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Is There a Relationship Between Chronic Rhinosinusitis and Otitis Media with Effusion in Pediatric Patients?

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Çocuk hastalarda kronik rinosinüzit ve efüzyonlu otitis media arasında ilişki var mı?

Çalışmadaki amacımız, efüzyonlu otitis medialı (EOM) çocuk hastalarda kronik rinosinüzit (KRS) ve adenoid vejetasyon hipertrofisinin (AVH) rolünü araştırmaktı. Antibiyotik tedavisine yanıtsız, rinosinüzit semptomları olan 42 hastanın, paranazal sinüs bilgisayarlı tomografileri ve akustik impedans incelemeleri yapıldı. Hastaların 19'u erkek, 23'ü bayandı. Hastaların en küçüğü 3 en büyüğü 13 olup, ortalama yaş 7 idi. Hastaların, %61.9'unda (26/42) EOM, %45.2'sinde (19/42) KRS ve %83.3'ünde (35/42) AVH mevcuttu. KRS, EOM bulunan hastaların %57.7'sinde (15/26), bulunmayan hastaların %25.0'inde (4/16) [p<0.05], AVH ise EOM bulunan hastaların %92.3'ünde (24/26) ve bulunmayan hastaların %68.8'inde (11/16) [p>0.05] belirlendi. Sonuçlarımız, çocuklarda KRS'in EOM etyolojisinde rolü olabileceğini ve bu nedenle bu hastaların KRS yönünden de değerlendirilmesi gerektirildiğini düşündürtmektedir.

Anahtar Sözcükler: Kronik rinosinüzit, efüzyonlu otitis media, adenoid vejetasyon hipertrofisi.

Abstract

Our purpose was to investigate the role of chronic rhinosinusitis (CRS) and adenoid vegetation hypertrophy (AVH) in pediatric patients with otitis media with effusion (OME). Paranasal sinus computerized tomography scans were taken, and acoustic impedancemetry were performed in 42 patients with rhinosinusitis related symptoms nonresponsive to antibiotic therapy. There were 19 male, 23 female patients with an age range of 3 to 13 (mean 7). OME, CRS and AVH were found in 61.9% (26/42), 45.2% (19/42) and 83.3% (35/42) of the patients, respectively. CRS was found in 57.7% (15/26) and 25.0% (4/16) of the patients with and without OME [p<0.05], AVH was found in 92.3% (24/26) and 68.8% (11/16) of the patients with and without OME [p>0.05], respectively. Our results in this study suggest that CRS may independently contribute to the course of OME in children. Therefore, these patients should be investigated for the presence of CRS.

Key Words: Chronic rhinosinusitis, otitis media with effusion, adenoid vegetation hypertrophy.

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Introduction

Otitis media with effusion (OME) is a common condition seen in children.[1] In general, recovery is spontaneous and complete, treatment is not necessary. However, in a small percentage of the cases, OME become refractory despite intensive medical treatment and leads to a long-lasting conductive

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hearing loss.[1,2] With few exceptions, it is difficult to predict which OME will become persistent.

OME has a complex etiology and pathogenesis that still remains unclear. Many prognostic and risk factors have been described for OME in children. The main factors considered are frequent upper respiratory tract infections (URTI), eustachian tube dysfunction, and adenoid vegetation hypertrophy (AVH).[1,3,4] According to this theory, OME is not curable in children in whom the chronic URTI persists. However, if the treatment of such a chronic infection is successful, OME may disappear as well.[1]

Chronic rhinosinusitis (CRS) is relatively common among the upper respiratory tract infections in children. Few studies attempt to show CRS as an etiologic factor in middle ear disease. In this study our purpose was to investigate the role of CRS in children with OME.

Materials and Methods

Pediatric patients with chronic or recurrent sinonasal symptoms and signs such as nasal obstruction, purulant rhinorrhea, postnasal drainage, cough and halitosis for at least 3 months comprised the population of the study. Such patients used at least two courses of 2 weeks of amoxicillin-clavulanate or cefuroxim axetil as antibiotic therapy, and those who were unresponsive were included in the study. A total of 42 children underwent computerized tomography (CT) scanning of the paranasal sinuses between April 2000 and November 2001.

