

The incidental finding of otitis media with effusion in children admitted for adenoidectomy or adenotonsillectomy

Luqman Aababaker Mustafa*

Said Mustafa Said**

Dariya Yousif Azeez***

Omar Suad Ali****

Abstract

Background and objectives: Otitis media with effusion is a common condition in the pediatric population, and is a leading cause of hearing loss in this age group. This condition is commonly missed by the parents due to lack of objective symptoms especially in young children, in turn leading to learning difficulties and communication problems. This study focused on the incidental finding of asymptomatic, undiagnosed otitis media with effusion in children with adenotonsillar diseases admitted for adenoidectomy or adenotonsillectomy (aged 2-12 years)

Methods: A cross sectional study conducted from January 2020 to February 2021. We randomly selected 110 children (aged 2-12 years), admitted purely for adenoidectomy or adenotonsillectomy at Rizgari Teaching Hospital in Erbil / Iraq. Those with acute upper respiratory tract infection, other otological problems, or craniofacial abnormalities were excluded. Selected children were examined by otoscopy and sent for tympanometry preoperatively.

Results: Of total 110 patients, 23 (20.9%) cases had hidden, undiagnosed otitis media with effusion, which was missed by parents (14.5% bilateral, 6.4% unilateral). The majority (n= 15; 65.2%) in (5-8) years age group (mean age of 5.1 years) (p=0.02), with gender distribution; males (n = 15; 65.2%), females (n= 8; 34.8%) (p=0.123).

Conclusion: Adenotonsillar disease carries an extra risk for developing otitis media with effusion in children. Otoscopic examination and simple test such as tympanometry can diagnose this condition in order to take the necessary steps for management and prevent future complications.

Key words: Adenoidectomy, Adenotonsillectomy, Otitis media with effusion.

Introduction

Otitis media with effusion (OME) is an accumulation of fluid behind an intact tympanic membrane (TM) without evidence of acute infection or inflammation. Among ear-specific and non-specific symptoms, hearing loss is the most common presenting symptom; this is as a result of impaired transduction of sound waves by the fluid in the middle ear. It commonly affects the pediatric

population and it is considered among the most prevalent diseases in young children globally.¹ It is also found that the preschool and the early grades school children are the main age groups who suffer from OME.²⁻⁴ Among other suggested pathogenesis, adenoidal hypertrophy which is a condition mainly observed in younger children is considered a risk factor due to its proximity to the opening of the Eustachian tube in the

*MBChB, KHCMS trainee (Otolaryngology, Head and Neck Surgery)

Email: lokman457@yahoo.com

**FIBMS/FACS, Consultant Otolaryngologist/ Rizgari Teaching Hospital

***Prof. Hawler Medical College/ Hawler Medical University

****MBChB, Otolaryngology department, Rizgari Teaching Hospital

nasopharynx, whether by physically obstructing the torus tubarius by enlarged adenoid or by its biofilms.⁵⁻⁶ This condition sometimes can be easily missed by parents as the physical symptoms of OME can be occult especially in young children.⁷ Families of children with OME are sometimes totally unaware of such condition and states that their children are without complaints.⁸ Sometimes hearing loss is only recognized when family attentions regarding hearing, speech development, behavior, or school performance are raised.⁹ The diagnosis of OME can be made by clinical examination to assess the middle ear status by observing any change in the tympanic membrane and the presence of middle ear fluid is an essential finding in reaching the diagnosis of OME. Tools such as an otoscope,

