

Frequency of Otitis Media with Effusion in Children with Adenoid Hypertrophy Falih Mehdi Al Anbaky F.I.C.M.S.,DLO*

Abstract:

Background: *Otitis Media with Effusion (OME)* is a chronic accumulation of mucous within the middle ear , and sometimes the mastoid air cell system .

Objective: To study the frequency of otitis media with effusion in relation to the effect and size of adenoid hypertrophy as an aetiological factor , in addition to others like presenting symptoms, risk factors and the changes of tympanometry in otitis media with effusion.

Patients and methods: A cross sectional study for 12 months (January 2011-january 2012) in Al-Yarmouk Teaching Hospital, ENT department. One hundred children with adenoid hypertrophy aged (3-12years) were included. All of them were evaluated by clinical ENT examination, tympanometry and lateral plane x-ray of nasopharynx to assess the size of hypertrophied adenoid and classified into 3 grades (I, II and III) and asses the frequency of otitis media with effusion in each grade.

Results: Only 38 children out of one hundred (38%) were diagnosed as having otitis media with effusion; with 26 patients were bilaterally involved (68.5%) and 12 patients were unilaterally involved (31.5%). According to adenoid grade, the incidence of otitis media with effusion was as follow: grade I: 19 patients (38ears) only 7 ear with effusion (18%) , grade II : 47 patients (94ears)only 26 ear with effusion (27%) and grade III : 34 patients (68 ears) only31 ears with effusion (45%). Type B tympanometry was more in grade III adenoid hypertrophy 47%.

Conclusion and Recommendation: The frequency of otitis media with effusion is directly proportional to the size of adenoid. It is recommend that early diagnosis and proper management of adenoid hypertrophy to reduce the incidence of otitis media with effusion and its sequels of hearing loss and poor speech development in children .

Keywords: otitis media with effusion, adenoid hypertrophy

Introduction

Otitis media with effusion is the chronic accumulation of mucus within the middle ear and Sometimes the mastoid air cell system. Many synonyms have been and are used for this condition. These include: 'glue ear', serous otitis media, secretory otitis media and chronic non purulent otitis media. The most common causes are: Eustachian tube dysfunction mostly due to adenoid hypertrophy in children, craniofacial abnormalities, Allergy and, Gastro-oesophageal reflux. The most frequent presentation is with latent or overt hearing loss, it may present with impaired speech and language development .It is frequently coincident with a common cold or minor upper respiratory tract infection, On examination of tympanic membrane there is changing in colour and loss of translucency range from pale grey or amber to black or the so called "blue drum". Fluid level or air bubbles may be visible. The reduced mobility of the membrane can easily be assessed with a seigle s pneumatic otoscope. A Tunnig fork tests may be helpful, particularly in children over 4 years of age. A negative Rinnie test can predict a hearing loss of more than 15 db^[1].

Tympanometry is a rapid and reliable test even in infants. Pure tone audiometry: In O.M.E.; show moderate conductive hearing loss. Myringotomy and aspiration of the fluid is the gold standard for diagnosing middle ear effusion^[2].

The aim of the study was to know:

- 1-The effect of adenoid hypertrophy in its three grades of size, as an etiological factor of OME in children.
- 2-The most common age and gender affected by OME.

3-The most possible risk factors for development of OME in children, and the clinical presentation.

4-The most common tympanometric finding in OME in children.

Patients and method:

The study was descriptive cross-sectional, It was conducted through the period from January 2011 to January 2012 in Al-Yarmouk Teaching Hospital, department of Otolaryngology.

The sampling technique was non-randomized Quata. By mean that 100 patients (3-12 years) were included in this study (any child having a signs and symptoms of adenoid hypertrophy were included), they were subdivided into 3 groups according to the adenoid size depending on lateral plain X-ray of the nasopharynx (by measuring the adenoid-nasopharyngeal ratio) to determine the size grade of adenoid and asses the incidence of OME in each group.

