% of cases.

Clinical Presentation and Otoscopic Findings: The most frequent symptom was hard of hearing (72%), followed by aural fullness (58%) and otalgia (54%). Associated nasal complaints were present in 40% of cases. Otoscopic examination revealed an amber-colored tympanic membrane in 62% and a dull membrane in 38% of patients. The predominant otoscopic findings included tympanic membrane immobility (92%), retraction (56%), and air–fluid level (42%) (Table 2). These findings reflect the characteristic conductive pathology of SOM.

Table 2: Clinical Presentation and Otoscopic Findings

Parameter	Category	n	%
Symptoms	Hard of hearing	36	72
	Aural fullness	29	58
	Otalgia	27	54
	Nasal symptoms	20	40
Tympanic membrane appearance	Amber	31	62
	Dull	19	38
Otoscopy findings	Retraction	28	56
	Air fluid level	21	42
	Immobile TM	46	92

Hearing loss and tympanic membrane immobility were predominant findings.

Predisposing Factors and Tympanometric Patterns: Recurrent upper respiratory tract infection (URTI) was identified as the leading predisposing factor, affecting 64% of patients, followed by allergic predisposition (18%) and gastroesophageal reflux disease (GERD) (10%). Adenoid hypertrophy was detected in 48% of children. Tympanometry showed a predominance of Type B curves (64% right ear; 58% left ear), suggesting the presence of middle ear effusion, while Type C curves were noted in 36% and 42% of ears, respectively [Table 3].

Table 3: Predisposing Factors and Tympanometric Patterns

Parameter	Category	n	%
Predisposing factors	Recurrent URTI	32	64
	Allergy	9	18
	GERD	5	10
Adenoid hypertrophy	Present	24	48
	Absent	26	52
Tympanometry type	Type B (Right)	32	64
	Type C (Right)	18	36
	Type B (Left)	29	58
	Type C (Left)	21	42

Recurrent URTI (64%) was the leading predisposing factor; Type B curve predominated.

Management Modalities and Outcomes: Medical therapy, including antibiotics, antihistamines, and decongestants, was instituted in 70% of patients, with symptomatic and objective improvement in 48%. However, 52% of these cases required surgical intervention due to persistent effusion or hearing loss. Among 33 surgically managed patients, adenoidectomy with grommet insertion was performed in 17 (51.5%) and myringotomy with grommet insertion in 16 (48.5%). Surgical success was highest in those who underwent adenoidectomy with grommet placement (94.1%) compared with myringotomy alone (75%) (Table 4).

Table 4: Management Modalities and Outcomes

Parameter	Category	n	%
Medical management	Performed	35	70
	Successful	17	48
	Failed	18	52
Surgical management	Total surgeries	33	66
	Adenoidectomy + Grommet	17	51.5
	Myringotomy + Grommet	16	48.5
Surgical outcome	Adenoidectomy + Grommet (success)	16	94.1
	Myringotomy + Grommet (success)	12	75

Adenoidectomy with grommet insertion showed the best success rate (94.1%).

Table 5: Factors Influencing Treatment Outcomes

Factor	Category	Success (%)	Failure (%)	p-value	Significance
Age (medical mgmt.)	≤5 yrs	66.7	33.3	0.72	NS
	6–10 yrs	50	50		
	11–15 yrs	41.7	58.3		
Gender (medical mgmt.)	Female	57.1	42.9	0.214	NS
	Male	35.7	64.3		
Allergy (medical mgmt.)	Present	66.7	33.3	0.043	Significant
Age (surgical mgmt.)	≤5 yrs	100	0	0.046	Significant
Adenoid hypertrophy (surgical mgmt.)	Present	94.1	5.9	0.126	NS

Younger age and presence of allergy significantly influenced outcomes.

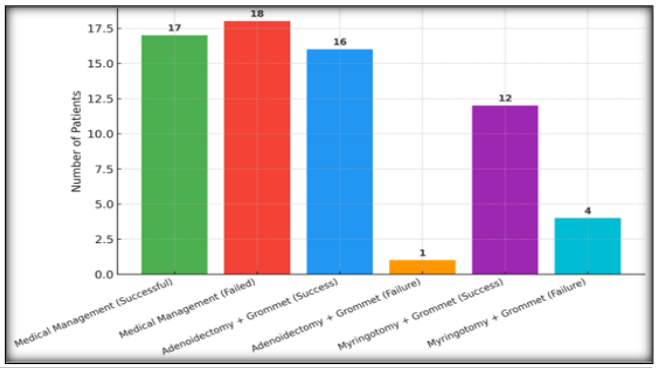

Figure 1: Management Modalities and Outcomes in Serous Otitis Media

Factors Influencing Treatment Outcomes: Younger age and allergic predisposition were significantly associated with improved treatment outcomes. Patients below five years showed the highest success rate with medical and surgical management ($p = 0.046$). Allergy as a predisposing factor demonstrated a statistically significant positive influence on response to medical therapy ($p = 0.043$). Other variables, including gender and adenoid hypertrophy, were not significantly associated with outcomes [Table 5].

