

## Otitis Media with Effusion in association with Nasal and Nasopharyngeal Diseases

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### Abstract

**Background:** Otitis media with effusion results when the ventilation and drainage functions of the Eustachian tube are impaired. This occurs either in the presence of nasopharyngeal disorders or Eustachian tube dysfunction.

**Aims:** review of otitis media with effusion associated with nasal and nasopharyngeal diseases ; causes & clinical manifestations.

**Patients and Methods:** Seventy two patients of different age groups suffered from unilateral or bilateral OME were reviewed , and their relation with nasal and nasopharyngeal diseases were assessed clinically , endoscopically, audiological and radiologically. Those 72 patients have been divided into three groups according to their age .

**Results:** The results were 64% males & 36% females with male to female ratio was (1.67:1) .The commonest age was in the 1<sup>st</sup> decade of life ( 55.6%). Otitis media with effusion was bilateral in 72% , with different clinical presentations found but hearing loss is the most frequent one (76.4%) , it was mainly conductive type (85.5%) with tympanometric curve frequently of type B (87%) . The tympanic membranes were commonly immobile (72.6%) & retracted (76%) . There were many variable different causes for OME.

**Conclusion:** - OME have different manifestations mainly due to otological problems but can be due to nasopharyngeal problems. The effect of the nose and nasopharynx on Eustachian tube is highly significant & consequently plays an important role in the health of the middle ear , so it is essential to treat these diseases (OME and nasopharyngeal pathologies) in continuity rather than separately.

**Keywords :** OME, tympanometry, nasopharyngeal diseases.

### Introduction

**Otitis Media with Effusion (OME) :** OME is the commonest cause of hearing difficulty & one of the most frequent reasons for elective hospitalization for surgery during childhood . It is defined as the presence within the middle ear cleft of an effusion which may be serous or mucoid but not frankly purulent for more than 12 weeks duration . It has been termed catarrhal , exudative , seromucinous , serous , secretory & non suppurative otitis media . Although OME not associated clinically with obvious symptoms & signs of infections , bacteria may be cultured from the effusion in approximately one third to one half of the cases <sup>[1]</sup>.

The pathogenesis caused by a tubal dysfunction is submitted to a staged course where the initial stage is based on condition of negative middle ear pressure. It present with the onset of an inflammatory process including the forming of an inflammatory oedema . Low viscosity exudate develops inside the tympanum<sup>[2]</sup>.

The time that the fluid has to be present in the middle ear for the condition to be considered chronic OME is usually taken as 12 weeks .Many studies reported that between 20 – 50% of children will have an episode of OME at some time between 3 – 10 years of age , & in 94% of these children the condition had resolved within 3 months & only 6% in whom it is persisted , where spontaneous resolution over the following 3 months was unlikely [3] .

In children the main underlying factors responsible for the production of OME are a

combination of Eustachian tube dysfunction with superadded infection. There are a wide variety of conditions affecting Eustachian tube function which may be associated with OME and these are considered under three main headings; Eustachian tube malfunction , altered mucociliary system & nasopharyngeal disproportion . OME can be due to many causes e.g. adenoid hypertrophy , upper respiratory tract infection , unresolved acute otitis media ,palatal abnormality , allergic rhinosinusitis etc. <sup>[1]</sup>.

In adults with OME , it is important to consider a postnasal space tumor but fortunately this is not a common cause in our community and in most cases no cause found, even a history of upper respiratory tract infection may be irrelevant because of its prevalence in the community <sup>[3]</sup>.

Generally in adults it can be caused mostly by nasal allergy & infection, nasopharyngeal pathologies, barotrauma or functional Eustachian tube obstruction <sup>[4]</sup>.

### Aim of the Study

Review of OME associated nasal and nasopharyngeal diseases, causes and clinical manifestations.