Subjects and methods

This is a cross-sectional observational study done at Rizgari Teaching Hospital in Erbil, Iraq from January 2020 to February 2021. On a sequential manner, 110 children, aged 2-12 years were randomly selected. Those patients were admitted purely for adenoidectomy or adenotonsillectomy based on indications such as snoring with obstructive sleep apnea, recurrent tonsillitis, or both conditions, to find out the prevalence of missed or undiagnosed OME in such population. Upon admission for the operation and before any examination, a written consent explaining the steps of examination and investigations were taken by the physician himself from all children's parents or legal guardians. All cases selected did not complain of any otological symptoms (especially hearing loss) not by themselves nor stated by their families. Any cases presented as such were excluded from the study. Other exclusion criteria included; children with acute otitis media, acute upper respiratory tract infection, a perforated tympanic membrane, impacted ear wax, or with craniofacial abnormalities. The patients then underwent an examination by otoscope to examine the

microscope, tympanometry, and audiometry are all suggested in the workup for diagnosis.¹ Tympanometry is an easy, accessible, and rapid tool for assessing middle ear status, and type (B) tympanogram with normal canal volume is still the most dependable non-invasive way for the detection of OME, and is considered a fair sensitive method in diagnosing OME when compared to myringotomy.¹⁰⁻¹¹ The main reason for this study was to assess the prevalence of missed or undiagnosed OME in young children requiring operation for adenoidectomy or adenotonsillectomy, as they will be a good population for such a research because their age is appropriate and because of already present multiple risk factors.

external auditory canal to confirm its patency and prepare it for tympanometry, to exclude the presence of any tympanic membrane perforation and to assess the status of the middle ear for the presence of any signs of OME. All cases then sent for audiological assessment by tympanometry, type A tympanogram are considered to have normal middle ear status, type C tympanogram is considered to have negative middle ear pressure, while type B tympanogram with normal canal volume diagnosed as OME. Those with type B tympanogram and high canal volume and confirmed tympanic perforation by otoscopy excluded from this study. All the data were then integrated into a statistical system using computer programs (Microsoft Excel 2016, and Statistical Package for Social Sciences (SPSS) version; 25) to interpret the data and calculate the statistics. Numerical data were presented in frequencies and percentages while categorical data were presented in terms of means and standard deviations. The ethical and scientific committee of Kurdistan Higher Council of Medical Specialties approved this study.

Results

In this study, 110 children aged 2-12 years were evaluated for the presence of any hidden OME. Of those, 39.1% (n = 43) were between the age of 2-4 years, 46.4%

(n = 51) were between the age of 5-8 years, and 14.5% (n = 16) were between the age of 9-12 years, Table (1). There were 56 boys (50.9%) and 54 girls (49.1%),

Table (1): Cases distribution by age

Age group	Cases	
	Total (%)	OME Cases
2 to 4 years	43 (39.1)	6 (26.08)
5 to 8 years	51 (46.4)	15 (65.21)
9 to 12 years	16 (14.5)	2 (8.69)
Total	110 (100)	23 (100)

Of the 110 children, 97 (88.2%) cases underwent adeno-tonsillectomy and 13 (11.8%) underwent only adenoidectomy. The main indications for surgery were

recurrent tonsillitis (n = 87; 79.1%), obstructive sleep apnea (OSA) (n = 13; 11.8%), or OSA and recurrent tonsillitis together (n = 10; 9.1%), Table (2).

Table (2): Baseline data of the involved patients

Indications	Total (%)	Gender (%)	
		Male	Female
Total Patients	110 (100)	56 (50.9)	54 (49.1)
Recurrent tonsillitis	87 (79.1)	47	40
OSA	13 (11.8)	5	8
OSA & Recurrent tonsillitis	10 (9.1)	4	6

All cases were selected based on lack of any objective ear symptoms upon the admission. Otosopic examination findings showed that 155 (70.5%) ears showed

normal TM, 26 (11.8%) ears showed distorted cone of light, 24 (10.9%) ears showed no cone of light and 15 (6.8%) ears showed retracted TM, Table (3).

