

The Duration of Ventilation Tube Stay in Tympanic Membrane is Affected by the Duration of Serious Otitis Media*

Dr. Haldun OĞUZ¹, Doç.Dr. Mustafa Asım ŞAFAK¹, Doç.Dr. Münir DEMİRCİ¹, Dr.Necmi ARSLAN¹,
Dr. Selda KARGIN¹, Dr. Fazıl BAYRAKÇIOĞLU¹

Objective: With this study, the duration of ventilation tubes in the tympanic membranes was evaluated according to the duration of serous otitis media episodes before surgery; the number of postoperative otitis media attacks and antibiotic use. **Study Design:** Prospective **Methods:** Patients who had an operation of adenoidectomy and ventilation tube placement in 2002 were followed prospectively. **Results:** The only statistically significant variable on duration of ventilation tubes was the duration of serous otitis media episodes before tube placement. **Conclusion:** It was shown that, patients having serous otitis media episodes for more than 24 months had a shorter duration of ventilation tubes in their tympanic membranes.

Key Words
Otitis media
Serous otitis media
Effusion
Ventilation tube

Anahtar Kelimeler
Otitis media
Seröz otitüs media
Efüzyon
Ventilasyon tüpü

ÖZET

Ventilasyon Tüplerinin Kulak Zarında Kalma Süresi, Seröz Otitis Media Süresi ile İlişkilidir

Amaç: Bu çalışmada, ventilasyon tüplerinin kulak zarında kalma süresi, cerrahi öncesi seröz otitis media ataklarının süresi, cerrahi sonrası otitis media ataklarının sayısı ve postoperatif antibiyotik kullanımı değişkenlerine göre değerlendirilmiştir. **Çalışma şekli:** Prospektif **Yöntem:** 2002 yılında adenoidektomi ve ventilasyon tüpü tatbiki yapılan hastalar prospektif olarak takip edilmiştir. **Bulgular:** Ventilasyon tüplerinin kalma süresi üzerine istatistiksel anlamlı düzeyde etki ettiği belirlenen tek değişken, tüp tatbiki öncesinde seröz otitis media ataklarının süresidir. **Sonuç:** 24 aydan daha uzun süredir devam eden seröz otitis media atakları olan hastalarda, ventilasyon tüplerinin kulak zarında daha kısa süre kaldığı gösterilmiştir.

¹ II. KBB Kliniği S.B. Ankara
Eğitim ve Araştırma
Hastanesi
Ankara

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INTRODUCTION

Serous otitis media (SOM) is an important disease with both structural and functional complications. The structural complications of SOM are perforation of tympanic membrane, tympanosclerosis, ossicular discontinuity and fixation, petrositis, labyrinthitis, facial paralysis, cholesterol granuloma, adhesive otitis media, chronic suppurative otitis media, cholesteatoma and retraction pockets.¹

When the functional complications of SOM are taken into consideration, hearing loss, of conductive and high frequency sensorineural forms, is the most discussed.² SOM is the most common cause of hearing loss in children in the developed world, affecting up to 80% of preschool children at some time.³ Although controversial, hearing loss is thought to result in lasting impairments of speech, language, cognitive, and psychosocial development.⁴ To prevent these complications, SOM is a main indication for myringotomy with insertion of ventilation tubes in children.

MATERIALS AND METHODS

In a tertiary reference hospital, patients who had an operation of adenoidectomy and grommet ventilation tube placement in 2002 were followed prospectively. Presence of serous otitis media was confirmed with otoscopy and tympanometry by Interacoustics MK26. All children had a positive history of sleeping mouth-open with snoring and/or halitosis. Among the total 45 patients, the number of patients whose follow-up could be done until their tubes were extruded was 31. The duration of ventilation tubes (VT) in the tympanic membranes was evaluated according to the following variables: the duration of serous otitis media episodes before surgery; the number of postoperative otitis media attacks and the number of postoperative antibiotic use.

Each of the above mentioned parameters was evaluated according to the stay of VTs in the

tympanic membrane using Fischer's exact test by StatCrunch 4.0 software.

