

# *Evaluation of the Results and Complications of the Ventilation Tubes' Setting Surgery in Patients with Serous Otitis Media*

## *Avaliação de Resultados e Complicações da Cirurgia de Colocação de Tubos de Ventilação em Pacientes com Otite Média Serosa*

**José Ricardo Testa\***, **Spyros Cardoso Dimatos\*\***, **Bárbara Greggio\*\*\***, **Juliana Antonioli Duarte\*\*\***.

\* Doctor of Medicine. Medical Faculty Otorhinolaryngology.

\*\* Master Pediatric Otolaryngology. Medical Graduate Student.

\*\*\* Medical Residency. Resident.

Institution: UNIFESP / EPM - Federal University of São Paulo Paulista School of Medicine - Department of Pediatric Otolaryngology.

São Paulo / SP - Brazil.

Mail Address: Juliana Antonioli Duarte - Rua Pedro de Toledo, 947 - 2º andar - Vila Clementino - São Paulo / SP - Brazil - ZIP CODE: 04039-002 - Telefax: (+55 11) 5539-5378 - E-mail: j\_antonioli@yahoo.com.br

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### **SUMMARY**

- Introduction:** Tympanostomy for ventilation tube setting is one of the surgeries more frequent performed in patients in the pediatric age group.
- Objective:** This study evaluates the indications and complications post operatives more frequents in this otorhinolaryngological practice in a school hospital.
- Method:** It was realized a series type retrospective study of cases in which 109 pediatric patients, that have received ventilation tube were evaluated as for the post operative indication and attendance for the otorhinolaryngology sector of the Paulista Medicine School for 2007 to 2008.
- Results:** The age' average found was 7,37 years, being the majority of the patients of the male sex (59,63%). All the cases have had as surgical indication serous otitis media. The taxes of complications found were lower than those related for the literature with 3,43% of residual perforation with necessity of surgical re intervention and 5,47% do not presented a audiometric improvement needing a new insertion of ventilation tube.
- Conclusion:** The results found suggest that in our service there are lower rates of postoperative otorrhea, tube reinsertion, less tubes surgically removed and a similar rate of residual perforations that that one described in the literature for surgical placement of ventilation tubes in patients with SOM.
- Keywords:** otitis media, middle ear ventilation, results evaluation (health care).

### **RESUMO**

- Introdução:** Timpanotomia para colocação de tubo de ventilação é uma das cirurgias mais frequentes realizadas em pacientes na faixa etária pediátrica.
- Objetivo:** Esse estudo avalia indicações e complicações pós-operatórias mais frequentes nesta prática otorrinolaringológica em um hospital escola.
- Método:** Foi realizado um estudo retrospectivo tipo série de casos no qual 109 pacientes pediátricos, que receberam tubos de ventilação, foram avaliados quanto à indicação e acompanhamento pós-operatório pelo setor de otorrinolaringologia da Escola Paulista de Medicina durante os anos de 2007 a 2008. A idade média encontrada foi de 7,37 anos, sendo a maioria dos pacientes do sexo masculino (59,63%). Todos os casos tiveram como indicação cirúrgica otite média serosa. As taxas de complicações encontradas foram menores que as relatadas pela literatura com 3,43% de perfuração residual com necessidade de reintervenção cirúrgica e 5,47% não apresentaram melhora audiométrica, necessitando de nova inserção de tubo de ventilação.
- Resultados:** A idade média encontrada foi de 7,37 anos, sendo a maioria dos pacientes do sexo masculino (59,63%). Todos os casos tiveram como indicação cirúrgica otite média serosa. As taxas de complicações encontradas foram menores que as relatadas pela literatura com 3,43% de perfuração residual com necessidade de reintervenção cirúrgica e 5,47% não apresentaram melhora audiométrica, necessitando de nova inserção de tubo de ventilação.
- Conclusão:** Os resultados encontrados sugerem que em nosso serviço há menores taxas de otorreia pós-operatória, reinserção de tubos, menor número de tubos removidos cirurgicamente e taxa semelhante de perfurações residuais que a descrita na literatura para a cirurgia de colocação de tubo de ventilação em pacientes com OMS.
- Palavras-chave:** otite média, ventilação da orelha média, avaliação de resultados (cuidados de saúde).

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## INTRODUCTION

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Otitis media is the most common disease in childhood (1). It is estimated that about 90% of children have suffered at least 1 episode of acute otitis before 2 years of age (2). Hearing loss consequent to the damage involves otitis more frequently found in this population and may be responsible for delayed acquisition of language, cognitive and psychosocial development.

The placement of tympanostomy tubes after myringotomy for treatment of otitis media is the surgical procedure most commonly performed in children (1,2,3). This procedure can be used to treat serous otitis media (seromucous) and to treat recurrent acute otitis media (1,2). Both diseases can be associated with hearing loss and damage to the middle ear structures.