A Hitachi Radix Turbo spiral CT machine (100 mA and 120 kV, with high resolution) was used. CT scans of 3 mm sections were done without using contrast material, and coronal sections were taken with the addition of axial sections if necessary. The CT scans were reviewed by two experienced otolaryngologists.

CRS was defined, according to the modified criteria proposed by Shapiro and Rachelefsky,[5] by the presence of two or three clinical signs for at least 3 months and confirmed by a positive CT scan. Any opacification on CT scans was accepted positive. The diagnosis of OME was based on otoscopic and tympanometric findings. Tympanometry was performed with an Interacoustics AZ-26 tympanometer.

The patients were divided into two groups; a group with OME and a group without OME. The existence of CRS and AVH were compared in between 2 groups.

Results

Fourty two patients were included in the study and their ages ranged between 3 and 13 years with a median of 7. Of the 42 patients 54.8% (23/42) were female and 45.2% (19/42) were male.

OME and CRS were found in 61.9% (26/42) and 45.2% (19/42) of the patients, respectively. And also 83.3% (35/42) of the patients had AVH (Table 1). CRS was found in 57.7% (15/26) and 25.0% (4/16) of the patients with and without OME, respectively. Statistical analysis of the data revealed correlation between OME and CRS ($p<0.05$) (Table 2). The patients with and without OME had 92.3% (24/26) and 68.8% (11/16) AVH, respectively. Statistical analysis of the data revealed no correlation between OME and AVH ($p>0.05$) (Table 3). The patients with and without CRS had 89.5% (17/19) and 78.3% (18/23) adenoid vegetation, respectively. Statistical analysis of the data revealed no correlation between CRS and AVH ($p>0.05$) (Table 4).

Discussion

AVH has been defined as an important factor in the pathogenesis of OME for years. Adenoidectomy has been well accepted in the surgical treatment of OME, but the exact role of the AVH in the etiopathogenesis has not been understood clearly.[6,7] It is considered that AVH may be a source of infection or obstruct ion in the Eustachian tube mechanically and cause reflux.[8] In this study, AVH was detected in 92.3% (24/26) and 68.8% (11/16) of the patients with and without OME, respectively ($p>0.05$). The difference was not statistically significant, but AVH was clearly more frequent in patients with OME. Therefore, it is not possible to

Tablo 1. The incidence of OME, CRS and AVH in the study group.

OME	n	CRS	n	AVH	n
(+)	26	(+)	15	(+)	14
				(–)	1
		(–)	11	(+)	10
				(–)	1
(–)	16	(+)	4	(+)	3
				(–)	1
		(–)	12	(+)	8
				(–)	4

n: number of patients, **OME:** otitis media with effusion, **CRS:** chronic rhinosinusitis, **AVH:** adenoid vegetation hypertrophy, **(+):** present, **(–):** absent

Tablo 2. Comparison of chronic rhinosinusitis (**CRS**) in patients with or without otitis media with effusion (**OME**).

OME	CRS (+)	p
(+) n=26	15 (57.7%)	<0.05
(–) n=16	4 (25.0%)	

Tablo 3. Comparison of adenoid vegetation hypertrophy (**AVH**) in patients with or without otitis media with effusion (**OME**).

OME	AVH (+)	p
(+) n=26	24 (92.3%)	>0.05
(–) n=16	11 (68.8%)	

Tablo 4. Comparison of adenoid vegetation hypertrophy (**AVH**) in patients with or without chronic rhinosinusitis (**CRS**).

CRS	AVH (+)	p
(+) n=19	17 (89.5%)	>0.05
(–) n=23	18 (78.3%)	

deny the role of AVH with this number of patients in our study.

