

# SURGICAL FINDINGS IN TYMPANIC CAVITY OF CHILDREN SUFFERING FROM OTITIS MEDIA

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## Summary

We described and compared the surgical findings in 38 children suffering from different forms of otitis media – otitis media with effusion and recurrent otitis media. We have shown that various forms of otitis media are dynamically interrelated regarding their causes and pathogenesis and do not represent separate entities. Rather, they represent the same disease process as it progresses in continuum.

## Rezumat

Am descris și comparat descoperiri intraoperatorii la copiii cu diferite forme de otita medie – otita medie exudativă și otita medie recidivantă. Am demonstrat că forme variate de otita medie interrelatează dinamic și nu prezintă entități separate, dar sunt manifestări clinice al aceiași proces patologic în continuitate.

## Introduction

Otitis media (OM) is the most common disease of childhood with the exception of viral upper respiratory infection. More than 80 % of children suffered from acute otitis media (AOM) at least once in their life, more than 70 % have 3 or more episodes. Diagnostics of OM in early childhood is often complicated by feebly marked local signs and strongly pronounced general manifestations of this disease and concomitant pathology. Absence of timely diagnostics and appropriate treatment and also, some anatomical and physiological features of infant middle ear and organism lead to formation of recurrent otitis media and otitis media with effusion.

Recurrent acute otitis media (RAOM) is defined as three bouts of AOM in 6 months or four episodes in 12 months. Otitis media with effusion (OME) means presence of liquid (serous, mucous) behind the relatively intact tympanic membrane. The bacteria, bacterial products, enzymes, and inflammatory mediators present in the unresolved OM contribute to progression of local disease and eventually to irreversible changes associated with chronic otitis media (COM).

Surgical intervention should be considered when observation and medical therapy fail to demonstrate timely resolution of the effusion. Myringotomy with insertion of ventilation tubes was found by many authors to be most effective in preventing and treating of different forms of OM.

The **purpose** of our research is to describe and compare the surgical findings in children suffering from different forms of OM who underwent Myringotomy with Tympanostomy tubes insertion.

## Material and Methods

Our research was carried out in ORL Clinic, Republican Hospital for children “Em. Cotaga”. The study involved 38 patients at the age from 1 mo to 18 years with different forms of otitis media – otitis media with effusion (OME) and recurrent acute otitis media (RAOM) in remission.

The Work up included anamnesis, pneumatic otoscopy, otomicroscopy, conventional audiometry, impedance audiometry otomicroscopy during surgery, examination of surgical findings and analysis of morphological changes in tympanic cavity, cytological and histological results. In additional rhinoscopy, oropharyngoscopy and posterior rhinoscopy were performed.

Tympanic membrane (TM) appearance (color, transparency, dullness, opacity, thickness, visibility of main points, presence of retraction pockets, thin-film adhesion, its localization and size) were evaluated by otoscopy before surgery and otomicroscopy during the surgery.

Tympanic cavity (TC) changes (presence and character of effusion – serous, mucous, purulent, changes of mucosa - color, thickness, presence of granulation tissue, polyps), etc. were evaluated by otomicroscopy during the surgery.

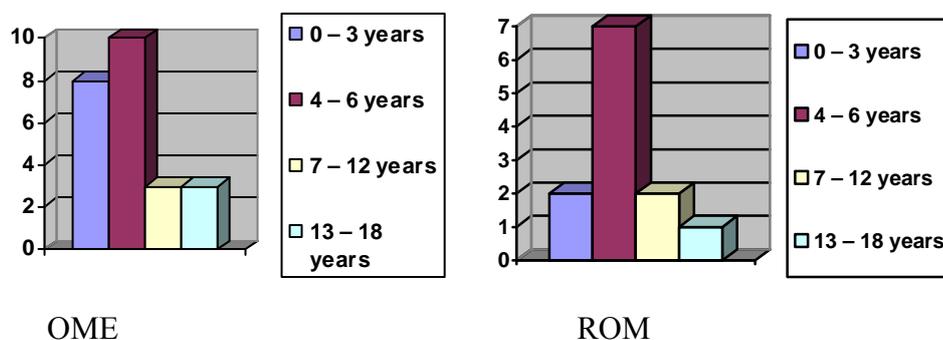
Surgical procedure - Myringotomy was made under general anesthesia with endotraheal anesthetic.