Table (3): Otoscopic findings of the involved patients

TM findings	Ear		Total (%)
	Right	Left	
Normal	76	79	155 (70.5)
Distorted cone of light	13	13	26 (11.8)
No cone of light	13	11	24 (10.9)
Retracted TM	8	7	15 (6.8)
Total	110	110	220 (100)

Of the total children population admitted for surgery, tympanometry showed that 64.5% (n = 71) had bilateral type (A) tympanogram, and 14.5% (n = 16) had unilateral type (A) tympanogram with either type (B) or (C) on the other side, Figure (1). Bilateral type (C) tympanogram identified in 6.36% (n = 7) of cases and unilateral type (C) tympanogram in 8.18%

(n = 9) of cases indicating that 14.55% (n = 16) of cases had negative middle ear pressure, Figure (1). After excluding all cases who previously were complaining of symptoms of OME or were diagnosed as OME, it showed that 14.5% (n = 16) of cases had bilateral type (B) tympanogram, of those 56.3% (n = 9) were boys and 43.8% (n = 7) were girls. While unilateral

type (B) tympanogram identified in 6.4% (n = 7) of cases, of those 85.7% (n = 6) were boys and 14.3% (n = 1) was a girl, indicating that 20.9% (n = 23) of cases had hidden OME with fluid in middle ear diagnosed incidentally preoperatively,

Figure (1) & Figure (2). The majority (n= 15; 65.2%) in (5-8) years age group (mean age of 5.1 years) (p=0.02), Table (1), with gender distribution; males (n = 15; 65.2%), females (n= 8; 34.8%) (p=0.123),(Figure (2).

