



Risk factors for recurrent otitis media with effusion

Faktori rizika od nastanka rekurentnog sekretornog otitisa

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Abstract

Background/Aim. Otitis media with effusion (OME) is a common disease among the children aged from 6 months to 4 years, but recurrences are common after the extraction of ventilation tubes. The aim of the study was to determine the risk factors for recurrent OME after extraction of ventilation tubes. **Methods.** The research was a prospective study with 305 children aged 0 to 10 years with OME. Forty three (14%) of them had recurrent OME. We analyzed the factors that could lead to the redevelopment of the disease after extrusion of the tubes. **Results.** It was found that the majority of children with recurrent disease was between the ages of 5 to 7 years (56%) and had allergy in significantly higher rate than children without recurrence. In most cases (37.7%), the retention time of ventilating tube was above 10 months and the recurrent disease was diagnosed in 46.5% cases within a period of 10 to 12 months after extrusion of tubes. **Conclusion.** Children with OME and after ventilation tube extrusion need to be followed up for 1 year after the removal of tubes. It is necessary to inform the parents that the disease can recur. Children in the kindergarten, in preschool age and with a respiratory allergy had higher possibility for recurrent OME.

Key words:

otitis media with effusion; risk factors; child, preschool; recurrence; serbia.

Apstrakt

Uvod/Cilj. Rekurentni sekretorni otitis je često oboljenje dece uzrasta od šest meseci do četiri godine, a relapsi se najčešće javljaju nakon ekstrakcije ventilacionih cevčica. Cilj istraživanja je bio da se utvrde faktori rizika za rekurentni sekretorni otitis nakon ekstrakcije ventilacionih cevčica. **Metode.** Istraživanje je bila prospektivna studija sa 305 dece sa sekretornim otitisom uzrasta od 0 do 10 godina, od kojih je 43 (14%) imalo rekurentni sekretorni otitis. Analizirano je koji faktori mogu dovesti do ponovnog razvoja bolesti nakon ispadanja ventilacione cevčice. **Rezultati.** Utvrđeno je da je većina dece sa recidivom bolesti bila uzrasta od pet do sedam godina (56%) i sa pojavom alergija na znatno višoj stopi nego deca bez recidiva. U većini slučajeva (37.7%) vreme zadržavanja ventilacionih cevčica je trajalo više od 10 meseci, a rekurentna bolest je dijagnostikovana u 46.5% slučajeva u periodu od 10 do 12 meseci nakon ekstrakcije cevčice. **Zaključak.** Decu sa sekretornim otitisom i posle ispadanja ventilacionih cevčica treba pratiti godinu dana. Neophodno je informisati roditelje da se bolest može ponovo javiti. Deca u vrtiću, u predškolskom uzrastu i sa respiratornim alergijama imaju veću mogućnost za pojavu rekurentnog sekretornog otitisa.

Ključne reči:

otitis medija, serozni; faktori rizika; deca, predškolska; recidiv; srbija.

Introduction

Otitis media with effusion (OME) is a very common disease in children and those aged between 6 months and 4 years are the most threatened¹. Many episodes resolve spontaneously within 3 months, but in about 30% to 40% of children OME recurs².

The treatment modality includes watchful waiting, medical treatment and surgical intervention¹. Ventilation tube insertion is one of the most frequently performed treatments for OME and about 20% of children who underwent ventilation tube insertion

required additional insertion within 2 years since their first procedure³. It is necessary to identify a group of children with high risk of recurrent OME due to choosing efficient treatment policies.

The aim of this study was to determine risk factors for recurrent OME after ventilation tube extrusion.

Methods

A prospective study was performed in one-year period (March 2012 to March 2013) in the tertiary referral centre and included 305 children with OME treated by the same