In 2004 a guideline (4) was published, updating the first guideline of 1995 BLUESTONE and KLEIN (5), and reviewing the indications for placement of tympanostomy tubes transtympanic following:

- A - Secretory otitis media (WHO), no improvement after antibiotic treatment and persisting for 3 months or more in bilateral cases or 6 months or more in unilateral cases.
- B - Recurrent acute otitis media especially when there is failure of antibiotic prophylaxis. In the presence of 3 episodes of AOM in the last 6 months or 4 episodes in the last year.
- C - Recurrent secretory otitis media episodes whose duration is considered excessive, or 6 months within 1 year.
- D - Suspected suppurative complications
- E - Dysfunction of the Eustachian tube, even with absence of middle ear effusion when the patient presents with recurrent signs and symptoms not relieved by medical treatment.
- F - Barotrauma, especially in the prevention of recurrent episodes of aircraft such as trips or treatment with hypobaric camera.

According to the American Academy of Pediatrics, a guideline on secretory otitis media, a patient is considered a candidate for surgery when the diagnosis is established by WHO for 4 months or longer with persistent hearing loss and myringotomy with ventilation tube insertion is the preferred myringotomy only (6). This guideline does not recommend implementation of adenoidectomy in the same operative time, unless there is a distinct indication for nasal symptoms such as nasal obstruction or chronic adenoiditis. Adenoidectomy should be used to treat only the need for WHO 2nd intervention, and in such cases should be performed adenoidectomy and myringotomy with or without insertion of ventilation tubes (6).

Tonsillectomy and myringotomy should be shown not only to treat OME (6).

Despite the placement of tympanostomy tubes is a simple procedure, complications can occur. Tympanic sequelae after myringotomy for insertion of tympanostomy tubes are common but are generally transient (otorrhea) or do not affect the function (tympanosclerosis) and is reported to occur in 25% to 33% of patients (7). One of the most common complications are perforation and residual is reported in about 2% of patients receiving tube of short duration, type Shepard, and 17% of patients receiving long-term tube type Paparella (6). Studies indicate that tubes remain leased for more than 30 months have a lower chance of spontaneous extrusion and higher residual risk of perforation (2,8). It is estimated that 7 to 8% of the tubes inserted should be removed by the doctor (2). Anesthetic complication is reported in cases 1:50.000 (6).

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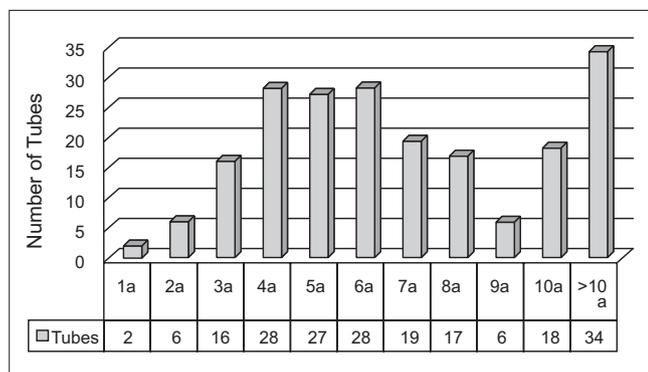
## METHOD

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We Cconducted a retrospective case series with data collection for the Study of medical records. We included all Patients Between 2 and 18 years old undergoing myringotomy for insertion of ventilation tubes made in Our teaching hospital During the years 2007 and 2008 by a team of pediatric otolaryngology. We excluded Patients who, despite being shown the insertion of ventilation tube, underwent myringotomy alone.

Analyzed the data included age, gender, Indication / diagnosis, Audiogram and Impedance pre operative, intraoperative and postoperative complications, length of the tube, Necessary to remove the tube in the operating room and postoperative Audiogram. We Evaluated the Indications for surgery and postoperative evolution of these patients.



**Figure 1.** Age distribution of patients who received ventilation tubes.

All Patients HAD their first review on the first postoperative week and subsequently Were Followed with bimonthly assessments by the extrusion of the tube, When It was requested a new Audiogram.

## RESULTS

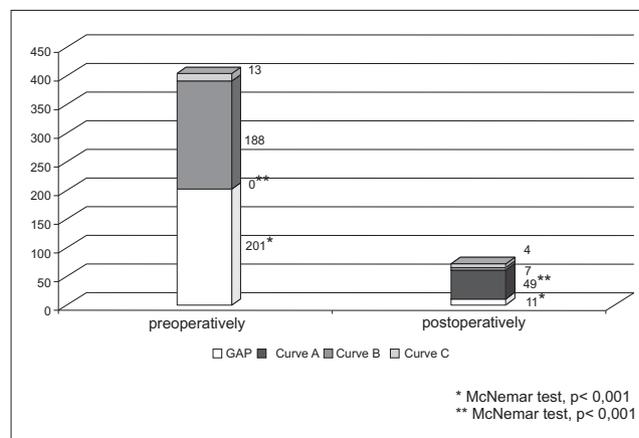
It was identified 109 patients between 2 and 18 years of age with a mean age of 7.37 years. The gender distribution 65 patients (59.63%) were male and 44 (40.37%) females.