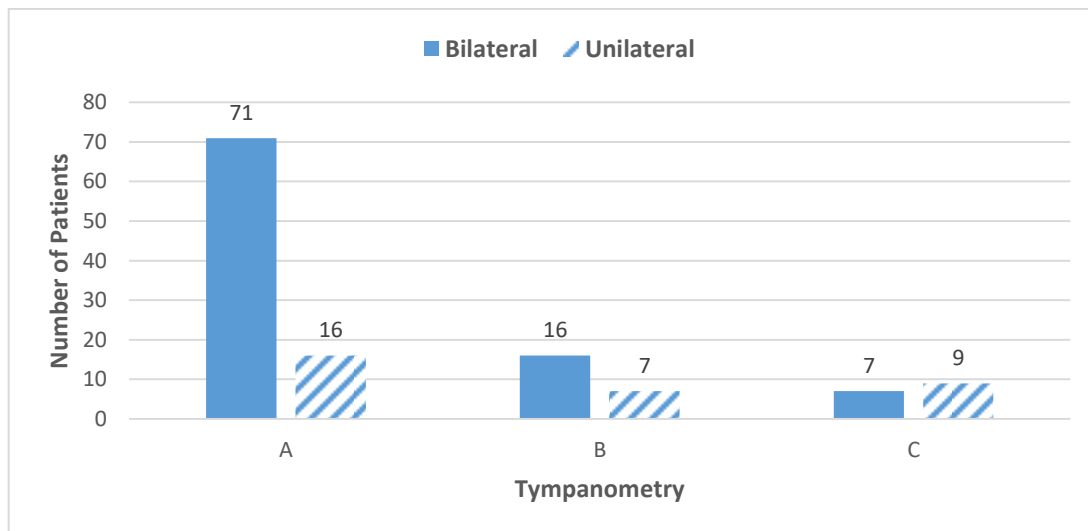


Figure (1): Tympanometry results

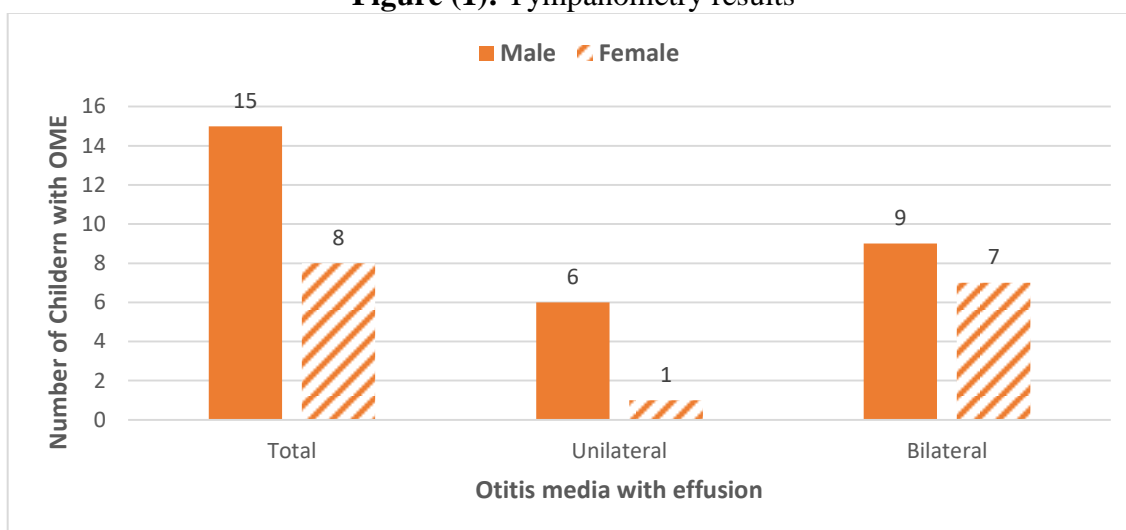


Figure (2): OME prevalence

Discussion

In this study, of 110 children aged 2-12 years, 14.5% (n = 16) had bilateral hidden OME while 6.4% (n = 7) had unilateral OME, both indicating that overall incidence is (20.9%). Our results were approximately similar to the results of a recently published study done by Els et al. who concluded that among 109 children, aged 2-12 years who were also admitted for adenotonsillectomy, 11.9% (n = 13) had bilateral OME.¹² In this study, we focused

on finding hidden undiagnosed OME in children with adenotonsillar disease, which causing OSA, recurrent tonsillitis, or both. A similar study by Sinha et al. done on 100 children admitted for adenotonsillectomy found that 33% of cases had asymptomatic OME.¹³ Also, a recent study by Bhat et al. on 100 patients with adenoid hypertrophy showed that 36% of cases had hidden OME diagnosed by tympanometry.⁷ Sogebi et al. assessed children with adenoid (sometimes

with tonsillar) enlargement by tympanometry and found that 29.2% had asymptomatic OME.¹⁴ Hearing loss is the main symptom associated with OME; however, this could be missed by parents especially in young children. Kiliç et al. found that families of (19.4%) children with OME stated that their children had no complaints when asked about that.⁸ Sometimes hearing loss is only recognized when family attentions regarding hearing, speech development, behavior, or school performance are raised.⁹ The tympanic membrane findings were mainly normal in (70.5%) of ears. Others showed distorted cone of light (11.8%), no cone of light (10.9%), or retracted TM (6.8%). This is in comparison to the study by Bhat et al., who found 61% with a normal tympanic membrane, other findings were a distorted cone of light in 18%, retraction of the pars-tensa in 11%, with an air-fluid level in remaining 10%.⁷ We considered the presence of type (B) tympanogram with normal canal volume as diagnostic of OME, as type (B) tympanogram is still the most reliable non-invasive method for diagnosing OME. In a study by Günel et al. compared the accuracy of tympanometry to myringotomy in diagnosing the presence of middle ear fluid in pediatric cases with OME, the accuracy of type (B) tympanogram was 92% (Sensitivity; 92.3%, Specificity; 91.9%).¹⁰ Anwar et al. found that in comparison to myringotomy, type (B) tympanogram with normal canal volume is a fair sensitive method in diagnosing OME (Sensitivity; 85.8%, Specificity; 72.2% and accuracy; 83.7%).¹¹

Conclusions

The adenotonsillar disease can carry an extra risk for developing OME, which can be easily missed by parents especially in young children. Early diagnosis in such population by simple otoscopic examination and sending them for tympanometry can lead to early management and prevent further damage to

the tympanic membrane. Other complications can also be prevented such as communication problems and learning difficulties with poor school performances, especially in preschool and early grades school children, as they were the mainly affected age group in our study.