### Patients and Method

A cross sectional study done from June 2016 to March 2017, at outpatients clinic in Al-Yarmouk Teaching Hospital –Baghdad. It was a descriptive study involved 72 patients with 124 ears (20 patients

with unilateral and 52 patients with bilateral disease) of both genders. All patients diagnosed to have OME were subjected for thorough ENT examination (after removing of wax if present) using otoscopy, pneumatic otoscopy, audiological assessment by tympanometry & audiometry and the data were registered on special formula prepared for that reason contained a detailed parameters. Those 72 patients had been divided into three group (4 -10 years, 10-20 years, > 20 years) basing on statistician advice. Ears with acute otitis media, chronic suppurative otitis media, pure sensorineural deafness & ears with ventilation tube (Grommet) were excluded from the study. Assessment of the cases was based on:-

**A-Clinical examination:**

Ear examination using otoscopy or pneumatic otoscopy to find out the color, position & mobility of the ear drum together with looking for air bubbles & fluid level to catch cases of OME . Nasal examination by anterior rhinoscopy & nasopharyngeal examination either by postnasal mirror of adequate size in suitable patients or by using flexible nasopharyngoscope or rigid endoscope (4mm) to check for any pathological changes .

**B. Audiometric assessment:**

1-Tuning fork tests: using the tuning fork 512 Hz. done in majority of patients . The difficulty arises when the child was uncooperative or the

patient has had associated sensorineural deafness.

2-Tympanometry: by using an impedance audiometer done in all patients.The tympanogram resultant curves are divided into 3 types; type A (normal curve), type B(flat curve) &type C2(negative pressure curve).

3- Pure tone audiometry: It was done in most of the patients and the results are divided into (conductive deafness, mixed and normal).patients with pure sensorineural deafness were excluded.

**C- Radiological assessment:**

1- X- ray lateral view of the postnasal space soft tissue was done in all children with OME who are uncooperative for endoscopic examination. This view gave an idea about the size of the adenoids.

2- CT scan and MRI done in indicated cases, to assess the extension of the mass outside the nasopharynx, in particular invasion of the base of skull and intracranial extension.

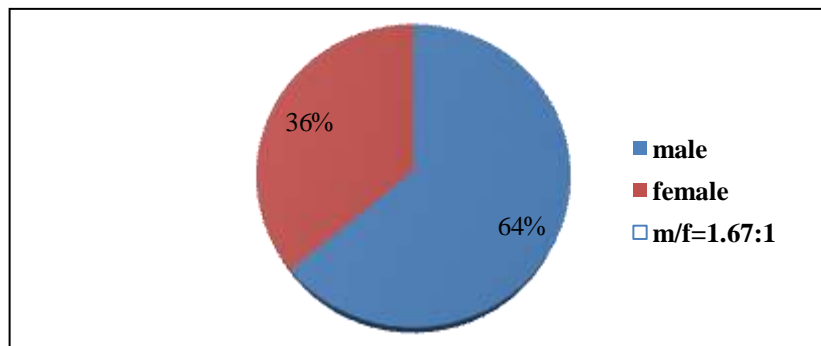
**Results**

**Age and gender:**

In this study 72 patients with OME age ranged from 4- 62 years, with a mean age 18 years, the commonest age frequency was found during the was found during the 1<sup>st</sup> decade of life( 55.6% ) as shown in table (1). Male to female ratio was 1.67:1 as in figure (1).

**Table(1):** showing the distribution of patients according to the age

Age/years	No .of patients	%
<b>4 - 10</b>	(40) uni. →26 bi. →14	55.6
<b>10-19</b>	(14) uni. →9 bi. →5	19.4
<b>&gt;20</b>	(18) uni. →11 bi. →7	25
<b>Total</b>	72	100



**Figure (1)** showing the distribution of patients according to the gender.

**Clinical presentations:**

The clinical presentations in this study was partly related to middle ear problem and partly to nasal & nasopharyngeal diseases and their associated symptoms and signs. The frequency of unilateral and bilateral OME as shown in figure (2) Regarding the frequency of different presentations (signs and symptoms), the hearing loss was the main clinical presentation in 55 patients, many patients may had one or more signs and symptoms , as shown in table (2).

- By otoscopy, the possible positions of the tympanic membranes of the examined ears classified into 3 categories ,as shown in figure (3).
- **Audiological finding:**
- **Tympanometry** : it is an important audiometric investigation in diagnosis of OME, it has been

done in 72 patients ( 124 ears) & the tympanometric curves were classified as shown in figure (4).

- Nasal discharge\*(anterior and/or postnasal dripping)
- Tympanic membrane mobility was checked and the data collected & shown in table( 3).
- **Pure tone audiometry:** has shown that the conductive hearing loss was found in the majority of the ears tested. It has been done in 62 patients(124 ears) and 10 patients in pediatric age group not respond to test, and the results were exhibited in table( 4 ) .

