

# Therapeutical protocol in otitis seromucosa

Radmila Anca Bugari<sup>1,2</sup>, Sorin Baschir<sup>1,2,3</sup>, Luminita Turcin<sup>2,3,4</sup>, Dana Simona Chita<sup>2,5</sup>, Dana Zdremtan<sup>1,3</sup>,  
Ioana Floarea<sup>1,3</sup>, Afilon Jompan<sup>4</sup>, Alexandru Chioreanu<sup>1,3</sup>

<sup>1</sup>Department of Otorhinolaryngology, "Vasile Goldis" Western University of Arad, Romania

<sup>2</sup>Department of Otorhinolaryngology, "Dr. Turcin" Clinic, Arad, Romania

<sup>3</sup>Department of Otorhinolaryngology, Arad County Clinical Hospital, Romania

<sup>4</sup>Department of General Medicine, "Vasile Goldis" Western University, Arad, Romania

<sup>5</sup>Department of Neurology, "Vasile Goldis" Western University of Arad, Romania

## ABSTRACT

**Introduction.** In the first part of the paper, the authors propose to systematize the data from the literature on seromucous otitis.

**Material and methods.** We performed a retrospective clinical study, starting from the premise that there are 3 therapeutic trends for children with chronic seromucous otitis in medical practice. A first group includes children who only underwent adenoidectomy, the second who underwent adenoidectomy and myringotomy and the third group who underwent adenoidectomy and the installation of a trans-tympanic drainage tube.

**The results** were compared, and a new therapeutic protocol regarding the pediatric patients with chronic seromucous otitis comes as a final conclusion.

**Keywords:** otitis, children, trans-tympanic tube, endoscopy, myringotomy

## INTRODUCTION

Otitis seromucosa, also known as serous otitis media or otitis media with effusion, is a common condition that involves the accumulation of fluid in the middle ear space without signs of acute infection. Otitis seromucosa can affect individuals of all ages, but it is most common in children under the age of ten [1]. The fluid can be either mucous or serous in nature and can be caused by a variety of factors, including allergies, infections, and blockages of the Eustachian tube.

## Etiology

The determining factor is represented by ototubar dysfunction – the three functions – ventilation, drainage mainly and protection of the middle ear – being affected. Age is a facilitating factor; the highest frequency is between 2 and 4 years with a decrease towards 7-8 years.

Another category of factors are the mechanical ones (obstructive): adenoids (the most common cause in children), sinochoanal polyp, nasal polyposis, chronic rhinitis-hypertrophy of the turbinates, deviated nasal septum, nasal or nasopharyngeal tumors.

The inflammatory etiology is a very common one: acute nasopharyngitis, acute infections of the upper airways – common causes in children, and of course the allergic factor (allergic rhinitis) is involved more and more frequently

In conclusion it can be caused by allergies, viral infections, bacterial infections, or blockages of the Eustachian tube. The Eustachian tube is a small tube that connects the middle ear to the nasopharynx. When the Eustachian tube becomes blocked, fluid can build up in the middle ear, leading to otitis seromucosa.

## Pathogenesis

Tubal dysfunction causes a drop in pressure at the level of the middle ear, hypoxia, dilation of blood vessels of the mucosa, hypersecretion of the submucous glands, processes followed by the appearance of a liquid – transudate – at the level of the middle ear.

## Classification

Seromucous otitis can be: a) acute serous otitis media- with evolution under 21 days, is an evolutionary phase of acute otitis media b) subacute otitis media 22 days-8 weeks c) chronic otitis media-over 8 weeks. In general, most specialists consider it to be chronic seromucous otitis when the swelling persists for 8-10 weeks in the middle ear [2].