Discussion

Serous otitis media (SOM) remains one of the most common and reversible causes of conductive hearing loss in children,

primarily attributed to Eustachian tube dysfunction and chronic middle ear effusion.[6,7] The prospective study of 50 pediatric cases assessed clinical characteristics, predisposing factors, and therapeutic outcomes to provide insights into effective management strategies.

In the present study, the mean age of participants was 9.48 ± 2.43 years, with most cases (62%) occurring between 6 and 10 years. This observation supports previous literature emphasizing the high prevalence of otitis media with effusion (OME) among school-aged children due to the anatomical and functional immaturity of the Eustachian tube and recurrent nasopharyngeal infections.[6,7] A slight female predominance (56%) was also observed, aligning with prior epidemiological data.

The leading symptoms were hearing loss (72%) and aural fullness (58%), reflecting the chronicity of effusion and conductive hearing impairment characteristic of SOM.[6] Otoscopic findings revealed tympanic membrane immobility (92%) and amber discoloration (62%), which are consistent with the diagnostic features described in comprehensive reviews by Schilder et al.[7] These features highlight the importance of detailed otoscopic evaluation for early diagnosis, especially in asymptomatic or minimally symptomatic children.

Recurrent upper respiratory tract infection (URTI) was the predominant predisposing factor (64%), followed by adenoid hypertrophy (48%). This finding concurs with recent studies that established a strong association between nasopharyngeal inflammation, mechanical obstruction, and middle ear effusion.[9,10] Chen et al,[10] further emphasized that adenoid hypertrophy significantly contributes to OME by promoting Eustachian tube blockage and serving as a bacterial reservoir. Tympanometric evaluation demonstrated a predominance of Type B curves (64%), indicative of middle ear fluid accumulation, characteristic of chronic effusion.[7,9] Medical management achieved improvement in 48% of patients, while surgical intervention was required in two-thirds of the cohort. Adenoidectomy with grommet insertion yielded the best outcomes (94.1%), consistent with the findings of Rasheed et al,[8] who reported superior results with combined adenoidectomy and myringotomy compared to medical management or single-procedure approaches.

Younger age and allergic predisposition significantly correlated with favorable treatment response ($p < 0.05$), consistent with the conclusions of Paing et al,[9] who identified modifiable risk factors such as allergy management and early intervention as key determinants of improved prognosis. The present study also supports evidence from Moideen et al,[11] that adenoidectomy substantially enhances overall quality of life and symptom control in pediatric upper airway disorders, including OME. Furthermore, safety analyses from a large population-based study by Thomas et al,[12] reaffirm that adenoidectomy is a safe and effective surgical procedure with a low complication rate.

Limitations: The present study has certain limitations. The sample size was relatively small and confined to a single tertiary care center, limiting the generalizability of results. Follow-up duration was short, preventing assessment of long-term recurrence or complications. Microbiological analysis of middle ear effusion was not performed, restricting pathogen identification. Objective parameters such as speech, language, and quality-of-life outcomes were not evaluated. Despite these limitations, the study provides valuable insights into the clinical patterns and management of serous otitis media in children.

Conclusion

Serous otitis media predominantly affects school-aged children and is closely associated with recurrent upper respiratory tract infections and adenoid hypertrophy. Hearing loss and tympanic membrane immobility were the most consistent clinical findings. Although medical therapy provides partial improvement, surgical intervention, particularly adenoidectomy with grommet insertion, offers superior outcomes and sustained hearing restoration—younger age and allergic predisposition significantly enhanced treatment success. Early recognition, timely referral, and addressing contributory factors such as allergy and nasal pathology are essential to prevent chronic sequelae and developmental delay. The study reinforces the role of combined medical-surgical management for optimal recovery and long-term middle ear health.

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Conflicts of interest

There are no conflicts of interest.