### Results

From 38 children included in Project 24 were diagnosed as having OME (63.2%) and 14 - RAOM (36.8 %). Total number of ears was 69 (in 7 patients only 1 ear was affected). The majority of patients (28 - 73,7%) were male. Age distribution is presented in *table 1*.

*Table 1. Age distribution of patients with otitis media*

Age groups of patients	OME	RAOM	Total
0 – 3 years	8	2	10
4 – 6 years	10	9	19
7 – 12 years	3	2	5
13 – 18 years	3	1	4
Total	24	14	38



*Fig. 1. Age distribution at the time of surgery performed for OME and RAOM*

The onset of OME began early in most of the patients. In Group 1, the mean age of OME diagnosis was 2.74 years (SD 1.63), in Group 2 – 4.24 years (SD 3.57). Figure 1 illustrates age distribution at the time of surgery performed for OME and RAOM.

Eight patients from Group 1 and 2 patients from Group 2 were operated for OM during their first three years of life. Ten patients from Group 1 and 9 patients from Group 2 were operated at 4 to 6 years of age. Six patients from Group 1 and 3 patients from Group 2 were operated at 7 to 18 years of age.

From 69 ears which have been operated 41 were diagnosed as having OME and 28 ears – having RAOM.

#### **Otoscopy**

In both groups (OME and RAOM in remission) TM was relatively intact during conventional otoscopy (grey color, dullness, opacity, thickness of TM, low visibility of main points).

#### **Audiometry**

The mean hearing level before surgery in Group 1 was 35 dB (SD 4) and in Group 2 – 39 dB (SD 6).

#### **Impedance audiometry**

Type B of tympanogram was registered in 96 % of ears from Group 1 and 72 % of ears from Group 2, Type C<sup>2</sup> - in 4 % and 28 % accordingly. No any Acoustical Reflex was registered.

TM and TC changes	OME	RAOM	Total
Retraction pouchets	12	18	30
Thin-film adhesion	2	3	5
Glue-like effusion	39	20	59
Serous liquid	1	5	6
Purulent effusion	1	3	4
Granulation tissue, polyps	9	12	21
Cholesteatoma-like formations	3	7	10

### **Otomicroscopy**

Otomicroscopy during surgery revealed more changes: enlargement of vessels, changes in transparency and visibility of main points, retraction pockets and thin-film adhesion.

Retraction pockets were found in 12 ears from Group 1 and in 18 ears from Group 2. Thin-film adhesion to Promontory presented in 2 cases of Group 1 and 3 cases of Group 2.

We analyzed the area and size of the retraction pockets in these two groups. In 10 ears from Group 1 retraction pockets were mild and situated in the anterior part of the tympanic membrane; the same data from Group 2 showed 8 ears. Total retraction of the tympanic membranes were found in relatively equal percentage of both groups (5% and 7%). Severe retraction pockets involving the posterior superior quadrant of the tympanic membrane, was noted in 2 ears of Group 1 and in 7 ears of Group 2.

#### **Tympanic cavity**

Effusion was presented practically in all ears. Thick, glue-like effusion was found in both groups (39 and 20 cases accordingly). Serous liquid was aspirated from 1 ear of Group I and 5 ears of Group II. Purulent effusion was noted in 1 ear from Group I and 3 cases from Group II. Granulation tissue, polyps were noted in 9 cases Group 1 and in 12 ears in Group 2. Cholesteatoma-like formations were removed from 3 ears of Group 1 and from 7 ears of Group 2. All these patients were older than 6 years of age.