## Symptomatology

Acute serous otitis media – or acute catarrhal otitis media is an evolutionary phase of acute otitis and it is usually related to an acute condition, especially in children with acute adenoiditis or with acute infections of the upper respiratory tract [2,3]. The symptoms include: otalgia, always present in children, of moderate intensity, in adults it may be absent, hypoacusis with a feeling of fullness in the ear and autophony, the sensation of liquid in the ear. At the otoscopic examination we will observe: diffuse congestion of the tympanic membrane, more intense at the level of the hammer, modification of the light triangle, liquid level-sometimes-yellowish, more opaque area and air bubbles. Audiogram will present transmission hearing loss and impedancemetry- type B or C curve. The evolution is usually towards healing in 7-14-21 days, the hearing loss dis-

appears at the latest. Complications usually appear in case of absence of proper therapy evolving into chronic state [3,4].

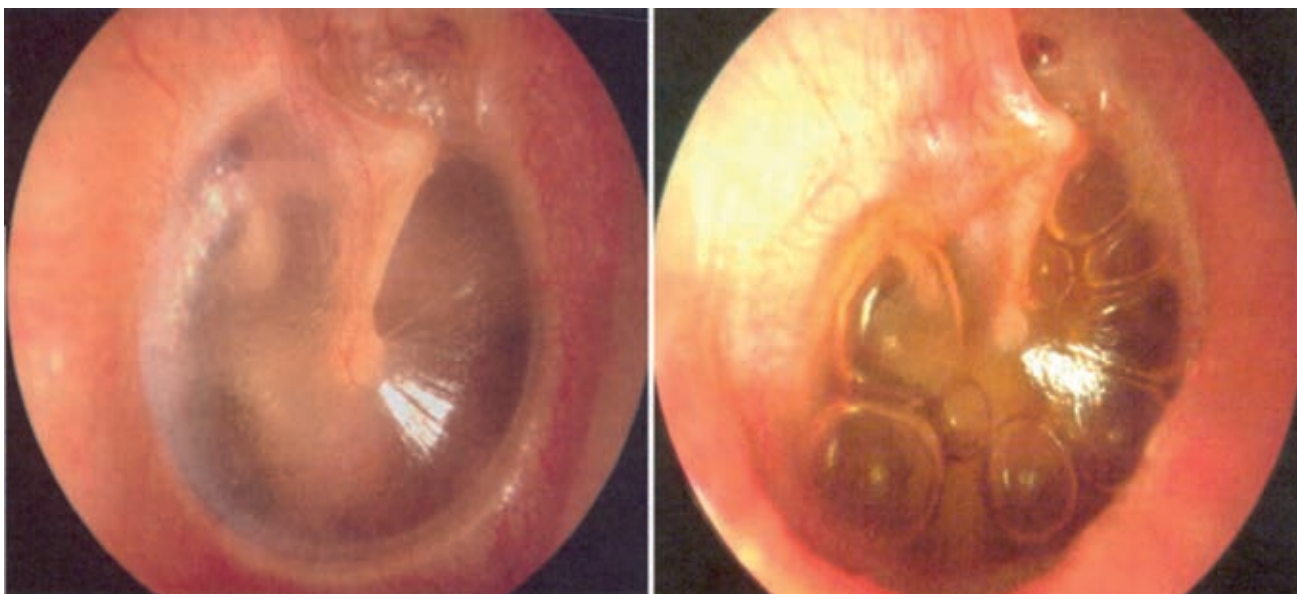
Chronic seromucous otitis media evolutionarily follows acute serous otitis, due to persistent ear infections or incorrect treatment, or it evolves from the start as chronic serous otitis. Subjective symptoms include hearing loss is the predominant and usually unique symptom, pressure in the ear, full ear sensation. During otoscopy we observe matt ear drum, with lost luster, decrease in the mobility of the eardrum. In the initial stages, when there is liquid in the middle ear, the eardrum bulges, then in the advanced stages it becomes retracted, but in both cases it is with loss of mobility. Audiogram shows transmission hearing loss, and impedancemetry-curve is type B-liquid presence phase, or type C, in the membrane retraction phase [4].