Of these 92 patients (84%) underwent myringotomy tube placement for bilateral and 17 (16%) for myringotomy and ventilation tube unilaterally, totaling 201 insertions of ventilation tubes.

The statement, in its entirety, was secretory otitis media unresponsive to antibiotic therapy that persisted for at least 3 months. All patients had pure tone audiogram with air-bone gap. The impedance curve type B was found in 188 cases (93.54%) and type C curve was found in 13 cases (6.46%).

Among the secondary procedures performed in the same operative time, adenoidectomy was found in 21.89% of cases (44 cases), adenotonsillectomy in 57.71% (116 cases), otoplasty was performed in two cases, cauterization of inferior turbinate in two cases of tympanoplasty and contralateral ear in two cases.

Among the syndromic diagnosis we found 20 cases with Down snbyndrome (9.95%), two cases of Turner syndrome, two cases of Alpert's syndrome, 2 cases of Pierre Robin syndrome and 2 cases of Crouzon syndrome.



**Figure 2.** Parameter variations and impedance audiometry in pre-and postoperatively.

Among the most common secondary diagnosis was apnea Obstructive sleep apnea (OSA) 16.41% (33 cases).

Residual perforation was the most frequent postoperative complication was found in 7 cases (3.43%). Most of these patients progressed to chronic otitis media nonsuppurative and had to be submitted to tympanoplasty. In two cases the patients developed chronic otorrhea is needed later rapprochement with mastoidectomy.

Only two cases had to be surgically removed because it remained leased for more than 18 months. In all cases tubes were used for short stay type Shepard®.

The average length of stay of each tube was 9.97 months, ranging from 1 to 17meses. At the time of data collection, only 124 cases had been extracted from the tube and the remaining cases, the last visit, still retained the tube rented.

Regarding postoperative audiometric results were observed improvement of air-bone gap in 49 cases (81.67%), 11 cases (18.33%) had bone GAP air after surgery. The remainder of cases at the time of data collection, still awaiting audiometry or had not lost the ventilation tube.

In 60 postoperative audiometric observe significant change in the air bone GAP (McNemar test, p <0.001), whereas preoperatively 100% of cases showed the GAP in the postoperative period only 18.3%.

Regarding the tympanometric data, we found 4 cases (6.67%) that remained curve type B and 7 cases (11.67%) that developed type C curve All these cases had new programming placement of tympanostomy tubes.

As the impedance also observe that there are significant changes in postoperative results (McNemar test,  $p < 0.001$ ). Preoperatively 100% of cases of B or C curve as the audiometry postoperatively 81.7% had a curve of type A.

## DISCUSSION

It was examined clinical characteristics and postoperative outcome of children under the age of 18 years and who underwent insertion of tympanostomy tubes in São Paulo Hospital during the years 2007 and 2008. This population is urban and ethnically diverse.

The clinical features were very varied, we find within that population healthy children, with secondary diagnoses such as hypertrophy adenoamigalian and OSA, and children with genetic syndromes.

The international literature posits a surgical criterion was more comprehensive than those used in the service studied. In this work we studied only patients whose indication for surgery was otitis media with effusion persisting for three months or more without improvement after antibiotic therapy.

This study demonstrated that most post-operative outpatient visits did not result in clinical interventions such as antibiotics for acute otorrhea and aspiration of MAE.

All patients underwent secondary procedures in the same surgical indications were as nasal obstruction and / or OSA diagnosed by polysomnography. Only 1 (1.09%) of these patients had anesthetic complications and postoperative bleeding from the operative site. As consistent with the literature reporting 0.2 to 0.5% of postoperative hemorrhage (6).

There were no cases of acute postoperative otorrhea, unlike with literature that refers to 16% of acute postoperative otorrhea (2,3,9). There were 2 cases (0.99%) of chronic otorrhea after surgery, the lowest rate reported in the literature (Table 1). This difference may be related to the fact that the international literature includes recurrent acute otitis media and surgical indication. This did not occur in the study.

The rate of residual perforation found (3.43%) is consistent with that studied in the literature (6,7) (Table 1).

Only 5.47% of the cases required new approach to rehabilitation of the ventilation tube. The literature values of 10% to 50% (3, 6).

**Table 1. Rates of perforation and residual chronic postoperative otorrhea found in our work and studies of references.**

Complications	Results	Kay DJ & Nelson M (7)	Scraff SA (3)
Residual Perforation	3,43%	4,8%*/2,2%**	0,5 a 11%
Cronic Otorrhea	0,99%	3,8%	-

\* Rate calculated using tubes of short and long duration.

\*\* Rate calculated on short tubes only.

Regarding the length of stay, we found an average of 9.97 months and only 2 cases (0.99%) had to be surgically removed because it remained leased for more than 18 months, which also confers a number less than found in the literature that suggests an average of 7 to 8% of cases to be removed by the doctor (2).

## CONCLUSION

The results suggest that in our service for a lower rate of postoperative otorrhea, tube reinsertion, fewer tubes surgically removed and similar rate of drilling waste that described in the literature for surgical placement of tympanostomy tubes in patients with WHO.

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