A number of clinical studies suggest a correlation between OME and URTI.[1,9,10] In children, CRS is a relatively common problem among these infections. The literature cites that 5-47% of children with OME have concurrent maxillary sinusitis, and OME was the presenting symptom in 23% of the patients with chronic sinusitis. In cases with refractory OME, paranasal sinusitis was documented in 49% of adolescents and in 78% of children and also abnormal radiographs were found in 28% of children with OME in another study.[2,9-13] In most of these studies, the diagnostic criteria of sinusitis were based on the patient's complaints, physical examination, radiographic evaluation and finally diagnostic and therapeutic antral irrigation.[9]

The diagnosis of CRS in the pediatric population is rather difficult, and is therefore frequently overlooked.[9,14] It is defined as, the disease persisting longer than 3 months with radiographic evidence of mucosal hyperplasia or opacification. Most children are poor historians and the symptoms and signs are not specific. Rhinorrhea, postnasal drainage and cough are strongly associated with CRS in this age group.[15] Physical examination of a child's nose, and especially diagnostic office endoscopy is often extremely difficult.[14] In addition, the radiologic imaging of these patients is challenging in many aspects and even controversial.[16] Except for some complications of sinusitis, the signs and symptoms of paranasal sinus disease correlate poorly with the imaging findings. The value of plain sinus films in assessing children is ques-

tionable, because the results have correlated poorly with the successful diagnosis of CRS.[13] Also the correlation between plain sinus films and CT scans is poor, and coronal CT investigation is considered superior to plain radiographies in evaluating sinus diseases. Furthermore, with the increasing popularity of endoscopic sinus surgery (ESS) CT is the preferred imaging modality for this region, which can display areas of residual disease and anatomic abnormalities. Today it is widely agreed that CT scanning is currently the radiological procedure of choice for diagnosis of chronic sinus disease to confirm clinical suspicion. However, in some pediatric patients, sedation, anesthesia or both may be required for adequate CT scans.[15-18]

In our study, patients refractory to medical treatment with chronic or recurrent sinonasal symptoms were investigated by CT. If any opacification was found on CT scans (45.2% of the patients), diagnosis of CRS was given.

Hoshaw and Nickman[12] reported that 43% of 166 children requiring ventilation tubes presented with radiographic evidence of maxillary sinusitis. Forty-seven per cent of 1252 children with middle ear effusion were found to have maxillary sinusitis by Grote and Kuijpers.[10] They also found that irrigation of the infected sinuses resulted in resolution of the middle ear effusion in about 85% of the cases. However, adenoidectomy in patients in with AVH was found to have only a minor effect on OME. Draf and Schulz[19] found radiographic evidence of sinus pathology in more than 20% of their children and adult patients with tympanic ventilation tubes.

Finkelstein et al[9] investigated 148 patients with OME or chronic sinusitis and found that 95 of these patients had chronic sinusitis without OME, 24 had OME without chronic sinusitis and 29 patients had OME and chronic sinusitis. They strongly suggested that every patient with OME needed evaluation for sinusitis, and an appropriate treatment should be applied. Otten and Grote[1] reported that persistence of the chronic upper respiratory tract infection during the follow-up period proved to be a negative prognostic factor in the course of treatment of OME. Children with chronic rhinosinusitis as defined in their study appear to have a higher risk of developing chronic otitis media with effusion. Mills et al[13] evaluated 240 new cases of childhood OME with sinus radiographs. When the films were suggestive of infection, maxillary sinus washouts were carried out as part of the surgical treatment. Abnormal X-rays were obtained in 28% of the study group, but only 16 cases (7%) of sinus infections were confirmed on antral lavage, which revealed a poor correlation.

In this study, CRS was found in 57.7% (15/26) and 25.0% (4/16) of the patients with and without OME, respectively ($p<0.05$). We consider that the pediatric patients with chronic or recurrent sinonasal symptoms and OME should be investigated to prove or disprove the presence of CRS. However, CRS is not the only factor in the multifactorial etiopathogenesis of OME.

Conclusion

Our results in this study suggest that CRS may independently contribute to the course of OME. For this reason, pediatric patients with chronic or recurrent sinonasal symptoms and OME need an investigation for the presence of CRS. If the imaging is needed, CT should be preferred but with meticulous selection of patients in the pediatric age group.

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