## Therapeutical methods

The review of specialized literature highlights different therapeutic attitudes, depending on the evolutionary-acute or chronic form.

In acute serous otitis media, the treatment of choice is medication, broad-spectrum antibiotic (amoxicillin, amoxicillin with clavulanic acid, clarithromycin), non-steroidal anti-inflammatory drugs, nasopharyngeal disinfection-local vasoconstrictors, otic solutions; myringotomy is reserved for cases of complications like: a) acute suppurative otitis media-is an evolutionary form of acute otitis media that follows the catarrhal form b)facial nerve paralysis c) acute autogenous meningitis d) secondary vertigo syndrome

The treatment of chronic seromucous otitis includes three different directions: a) adenoidectomy



A B  
**FIGURE 1.** A. Normal eardrum B. Otitis seromucosa

without other otic maneuvers b) adenoidectomy with simple myringotomy c) adenoidectomy with installation of a drainage tube and transtympanic aeration.

Studying the specialized literature, it can be seen that the overwhelming majority of authors agree with performing adenoidectomy in children and correcting other favorable factors, when they exist, the differences consist in the surgical approach to the middle ear, from the absence of any surgical act to the systematic installation of a transtympanic ventilation tube in all adenoidectomies cases [4,5,6].

There is a variety of tympanostomy tubes, they are variable in terms of size, shape, construction material, the presence or not of a metal wire or an external extension (ear) that is useful for insertion and extraction which we agree.

There is also a large variety of opinions regarding the place of insertion of the tube: the posterior and inferior quadrant the most common, but also the antero-inferior or antero- superior quadrant (Armstrong 1983).



**FIGURE 2.** Trans – tympanic tube

The duration of maintaining the tympanostomy tube is at least 3 months, in recurrent cases it is maintained for 6 to 12 months; the penetration of water “into the ears” is completely prohibited during the entire period of maintaining the tube. The most frequent complications of the introduction of trans- tympanic drainage and ventilation tubes are: a) otorrhea – the most frequent complication, the percentage of its occurrence is between 15% and 50% with an average between 15% and 20% [5-7]. There are differences between the bacteriology regarding the mechanism of production and the treatment of otorrhea in a small child – under three years old – and in an older child or an adult. b) tympanosclerosis incidence is three times higher in patients

who had a trans- tympanic tube [8,9]. c) the persistence of frequent tympanic perforation is directly proportional to the duration of maintaining the tube and is 3-5% [9,10]. d) cholesteatoma is a rare complication [10].

## PURPOSE

The objective of the study is to establish an effective therapeutical protocol for seromucous otitis patients.

In this context, studying the evident case files of the ENT Clinic of Arad, we conducted this study, based on the cases operated on in the last 10 years, the total number of selected patients being 177 cases out of a total number of 1707 children operated in the clinic. Out of the total number of operated children, 802 presented seromucous otitis, representing 47%, from this group the cases that were included in the study were chosen, constituting 22% of the group of children with seromucous otitis. A rigorous selection of cases was carried out according to inclusion-exclusion criteria as precise as possible: *group 1* – children with chronic seromucous otitis in which only adenoidectomy was performed - 47 cases, *group 2* – children who underwent adenoidectomy and myringotomy, trans-tympanic puncture - 65 cases, *group 3* – children who underwent adenoidectomy and installed trans-tympanic ventilation tube – 65 cases (Figure 3).

The inclusion criteria were the following: a) children with chronic seromucous otitis, diagnosed clinical using examination with the microscope; b) impedancemetry-type B curve; c) audiogram; d) allergology testing negative; e) the informed consent of parents or legal guardians; f) Nasal and nasopharyngeal endoscopy.