senior surgeon. The study excluded all children with chronic or systemic diseases, such as children with craniofacial anomalies. Ethical Board of the Institute for Health Protection of Mother and Child of Serbia in Belgrade improved this study and signed informed consent was obtained from parents. Diagnosis of OME was made by otomicroscopy and tympanometry. During otomicroscopic examination, presence of fluid or air bubbles behind ear drum and any retraction suggested OME. Also, type B tympanogram was considered positive for OME. All patients underwent skin prick tests for common perennial and seasonal allergens: dust, feathers, tobacco, grass pollen, tree pollen, weed pollen, ragweed, dust mites, cat hair, dog hair. The results were evaluated after 10 minutes and reaction upper than 3 mm were considered positive. Children were in conservative treatment with an antihistaminic (either with allergic negative reaction) and a secretolytic for peroral usage 2 months prior surgery. Also, they used hypertonic saline solution and intranasal steroids (older than 6 years old). Children with 3-months-lasting OME underwent surgical treatment. There was an initial ventilation tube insertion with adenoidectomy in 262 patients due to OME and additional ventilation tube insertion in 43 children due to recurrent OME. Surgeon used ventilation tube type Shepard (Spiggle and Theis, Germany) for initial insertion and type Good for prolonged ventilation in patients with recurrent OME. All children with recurrent OME had adenoidectomy and ventilation tube insertion as an initial treatment of OME in previous history. Their data were collected from questionnaire answered by parents and history of illness and included age, gender, economic status (low, high), ear disease in another member of family, out of home day care, presence of frequent middle ear and upper respiratory infections before initial tube insertion, ages of the initial ventilation tube insertion, the time of extrusion of tubes, respiratory allergy status and the time of onset the recurrent OME.

Twenty-two children of 43 (53.5%) with recurrent OME had a single tube insertion in previous history and rest of them had two ventilation tube insertions.

Statistical analysis included a descriptive statistics and χ^2 test using SPSS for Windows.

Results

In one year period 305 children (181 male and 124 female, 59% and 41%, respectively) had surgery due to OME. They were divided into 3 age groups: below 2 years (54 children = 17.7%), between 3 and 6 years (201 children = 66%), between 7 and 10 years (50 children = 16.3%). Forty three of them were with recurrent OME for a total of 81 ears (38 cases with bilateral recurrent OME). The overall prevalence rate of recurrent OME was 14%; 16% between the age 2 and 4; 56% between 5 and 7; 28% above 8 years. A significant statistical relation was reported between age and recurrent OME ($p < 0.05$) with peak in age group between 5 and 7. It was found that 56% of children with recurrent OME had a respiratory allergy. Children had an allergic rhinitis. It was statistically significant when compared with children without recurrent disease who had allergy in 23% cases ($p < 0.001$). Children with bronchial asthma were excluded from the study.

Distribution of children with OME in dependence of the retention time of ventilating tube after the first implantation and the time of diagnosis of recurrent OME is shown in Table 1. There was no statistically significant association between these times ($p = 0.306$) i.e. recurrence rate was not dependent on ventilating tube retention time.

The factors identified in children with recurrent OME are shown in Table 2. Children with a recurrent OME were dominantly from kindergarten (70%).

In the group of children with recurrent OME, 22 (53.5%) of them had only one ventilation tube insertion and

Table 1
Distribution of children with otitis media with effusion (OME) in dependence on retention of ventilating tube and time of diagnosis of recurrent OME

Parameters	0–3 months n (%)	4–6 months n (%)	7–10 months n (%)	above 10 months n (%)	Total n (%)
Retention time of ventilating tube	1 (2.3)	16 (37)	10 (23)	16 (37.7)	43 (100)
The time of diagnosis of recurrent OME	6 (14)	14 (32.5)	3 (7)	20 (46.5)	43 (100)

n (%) – number (percentage) of children.

Table 2

Parameters	Number (%) of children	
	yes	no
History of frequent AOM	24 (56)	19 (44)
History of frequent URTI	21 (49)	22 (51)
Family history of ear disease	10 (23)	33 (78)
Kindergarten	30 (70)	13 (30)
Low economic status of the family	1 (2.3)	42 (97.7)
Craniofacial abnormalities	2 (4.6)	41 (95.4)

AOM – acute otitis media; URTI – upper respiratory tract infections.

21 (46.5%) had two ventilation tube insertion. Table 3 demonstrates the comparison between various characteristics of children who had a single ventilation tube insertion vs those who had more than one tube insertion. Children with recurrent ventilation tube insertion had significantly more allergy than children who had only a single ventilation tube intervention ($p < 0.05$).

removal of a chronic infection of adenoids. Children with recurrent OME not necessarily need to have readenoidectomy, if carried out during the first operation. Iwaki et al.⁶ found that there was no correlation between adenoidectomy and the recurrence rate of OME. However, some studies showed that adenoidectomy reduced the need for additional tubal insertion^{3,7}.