Concerning causes of OME the main was adenoid hypertrophy (41.7%) and least common one was antrochoanal polyp (2.7%) with (7%) no cause can be detected as seen in table (5)

**Clinical examination of the nose and nasopharynx:**

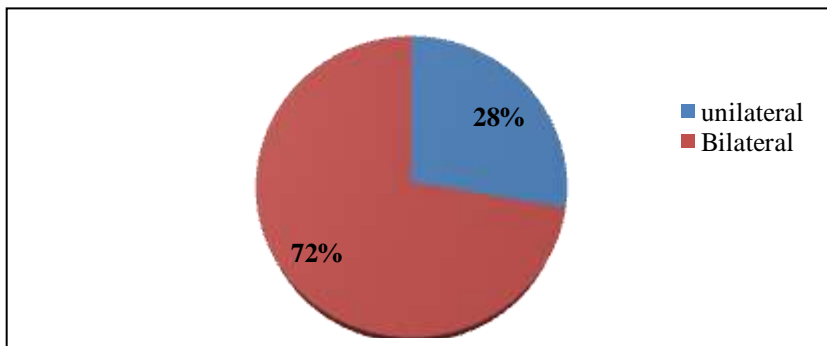


Figure (2) shows the frequency of unilateral and bilateral OME

able (2) : frequency of different signs and symptoms

Presentation( symptoms/ signs)	No.of patients	%
Hearing loss	55	( 76.4 )
Nasal obstruction	48	( 66.7)
Nasal discharge*	36	( 50)
Snoring	34	( 47.2)
Recurent sore throat	28	(38.9)
Referred Otagia	12	( 16.7)
Epistaxis	10	( 13.9)
Head ache	7	( 9.7)
neck mass	4	( 5.6)
Tinnitus	2	(2.8)
Delayed learning	2	(2.8)
Cranial nerve palsy	2	(2.8)

**Examination of the ear:**

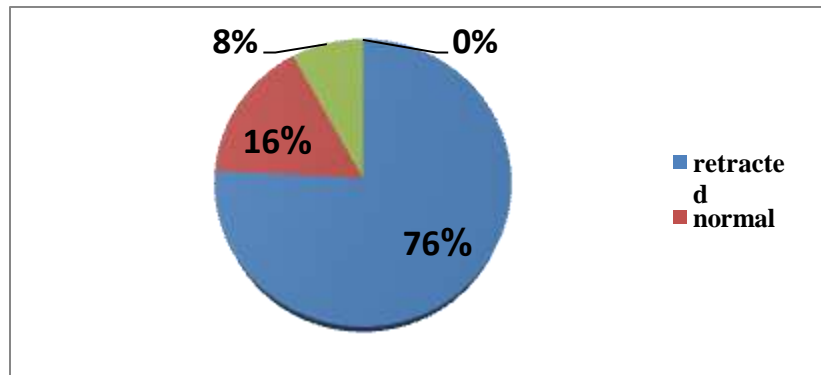


Figure (3): otoscopic findings

Table (3): Distribution of cases according to mobility of tympanic membrane

Mobility	No. of ears	%
Immobile	90	72.6
Reduced	29	23.4
Normal	5	4
Total	124	100

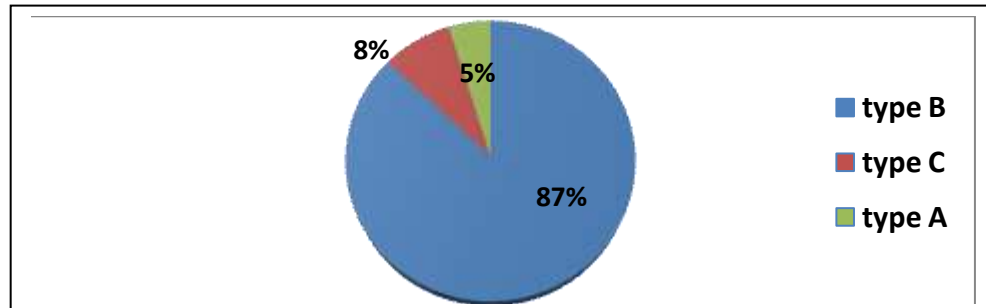


Figure (4): Tympanometric findings of 124 ears with

Table (4) : Audiometric testing of 124 ears in 62 patients with OME

	<10	10-19	>20	Total	
Audiometry	No. of ear	No. of ear	No. of ear	No. of ear	%
Conductive deafness	52	24	30	106	85.5
Mixed deafness	4	2	4	10	8
Normal	4	2	2	8	6.5
Total	60	28	36	124	100