### **Discussion**

The age of the patients when OM was diagnosed in these two groups was slightly different which means that in Group 1 the disease was diagnosed at an early stage. OME begins more often at 2 – 3 years, RAOM - a little bit later – at 4 – 5 years.

Retraction pockets were found more often in Group 2, in Group 1 in most cases it was mild and in the anterior part of the tympanic membrane. Severe retractions in the superior posterior quadrant (Prussak space) predisposing for cholesteatoma development was found more rarely in the OME group compared to the RAOM group. Cholesteatoma – like formation was found more often in ears from RAOM group.

### **Conclusions**

We have shown that various forms of OM are dynamically interrelated regarding their causes and pathogenesis and do not represent separate entities. Rather, they represent the same disease process as it progresses in continuum.

We support the opinion of some authors that TT insertion prevents severe retraction pocket formation and cholesteatoma development.

We consider that using tympanostomy tubes for the treatment of otitis media with effusions and recurrent otitis media in childhood might prevent the necessity of early, repeated and radical ear surgery in the future.

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## EVOLUȚIA NATURALĂ A OTITEI MEDII EXUDATIVE LA COPII

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### **Summary**

#### *Natural evolution of otitis media with effusion in children*

We present the results of functional dynamic investigation of children suffering from Otitis media with effusion. The work up included otoscopy, pneumatic otoscopy, otomicroscopy, tympanometry, registration of acoustic reflex, conventional audiometry, surgical findings, functional results in dynamics. The majority of patients had received comprehensive treatment in time, but 30 of them underwent surgery later (in 3 – 5 years). We compared the results of noninvasive examinations in children and analyzed surgical findings in these 2 groups. Our research revealed that in all patients who hadn't received in time adequate treatment more severe forms of otitis media were registered. Various forms of otitis media are dynamically interrelated and can be transformed one to other in case of lack of comprehensive management.

### **Rezumat**

Prezentăm rezultate examinărilor funcționale a copiilor cu otită medie exsudativă în dinamică. Pacienții au fost examinați corespunzător «Schemei examinării otologice a copilului», elaborate de noi, care include datele anamnezei minuțioase, otoscopiei optice, otoscopiei pneumatice, otomicroscopiei, timpanometriei și înregistrării reflexului stapedian, audiometriei, rezultatele investigațiilor intraoperatorii, rezultatele funcționale pe parcursul 5 ani. Majoritate pacienților au primit tratament, dar 30 din copii din diferite motive au suportat tratament chirurgical numai peste 3 – 5 ani. Comparând rezultate investigațiilor funcționale și descoperirile intraoperatorii concluzionăm că la pacienții care nu au primit tratament adecvat la timp proces patologic în urechea medie s-a transformat în forme mai severe. Diferite forme de otită medie interrelatează dinamic și în lipsa tratamentului adecvat se transformă din una în alta.

### **Actualitatea problemei**

Otită medie (OM) constituie una din cele mai răspândite afecțiuni în copilărie cu excepția infecției virale a căilor respiratorii. Majoritatea copiilor (până la 90%) suferă de otita medie acută (OMA) o singură dată în viață, 74 % copii - de 3 și mai multe ori. Datorită particularităților anatomofiziologice ale organelor ORL și a întregului organism al copilului (fon alergic, scăderea imunității ș.a.) ca rezultat al otitelor medii acute se poate dezvolta hipoacuzie progresivă, care spre timp devine stabilă și ireversibilă. Lipsa diagnosticului oportun și tratamentului adecvat duce la otită medie exsudativă, otită medie recidivantă, otită medie adezivă, otite medii cronice supurative, influența cărora la viața socială a copilului (dezvoltarea psiho-emoțională, formarea vorbirii și a intelectului) este semnificativă. Auzul la copilul de vârstă precoce are o mare