References

1. MacKeith S, Mulvaney CA, Galbraith K, Webster KE, Paing A, Connolly R, et al. Adenoidectomy for otitis media with effusion (OME) in children. Cochrane Database Syst Rev. 2023 Oct 23;10(10):CD015252. doi: 10.1002/14651858.CD015252.pub2. PMID: 37870083; PMCID: PMC10591285.
2. Alamri AA, Amoodi HA, Alsubaie SA, Alsehly AA, Alshuaibi RO, Alotaibi LA, et al. Efficacy of Adenoidectomy versus Tympanostomy on the Otitis Media with Effusion: A Systematic Review and Meta-Analysis. Afr J Paediatr Surg. 2024 Oct 1;21(4):236-241. doi: 10.4103/ajps.ajps_144_22. Epub 2024 Sep 7. PMID: 39254052; PMCID: PMC11493237.
3. Alaraifi AK, Alkhaldi AS, Ababtain IS, Alsaab F. Predictors of Otitis Media with Effusion Recurrence Following Myringotomy. Indian J Otolaryngol Head Neck Surg. 2022 Dec;74(Suppl 3):4053-4058. doi: 10.1007/s12070-021-02817-0. Epub 2021 Aug 14. PMID: 36742680; PMCID: PMC9895307.
4. Klopp-Dutote N, Kolski C, Strunski V, Page C. Tympanostomy tubes for serous otitis media and risk of recurrences. Int J Pediatr Otorhinolaryngol. 2018 Mar; 106:105-109. doi: 10.1016/j.ijporl.2018.01.023. Epub 2018 Feb 2. PMID: 29447881.
5. Vanneste P, Page C. Otitis media with effusion in children: Pathophysiology, diagnosis, and treatment. A review. J Otol. 2019 Jun;14(2):33-39. doi: 10.1016/j.joto.2019.01.005. Epub 2019 Jan 31. PMID: 31223299; PMCID: PMC6570640.
6. Zulkiflee S, Siti Sabzah M, Philip R, Mohd Aminuddin M. Management of otitis media with effusion in children. Malays Fam Physician. 2013 Aug 31;8(2):32-5. PMID: 25606279; PMCID:

PMC4170480.
7. Schilder AG, Chonmaitree T, Cripps AW, Rosenfeld RM, Casselbrant ML, Haggard MP, et al. Otitis media. Nat Rev Dis Primers. 2016 Sep 8;2(1):16063. doi: 10.1038/nrdp.2016.63. PMID: 27604644; PMCID: PMC7097351.
8. Rasheed AM, Abbas AM, Hilal SA, Homadi NJ. Adenoidectomy and Endoscopic Myringotomy with and without ventilation tube insertion for Treatment of Otitis Media with Effusion in 6-12 years old Children. Int Tinnitus J. 2023 Dec 4;27(1):27-33. doi: 10.5935/0946-5448.20230005. PMID: 38050881.
9. Paing A, Elliff-O'Shea L, Day J, Joshi D, Arnold S, Holland Brown T, et al. Modifiable risk factors for developing otitis media with effusion in children under 12 years in high-income countries: a systematic review. Arch Dis Child. 2024 Dec 13;110(1):45-51. doi: 10.1136/archdischild-2024-327454. PMID: 39304206.
10. Chen W, Yin G, Chen Y, Wang L, Wang Y, Zhao C, et al. Analysis of factors that influence the occurrence of otitis media with effusion in pediatric patients with adenoid hypertrophy. Front Pediatr. 2023 Feb 22; 11:1098067. doi: 10.3389/fped.2023.1098067. PMID: 36911018; PMCID: PMC9992982.
11. Moideen SP, G M D, Sheriff RM, James F. Effectiveness of Adenoidectomy as a Standalone Procedure in Improving the Quality of Life of Children with Obstructive Sleep Apnea. Indian J Otolaryngol Head Neck Surg. 2024 Jun;76(3):2344-2350. doi: 10.1007/s12070-024-04506-0. Epub 2024 Jan 23. PMID: 38883488; PMCID: PMC11169206.
12. Thomas K, Boeger D, Buentzel J, Esser D, Hoffmann K, Jecker P, et al. Pediatric adenoidectomy: a population-based regional study on epidemiology and outcome. Int J Pediatr Otorhinolaryngol. 2013 Oct;77(10):1716-20. doi: 10.1016/j.ijporl.2013.07.032. Epub 2013 Aug 14. PMID: 23993208.