1-The diagnosis of OME was depended on:

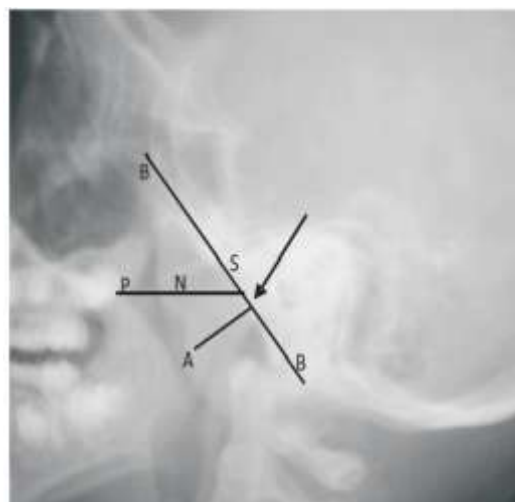
Clinical symptoms (hearing loss; delayed speech development; poor school performance and aural fullness), otoscopic examination(grey, yellow-grey or dull TM; visible air bubbles or fluid level and retracted TM), pneumatic otoscopy (hypomobility/ immobility of tympanic membrane)and tympanometry (flat; type B).

2-The diagnosis of adenoid hypertrophy was done by :

Clinical symptoms: (nasal obstruction, snoring mouth, breathing, nasal discharge). Lateral plain x-ray of nasopharynx. The adenoid/ nasopharyngeal ratio was depended to classify the hypertrophy into 3 grades:. (I)Small adenoid size (0.3 to 0.5). (II) Medium adenoid size (0.5- 0.7). and (III) Large adenoid size (0.7 to 1).

Figure1 : Photograph of postnasal x-ray of one of the patients illustrating the measurements for calculation of AN ratio. Line 'B' is tangential to the basiocciput. The adenoidal measurement 'A' is obtained by drawing a perpendicular line to B at the point of maximal adenoidal tissue. The nasopharyngeal measurement 'N' is made between the posterior border of the hard palate and the antero-inferior aspect 'S' of the spheno-basoccipitalsynchondrosis (black arrowhead). When the synchondrosis is not visible, point 'S' is determined as the point on the anterior edge of the basiocciput which is closest to the intersection of the lines A and B^{3,4}

(Elwany S, Fujioka M, Young LW)



Results

One hundred children (3-12 years old) with adenoid hypertrophy were analyzed ; the frequency of OME was 38%. Most frequently occurred at age of 3 and 5 years (23.7% and 21 % respectively) .The mean age 5.6 years as shown in **table(1)**. There was a male predominance {23 males (60.5%) and 15 females (39.5 %) }.The male to female ratio was 1.5 : 1 . There were 26 patients (68.5%) with bilateral involvement (52 ears)and 12 patients (31.5%) with unilateral involvement (12 ears) as shown in figure (3). The most common 3 risk factors were previous acute otitis media AOM (29 patient 67.3%) age less than 7 years (26 patient 68.4%) and frequent upper respiratory tract infections (URTIS) (24 patient 63.2%) as shown in **table 2** . The most common presenting symptom was hearing impairment (27 patients 71%). Associated nasal complaint of adenoid hypertrophy was found in 31 patients 81.5% as shown in **table 3**. The findings on

examination by otoscope and siegle pneumatic speculum (of 64 ears) were as follow : the most common Tympanic Membrane position(TM) was retracted (51 ears 80%) , the most common TM color was dull (48 ears 89%), TM was immobile in most cases (57 ears 89%). The visible air bubbles and fluid level were seen in a small number of patients as shown in **table 4** . The most common grade(according to Adenoid/Nasopharynx(A/N) ratio) of adenoid hypertrophy was grade II (47 %).

The frequency of otitis media with effusion (type B tympanometry) in relation to 3 adenoid grades were as follow : (**see table 5**)

GRADE I: 7 ears out of 38 ears (19 child) i.e 18 % .

GRADE II: 26 ears out of 94 ears (47 child) i.e 27%.

GRADE III: 31 ears out of 68 ears (34 child) i.e 45%

Table 1. distribution of patient according the age .