RESULTS

Twenty (64.5%) of the 31 patients were male and 11 (35.5%) were female. The mean age of the patients was 7.03 (range 4-12).

The mean and standard deviation of duration of ventilation tubes in the tympanic membranes (TM) was 11.19 ± 5.09 (range: 3-21) months. 14 (45.2%) of the patients' VT stayed in the TM less than 12 months and 17 (54.8%) stayed for 12 months or more. There was no difference between boys and girls. The number of postoperative otitis media attacks or the number of antibiotic treatments used postoperatively were not statistically significantly important on the duration of stay of ventilation tubes. The only statistically significant variable was the duration of SOM episodes before tube placement. Patients with SOM episodes of more than 24 months had significantly shorter duration of ventilation tubes in the TM in regard to the patients having SOM episodes for less than 24 months ($p=0.01$).

DISCUSSION

Although SOM is considered as a disease entity, its clinical features, medical history, bacteriology, cytology, and prognosis are not uniform. In this respect, we must think SOM as a non-homogeneous entity. SOM with different clinical properties and medical histories denote different prognoses.^{5,7}

Many medications are tried for clearing and preventing the re-formation of the effusion in SOM. When we think of medical treatment options in SOM, use of antihistaminic-decongestant combinations or mucolytics and steroids alone were shown to be only as effective as placebo by different authors.^{8,9} Medical treatment with antibiotics decreases the number of patients that will need insertion of ventilation tubes, however, type of antibiotic treatment and combination of mucolytics with antibiotics does not increase the effect of antibiotics.¹⁰

Abnormal functioning of the Eustachian tube plays a significant role in otitis media. As the duration of dysfunctional ventilation of Eustachian tube reaches a variable point, mucosa of the middle ear undergoes a metaplasia from non-fluid producing to fluid producing. This change is reversible with re-established ventilation.¹¹

The need to establish artificial ventilation in the middle ear is not a new idea. In 1869, Pulitzer first described the therapy including insufflation and paracentesis of the middle ear. Until his first hard rubber grommet, catgut strings, small fishbone plugs, lead wires, and small gold tubes were used for the same purpose. After Pulitzer, Armstrong made the most important contribution by describing the successful application of simple plastic tubing in 1954.¹¹ This set the standard for the design of tympanostomy tubes.

The gold standard for treatment of SOM unresponsive to antibiotics is insertion of ventilation tubes. As the natural history of SOM may change according to different factors in etiology and clinical properties, we must also take into consideration the factors that affect the success of ventilation tube duration. According to our knowledge, there are no studies in the English literature that discuss the factors affecting the duration of VT in the TM. In two studies, it was shown that there is no significant difference according to the place of VT in the TM (antero-superior versus antero-inferior).^{12,13} We made a prospective study to work on the effect of different variables. The only statistically significant factor affecting the duration of VT was found be

the duration of SOM episodes before VT placement.

In a study, it was shown that, children that receive ventilation tubes as soon as possible after the confirmation of the diagnosis of SOM remain relatively free of middle-ear effusion, whereas in most children in the group that receive tubes up to nine months, effusion would persist for longer periods of time.¹⁴ Combining this knowledge with our results, it may be concluded that early placement of ventilation tubes in SOM cases has two positive effects. First, the success of clearance of SOM is better in early placement group; second, the ventilation tubes stay longer in these patients leading to further success in treatment of SOM. This is a preliminary report and our follow-up is continuing with our patients that VT placement was performed in 2003 and 2004.

CONCLUSION

Early insertion of ventilation tubes to patients who are unresponsive to antibiotic treatment in SOM will increase the chance of long enough duration of their ventilation tubes in the tympanic membranes. However, the number of patients must be increased to further support this conclusion.

İletişim Adresi

Dr. Haldun OĞUZ

Posta adresi: S.B. Ankara Eğitim ve Araştırma Hastanesi
2.KBB Kliniği Cebeci-Ankara

Tel: 0-312-417 32 60

Gsm: 0-543-4924679

E-posta: drhoguz@gmail.com

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