Exclusion criteria were: a) children with adenoidectomy or other interventions on the middle ear; b) other surgical interventions in the field of ENT in the last six months; c) general treatment with antibiotics one month before; d) general or local therapy with cortisone in the last three months; e) antihistamine therapy one month before; f) deviated nasal septum; g) clinical symptomatology of nasal and/or sinus infection; h) other serious medical conditions that contraindicate surgical intervention

## METHOD

We staged the therapeutical protocol into 6 steps as follows:

Step 1 – we established the inclusion and exclusion criteria; we established the preoperative preparation of the patients and we obtained the informed consent for all the medical procedures;

Step 2 – the surgical intervention.

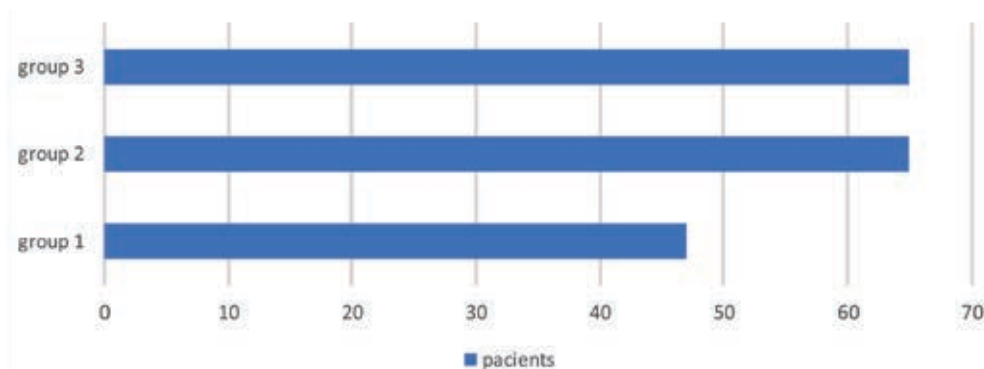


FIGURE 3. The three study groups

Step3 – seven days after the intervention, ENT clinical examination.

Step 4 – to 14 days after the intervention ENT clinical examination.

Step 5 – 30 days after the intervention, ENT clinical examination, impedancemetry, audiogram

Step 6 – 60 days after the intervention, ENT clinical examination, impedancemetry, audiogram

All interventions were performed under general anesthesia with orotracheal intubation, for all the group of 177 patients. Adenoidectomy was performed, the difference consisted in the different approach to the middle ear:

a) group 1 – 47 children – no surgery was performed on the middle ear, only adenoidectomy was performed.

b) group 2 – 65 children – endoscopic adenoidectomy was performed and at the same time the operator performed a trans – tympanic puncture-myringotomy, with aspiration of the liquid secretion from the middle ear.

c) group 3 – 65 children – endoscopic adenoidectomy was performed and at the same time the operator installed a trans-tympanic drainage tube.

The study protocol and the visit schedule were strictly observed by our multidisciplinary team.

**RESULTS**

In group 1, we observed favorable results, with the normalization of the aspect of the eardrum, the impedancemetric curve and the audiometric curve, were reported in 36 patients, representing 76% of the total group.

Analyzing group 2, we observed favorable evolution in a number of 59 patients, representing 92% of the batch.

The evolution of the patients included in group 3 is similar with the previous one, 60 children having a favorable evolution, which represents 93% of the total group.

**DISCUSSIONS-CONCLUSIONS**

Seromucous otitis media is a common condition in childhood – the maximum frequency is between two and five years [1,2]. Analyzing the evolution of the children from group 1, we observe a favorable evolution in 76% of the cases, which proves that adenoidectomy alone presents a fairly high percentage of failures, cases in which surgical intervention must be repeated and an intervention also performed at the level of the middle ear; it is possible that some of these cases present a very viscous secretion that can no longer be eliminated through the tube even if the tube resumes its normal functions.