It also worth saying that (14.55%) of cases in our study had type (C) tympanogram which we considered as indicative of negative middle ear pressure as mentioned in the study by Rosenfeld et al., who also stated that type (C) tympanogram has an intermediate probability of effusion.⁹ In a study by Günel et al.; 7 out of 13 ears with type (C) tympanogram and a tympanic pressure of less than -200 daPa in children with adenoid hypertrophy correctly predicted the presence of OME.¹⁰ Such condition can progress to develop retraction pockets or atelectatic tympanic membrane with risk of advancement to develop a future cholesteatoma.⁷ The age group in our study was (2-12) years, with the majority of cases (46.4%) were of age (5-8) years. The most commonly affected age group by OME was also (5-8) years with mean age (5.1) years, with a p-value (=0.02) indicating a significant relationship between having OME and this age group in this population. This finding of incidence of OME in this age group is similar to several studies that concluded that OME is higher in children aged (4-8) years.²⁻³ Di Francesco et al. stated that possibly because of Eustachian tube dysfunction by adenoid hypertrophy, preschool children are affected more by OME than other age groups.⁴ The gender distribution of those affected by OME in our study; (65.2%) males and (34.8%) females, with p-value (=0.123) indicating that the relationship between having OME in such population and gender is statistically non-significant, similar to the study by Els et al.¹²

Conflicts of interest

The author reports no conflicts of interest.

References

1. Flint PW, Haughey BH, Robbins KT, et al. Cummings otolaryngology-head and neck surgery e-book. Elsevier Health Sciences; 2014.
2. Tos M. Epidemiology and natural history of secretory otitis. *Otol. Neurotol.* 1984; 5(6): 459-62.
3. Casselbrant ML, Brostoff LM, Flaherty MR, et al. Otitis media with effusion in preschool children. *Laryngoscope.* 1985; 95(4): 428-36.
4. Di Francesco R, Paulucci B, Nery C, et al. Craniofacial morphology and otitis media with effusion in children. *Int J Pediatr Otorhinolaryngol.* 2008; 72(8): 1151-8.
5. Hoa M, Syamal M, Schaeffer MA, et al. Biofilms and chronic otitis media: an initial exploration into the role of biofilms in the pathogenesis of chronic otitis media. *Am J Otolaryngol.* 2010; 31(4): 241-5.
6. Kadhim AL, Spilsbury K, Semmens JB, et al. Adenoidectomy for middle ear effusion: a study of 50,000 children over 24 years. *Laryngoscope.* 2007; 117(3): 427-33.
7. Bhat V, Mani IP, Aroor R, et al. Association of asymptomatic otitis media with effusion in patients with adenoid hypertrophy. *J Otol.* 2019; 14(3): 106-10.
8. Kiliç R, Şafak MA, Özdek A, et al. Effect of 23 valent pneumococcal polysaccharide and Haemophilus influenzae conjugated vaccines on the clinical course of otitis media with effusion. *Laryngoscope.* 2002; 112(11): 2042-5.
9. Rosenfeld RM, Shin JJ, Schwartz SR, et al. Clinical practice guideline: otitis media with effusion (update). *J Otolaryngol-Head N.* 2016; 154(1_suppl): S1-41.
10. Günel C, Ermişler B, Başak HS. The effect of adenoid hypertrophy on tympanometric findings in children without hearing loss. *Kulak Burun Bogaz İhtis Derg.* 2014; 24(6): 334-8.
11. Anwar K, Khan S, ur Rehman H, et al. Otitis media with effusion: Accuracy of tympanometry in detecting fluid in the middle ears of children at myringotomies. *Pak J Med Sci.* 2016; 32(2): 466-70.
12. Els T, Olwoch IP. The prevalence and impact of otitis media with effusion in children admitted for adeno-tonsillectomy at Dr George Mukhari Academic Hospital, Pretoria, South Africa. *Int J Pediatr Otorhinolaryngol.* 2018; 110: 76-80.
13. Sinha V, Patel BH, Sinha S. Incidence of uncomplained secretory otitis media in patients undergoing adenotonsillectomy. *Indian J Otolaryngol Head Neck Surg.* 2005; 57(2): 110-1.
14. Sogebi OA, Oyewole EA, Ogunbanwo O. Asymptomatic Otitis Media with Effusion in Children with Adenoid Enlargement. *J Natl Med Assoc.* 2021; 113(2), 158-64.