**Table (5): The distribution of causes of OME.**

Findings	No. of patients	
Adenoid hypertrophy	30	41.7
Allergic Rhinitis	11	15.3
Sinusitis	10	13.9
Upper Respiratory Tract Infection	7	9.7
Nasal and nasopharyngeal tumors (benign or malign.)	7	9.7
No cause detected	5	7
Antrochoanal polyp	2	2.7
Total	72	100

### Discussion

Many studies dealt with the same disease were published in the world. Rishi B showed that OME was mainly in children at age of 5 – 8 years (56.8%)<sup>[5]</sup>. Nedunchelian S noted that average male and female percentages were 52.9% and 47.1% respectively with a male to female ratio of 1.12:1<sup>[6]</sup>. Dong-Hee L showed that the incidence was 65% males & 35% females with a ratio of (1.85:1)<sup>[7]</sup>.

The formal results agreed with results of our study. These findings are consistent with the fact that OME is the commonest disabling disease of childhood with male predominance because boys have less pneumatized mastoid air cells, in addition to overactivities of males in all age groups.

After a thorough view on the results of our study it is obvious that hearing loss was the main presenting symptom (76.4%). Many studies agreed with this result e.g. Maw AR with (76%)<sup>[1]</sup>, Ahmad NA with (47.2%)<sup>[8]</sup> & Syed HI with (50.3%)<sup>[9]</sup>. However, these wide variety of differences probably due to different causes of awareness about hearing loss like scholastic retardation, family awareness, or accidentally discovered during routine otolaryngological examination for other diseases.

Concerning the position of tympanic membrane our findings were nearly similar to different clinical studies e.g. Ahmad NA who found retracted tympanic membrane (91.7%) of ears<sup>[8]</sup>, Sharma Karan with 74% had retracted ear drum<sup>[10]</sup> & in Syed HI it was (72.18%)<sup>[9]</sup>. This agreement can be due to obvious fact that retracted tympanic membrane is strongly related to OME than other positions of the ear drum as retraction considered to be the main otoscopic sign that may reflect the negative middle ear pressure which is beneficial in detection of OME.

Audiologically the results of this study were agreed with some studies e.g. Ahmad NA who showed that type B curve in (92.2%), type C curve in (5%), and type A curve in (2.8%)<sup>[8]</sup>, Abdullah B found that most patients showed a flat type B curve (84%) on

tympanometry<sup>[11]</sup> & Maw AR where tympanometry curves revealed that (93%) with type B, (5%) had type C & (2%) had type A curves<sup>[1]</sup>. On the other hand our results disagreed with Sharma Karan who showed type A tympanometric curve in (34.5%), type B in (50.17%), and type C in (15.33%), with (69.75%) had an air conduction threshold level of >20 dB<sup>[10]</sup>.

Our finding regarding the causes of OME shown in table(5) are variably inconsistent with other studies. HO KY, found that the most common causes of isolated OME in his study were upper respiratory tract infections (23.0%), allergic rhinitis (18.4%), sinusitis (17.3%) & nasopharyngeal tumors (5.7%)<sup>[12]</sup>. Finkelstein Y stated that the most common causes of OME were paranasal sinus disease (67.1%), benign nasopharyngeal diseases (19%), (4.8%) were found to have head and neck cancer & (1.8%) no cause can be determined<sup>[13]</sup>. Robinson PM reported that OME cases were associated with sinusitis (16.0%), URI (8.5%), allergic rhinitis (5.3%), while (11.7%) of cases were caused by other benign conditions such as nasal polyps, nasopharyngeal cysts ...etc., & (7.4%) of cases head and neck tumors were found<sup>[14]</sup>.

The differences between these studies are probably due to fact that nasal & nasopharyngeal diseases as a causes of OME are widely variable with different populations, in addition to a small size sample taken in our study.

### Conclusions

- 1- OME have different manifestations mainly due to otological problems but can be due to nasopharyngeal problems.
- 2- The effect of the nose and nasopharynx on Eustachian tube is highly significant & consequently plays an important role in the health of the middle ear, so it is essential to treat these diseases (OME and nasopharyngeal pathologies) in continuity rather than separately.

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