FIGURE 4. Group 1 results

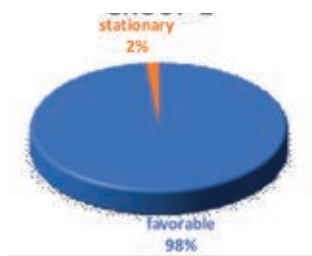


FIGURE 5. Group 2 results

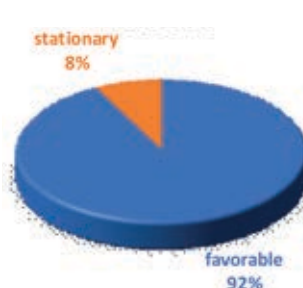


FIGURE 6. Group 3 results



The evolution of the children in group 2 demonstrates that adenoidectomy supplemented by myringotomy with aspiration of the contents of the middle ear is a procedure with very good results, the percentage of cases with full functional recovery being high, 92%.

Similar situation is encountered in the evolution of the cases in which adenoidectomy and trans-tympanic tube installation were performed, the percentage of patients with a favorable evolution being higher than in group 2, but the difference is insignificant from a statistical point of view 1-2 %.

In conclusion, corroborating the data from the literature with our own experience gained during years of work and observation, we proposed a new protocol for the child with chronic seromucous otitis:

a) preoperatively, impedancemetry, tonal audiometry and nasal and nasopharyngeal endoscopy.

d) endoscopic adenoidectomy, performed according to the classic method.

e) trans-tympanic puncture with aspiration of the secretion from the middle ear

f) evolution follow-up according to the described protocol

There is a percentage of 8-10% of children in whom seromucous otitis recurs, the liquid is restored and only in these patients we insert a trans-tympanic ventilation tube, after we necessarily perform a pre- or intraoperative endoscopic nasal and nasopharyngeal re-examination.

We did not record any complications in children with myringotomy. Children with a trans-tympanic tube presented otorrhea in two children – 3%, and one child presented persistent tympanic perforation – 1.5%.

*Conflict of interest:* none declared

*Financial support:* none declared

## REFERENCES

- Rosenfeld RM, Shin JJ, Schwartz SR, et al. Clinical Practice Guideline: Otitis Media with Effusion (Update). *Otolaryngol Head Neck Surg.* 2016; 154(suppl1):S1-S41.
- Venekamp RP, Damoiseaux RA, Schilder AG. Acute otitis media in children. *BMJ Clin Evid.* 2014;2014:0301. Published 2014 Sep 16.
- Bluestone CD. Role of surgery for otitis media in the era of resistant bacteria. *Pediatr Infect Dis J.* 1998;17(11):1090-100.
- Hendley JO. Clinical practice. Otitis media. *N Engl J Med.* 2002;347(15):1169-74.
- Marchisio P, Galli L, Bortone B, et al. Updated Guidelines for the Management of Acute Otitis Media in Children by the Italian Society of Pediatrics: Treatment. *Pediatr Infect Dis J.* 2019;38(12S Suppl):S10-S21.
- Heidemann CH, Lous J, Berg J, et al. Danish guidelines on management of otitis media in preschool children. *Int J Pediatr Otorhinolaryngol.* 2016;87:154-163.
- Thomas NM, Brook I. Otitis media: an update on current pharmacotherapy and future perspectives. *Expert Opin Pharmacother.* 2014;15(8):1069-83.
- Simon F, Haggard M, Rosenfeld RM, et al. International consensus (ICON) on management of otitis media with effusion in children. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2018;135(1S):S33-S39.
- Mariño-Sánchez F, Valls-Mateus M, de Los Santos G, Plaza AM, Cobeta I, Mullol J. Multimorbidities of Pediatric Allergic Rhinitis. *Curr Allergy Asthma Rep.* 2019 Feb;19(2):13.
- Sliwowska W. Obraz kliniczny wysiekowego, surowiczego-śluzowego zapalenia ucha środkowego (otitis media secretoria) [Clinical picture of exudative, seromucous inflammation of the middle ear (otitis media secretoria)]. *Otolaryngol Pol.* 1968;22(2):355-59.