Table 3
The comparison between various characteristics of children with recurrent otitis media with effusion (OME) who have undergone single ventilation tube (VT) insertion vs those who have undergone two VT insertions in previous history

Characteristics	One VT (n = 22; 53.5%)	Two VT (n = 21; 46.5%)	<i>p</i>
Allergy			
yes	9	17	0.01*
no	13	4	
Age of the first VT surgery (years)			
0–2	7	7	
3–6	15	14	0.09
7–10	0	0	ns
older than 10	0	0	
Retention time of the last ventilating tube (months)			
0–3	0	1	
4–6	7	10	0.12
7–10	4	6	ns
above 11	11	4	
History of frequent AOM			
yes	11	11	0.75
no	11	10	ns
History of URTI			
yes	10	11	0.53
no	12	10	ns
Family history of ear disease			
yes	2	8	0.03
no	20	13	ns
Kindergarten			
yes	15	12	0.33
no	7	9	ns
Low economic status of the family			
yes	3	1	0.55
no	19	20	ns

AOM – acute otitis media; URTI – upper respiratory tract infection; * – significant difference; NS – non significant difference.

Discussion

The literature presents OME prevalence in a bimodal distribution, with peak incidence at 1 to 2 years of age and again at 5–7 years⁴. In this study, 66% of children with OME were between 2 and 6 years old. OME is characterized by a high rate of spontaneous recovery but also by a high rate of recurrence⁵. The recurrence rate of OME in children was found to be higher at ages from 2 to 5 years than from 7 to 8 years⁴. About 20% of children need additional tube insertion due to recurrent OME³. In our study, the overall prevalence rate of recurrent OME in children who need additional ventilation tube insertion was 14%, and the most of them (56%) were between 5 and 7 years old.

All children with OME underwent adenoidectomy with ventilation tube insertion as the first surgery treatment. The rationale for adenoidectomy in the treatment of OME was reduction of nasal obstruction, improved Eustachian tube function and re-

Clinical and experimental studies showed that respiratory allergies promote adenotonsillar hypertrophy as well as inflammatory alternations in the mucous membranes of middle ear and Eustachian tube and can thus promote the formation and presence of OME⁸.

In our study, children with allergic rhinitis had more possibilities for OME. Frequently, symptoms of allergic rhinitis were treated by parents themselves or neglected. Untreated allergic rhinitis caused mucosal edema and occlusion of Eustachian tubes with effusion in the middle ear with prolonged duration.

In our study, group of children with recurrent OME had a significantly higher rate of allergy than children with no recurrence. Kwon et al.⁹ found that allergic rhinitis was more frequent among pediatric patients with than without OME and the rates of other allergic diseases were not significant. The epidemiological data of Martines et al.¹⁰ supported the existence of a relationship between OME and atopic disease

and suggested that allergy was an important risk factor for OME among the higher age group.

There was no correlation between the retention time of ventilating tube after the first implantation and the time of diagnosis of recurrent OME. In all cases of initial insertion, the surgeon used Shepard grommets and Good tubes for secondary insertion. Yaman et al.¹¹ showed that recurrence rate was 20.7% in ears after extrusion of Shepard tubes. They concluded that recurrence rates were the highest in the group with extrusion time of tube of less than six months and suggested that recurrence rate would be reduced when the tubes stayed in place for a long time. Talmon et al.¹² used T-tubes for treatment patients with OME and tubes were retained for 20 months. Reinsertion was performed only in 4.9% of ears due to recurrent OME.

In our study, the history of frequent AOM in children with recurrent OME was almost in distribution half and half (56% positive vs 44% negative). Similarly, the history of frequent upper respiratory tract infection (URTI) was in the same distribution (49% positive vs 51% negative).

Our results showed a statistically significant high number of children with recurrent OME who were in the kindergarten and with high economic status of the family. Children who attend day care are more often exposed to ear infections and respiratory infections, which may be the reason why the recurrent OME is more common in this group of patients. In some studies, it has been reported that the higher socioeconomic status is, the higher otitis media prevalence is^{4,13}.

Conclusion

Careful study of the related risk factors for recurrent OME is recommended for better understanding prognostic indicators and avoiding treatment failure. Parents must know that the disease can recur and that patients need to be follow-up for another year after the removal of tympanostomy tubes. Children in the kindergarten and with respiratory allergy are in the group with higher possibility for recurrent OME and need at least one-year-follow-up period after extrusion of tubes.

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