Age	Patients with adenoid hypertrophy	Patients with OME	Percentage of patients with OME
3	22	9	23.7 %
4	11	3	7.9 %
5	19	8	21 %
6	13	6	15.8 %
7	11	5	13.2%
8	10	4	10.5 %
9	6	2	5.3 %
10	4	1	2.6 %
11	3	0	0 %
12	1	0	0 %
Total	100	38	100 %

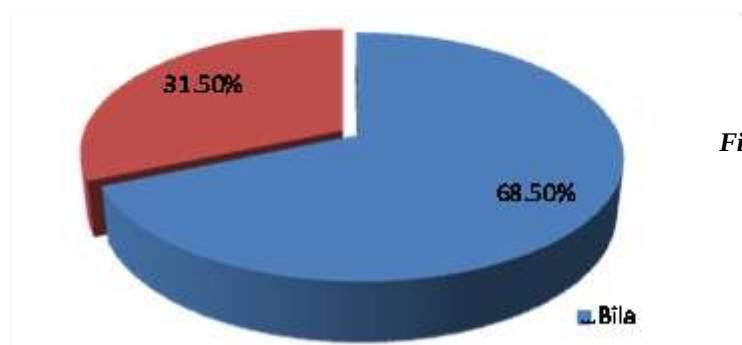


Figure2: distribution of patients according to unilateral and bilateral involvement of ears

Table 2: Risk factors distribution among 38 patients with OME

Risk factor	patient no.	Percentage
Previous acute otitis media AOM	29	76.3 %
Age less than 7 year	26	68.4 %
Frequent upper respiratory Tract infections URTI	24	63.2 %
Atopy	8	21 %
Parental smoking	10	26.3 %
Day care nursery	9	23.7%
Bottle feeding	10	26.3%
Family history	6	15.8 %

Table3: Distribution of patients according to the presenting symptom .

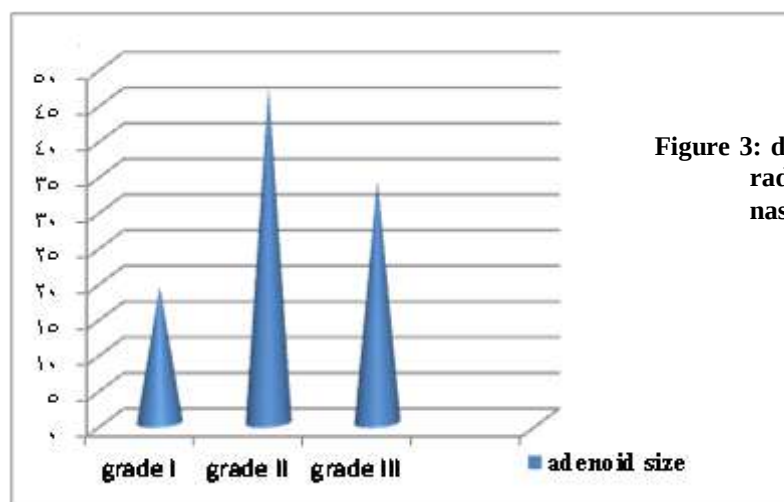
Symptom	Patient number	Percentage %
Hearing impairment	27	71 %
Aural fullness	5	13.6%
Pulling auricle	11	29 %
delayed speech development	6	15.8%
Poor school performance	8	21.1%
Nasal symptoms	31	81.5%

Table 4: distribution of 38 patients having adenoid hypertrophy and OME according to the TM features of 64 ears .

T M feature	Ear no.	Percentage %
Position: normal	5	8 %
Bulging	8	12 %
Retracted	51	80 %
Colour : pearly grey	4	7 %
Yellow grey	10	15 %
Congested	2	3 %
dull	48	75 %
Mobility : hypomobile	7	11 %
immobile	57	89 %
Fluid level	8	12 %
Air bubbles	6	9 %

Table 5: Tympanometric finding among 200 ears (100 child) in relation to 3 grades of adenoid hypertrophy

Ears	Tympanometry Type C		Tympanometry Type B		Tympanometry Type A		Adenoid grade
	LT ear	RT ear	LT ear	RT ear	LT ear	RT ear	
38	3	2	2	5	11	15	I
94	18	21	17	9	16	13	II
68	10	19	15	16	6	2	III
200	31	42	34	30	33	30	Total ears
	73		64		63		

**Figure 3: distribution of patients according radiological examination of nasopharynx (adenoid size)****Table 6: Correlation between adenoid grade (by X-ray) & OME by (type B tympanometry) in 100 patients**

Adenoid grade	Type B tympanometry		Percentage
	Bilateral	Unilateral	
Grade I 19 patients	2	3	26 %
Grade II 47 patients	9	8	36%
Grade III 34 patients	15	1	47%
Total patient number100	26	12	
	38 patients		

Discussion:

During the study period, the most common age groups affected were at 3years old and 5years old.

The mean age was 5.6 years. This result was nearly similar to that obtained by Orji F.T. et al^[5], showed that the mean age was 5 years and Pikandal, Sipala and Karma^[6] showed that the mean age was 5 years. But it was different from that stated by Ahmet Almac et al.^[7] where the mean age group affected was 3.5 years and J. L. da Costa et al.^[8], showed that the mean age was 3.7 years.

The decrease in the frequency of OME with increased age may be explained by ,maturation of

immune system ,increase growth of nasopharynx in relation to adenoid and decreased frequency of URTIs .

The most frequent risk factors were; the age below 7 years, previous AOM and frequent URTIs .These results were similar to that obtained by Orji F.T. et al^[5] and Pikandal, Sipala and Karma^[6].EBJ. Van Neuwkerk et al^[9] showed in the study about the lymphoid and non lymphoid cells in adenoid of children with OME ,that most common risk factor was frequent URTIs (36 out of 63 patients) which is about 57%. Carrie^[10] and Rosenfeld^[11], showed that 66% of patients with OME had previous AOM

attacks .J. L. da Costa et al^[8]. showed that 73% of patients with OME had previous AOM attacks .

The most common presenting symptom was the hearing impairment (71%). Delayed speech development was found in 6 patients (15.8%). These two results were similar to that of Fria ,Contekin ,and Echler^[2] showed that the presenting symptom was hearing loss, and Black et al^[12] showed that abnormal speech development was found in 15% of patients

In this study, It was noted that the frequency of OME is increased by increased adenoid grade. Being more in grade III, the frequency was 45%. These results were supported by many studies such as; Acharya et al.^[13], showed in the study of endoscopic grading of adenoid in OME patients, that grade 4 adenoid was more significantly associated with OME, Alfred Dreher et al^[14], stated a strong association between adenoid size and occurrence of OME, Cassano et al^[15] with a similar results.Paradise J L, Bluestone C D, Rodyers K D et al ^[16],showed that adenoidectomies reduce the recurrence of OME by 47%, Joong ho ahn et al^[17], concurrent adenoidectomy at initial ventilation tube insertion (VTI) was observed to reduce the need for subsequent VTI, demonstrating the effect of adenoid in increase the morbidity of chronic OME, and Nguyen et al^[18], showed that the recurrence of OME, in patients with grade 3 and 4 adenoid by endoscopic grades, was higher in patients treated by ventilation tube only (50%).

The recurrence was less in those treated by adenoidectomy with ventilation tube (17%). But Erin D. Wright et al^[19] stated that adenoid position more effective than the size in etiology of OME (laterally hypertrophied adenoid cause OME whatever the size).

We can observe the clear link between adenoid size and occurrence of OME .This may be due to:

The mechanical obstruction of Eustachian tube orifice which limit the drainage from middle ear.

Other cause which couldn't be excluded, that the adenoid may acts as reservoir of infection and bacterial source for the middle ear.

In conclusion the frequency of OME in children is directly proportional to the size of adenoid. The larger the adenoid, the more the incidence of OME. OME is more in ages (3 and 5 years old) and the mean age 5.6 years. The main presentation is hearing loss. The most common 3 risk factors are (age less than 7 years, previous acute otitis media and frequent upper respiratory tract infections). The early diagnosis and proper management of adenoid hypertrophy is recommended to avoid the occurrence of OME and its sequels mainly the hearing loss and poor speech development .Almost all patients with adenoid hypertrophy should be assessed by: (a) Tuning fork test ;for clinical hearing assessment. (b) Tympanometry: to exclude

middle ear effusion indicated by (type B tympanometry).

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