

## The effectiveness of unilateral tonsillectomy in chronic adenotonsillar hypertrophy

Kronik adenotonsiller hipertrofi hastalarda tek taraflı tonsillektominin etkinliği

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**Objectives:** This study sought to determine whether unilateral tonsillectomy was effective in the treatment of chronic adenotonsillar hypertrophy.

**Patients and Methods:** A total of 197 patients (96 girls, 101 boys) with chronic adenotonsillar hypertrophy were prospectively included. The patients were randomly assigned to either bilateral tonsillectomy (n=113; mean age 10.1 years; range 4 to 18 years) or unilateral tonsillectomy (n=84; mean age 4.5 years; range 3 to 8 years) performed with or without adenoidectomy. All the patients were followed-up for at least a year.

**Results:** The two groups did not differ significantly with respect to preoperative symptoms, the size of tonsils, and the presence of adenoid hypertrophy. At the end of the follow-up, no significant differences were found with respect to relief of snoring, mouth breathing, and upper airways obstruction between the two groups. A greater number of patients achieved complete improvement in snoring in the bilateral tonsillectomy group (p<0.05). With unilateral tonsillectomies, three patients required tonsillectomy to the other side, two had recurrent tonsillitis, and one had severe compensatory hypertrophy with persistent difficulty in inspiration and mouth breathing.

**Conclusion:** Unilateral tonsillectomy seems to be as effective as bilateral tonsillectomy in the treatment of chronic adenotonsillar hypertrophy.

**Key Words:** Adenoidectomy; adolescent; child; tonsillectomy; tonsillitis/complications/surgery.

**Amaç:** Çalışmada, kronik adenotonsiller hipertrofi tedavisinde tek taraflı tonsillektominin etkili olup olmadığı araştırıldı.

**Hastalar ve Yöntem:** Kronik adenotonsiller hipertrofi 197 hasta (96 kız, 101 erkek) prospektif olarak çalışmaya alındı. Hastalar, iki taraflı (n=113; ort. yaş 10.1; dağılım 4-18) veya tek taraflı (n=84; ort. yaş 4.5; dağılım 3-8) tonsillektomi ve/veya ade-noidektomi uygulanmak üzere rastgele seçimle iki gruba ayrıldı. Her iki ameliyatın klinik sonuçları ameliyattan en az bir yıl sonra değerlendirildi.

**Bulgular:** Gruplar arasında, ameliyat öncesinde semptomlar, tonsil büyüklüğü ve adenoid hipertrofi varlığı yönünden anlamlı farklılık saptanmadı. İzlem süresi sonunda, horlama, ağız solunumu ve üst solunum yolları tıkanıklığının düzelmesi bakımından iki grup arasında anlamlı farklılık görülmedi. İki taraflı tonsillektomi grubunda horlamada tam düzelmeye görülen hasta sayısı anlamlı derecede fazlaydı (p<0.05). Tek taraflı tonsillektomi grubunda, üç hastada diğer tarafta da tonsillektomi gerekti; iki hastada tonsillit tekrarladı; bir hastada da inspirasyon ve ağız solunumunda sürekli zorlukla birlikte ciddi kompensatuar hipertrofi görüldü.

**Sonuç:** Kronik tonsiller hipertrofi tedavisinde tek taraflı tonsillektominin iki taraflı tonsillektomi kadar etkili olduğu görülmektedir.

**Anahtar Sözcükler:** Adenoidektomi; adolesan; çocuk; tonsillektomi; tonsillit/komplikasyon/cerrahi.

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It is well known that tonsillectomy is mandatory in the cases of chronic airway obstruction associated with tonsillar hypertrophy or of a unilateral enlarged tonsil, which may be malignant. Tonsillectomy may also be indicated in recurrent tonsillitis, if acute tonsillitis occurs more than six episodes per year or three episodes per year for  $\geq 2$  years.<sup>[1]</sup> More rarely, tonsillectomy is performed in children for tonsil bleeding.<sup>[2]</sup> Aside from unilateral tonsil neoplasm and peritonsillar abscess, unilateral tonsillectomy and/or adenoidectomy is occasionally performed on children with recurrent infection and sleep apnea due to severe adenotonsillar hypertrophy.<sup>[3-7]</sup> Ikram et al.<sup>[8]</sup> reported histopathologic findings of their 400-tonsillectomy specimens. They found reactive lymphoid hyperplasia in 68.3% of them. We obtained histopathologic and clinical differences between chronic tonsillitis and chronic tonsillar hypertrophy.<sup>[9]</sup> As a result, we thought that unilateral tonsillectomy could be performed in chronic adenotonsillar hypertrophy (CTH).

In this study the results of unilateral tonsillectomy in children with CTH were evaluated prospectively. Our purpose was to determine the efficacy of unilateral tonsillectomy in the treatment of childhood with CTH.

### PATIENTS AND METHODS

The study followed 197 children with CTH between 1994 and 2001. We accepted CTH as with the following symptoms and signs; excessive snoring and chronic mouth breathing (especially in sleep), adenotonsillar hypertrophy associated with dysphagia,

speech abnormalities and failure to thrive without signs or symptoms of adenotonsillar infection.<sup>[1]</sup> Chronic tonsillitis or recurrent acute tonsillitis (at least three times a year), craniofacial abnormality, Down syndrome and sleep-apnea syndrome were not included in the study. The obstructive symptoms and signs (mouth breathing, snoring and frank difficulty in inspiration) were recorded in all children, each of whom was hospitalized for at least one day in the pre-operative period. On physical examination palatine-tonsil size was evaluated according to the criteria of Brodsky et al.<sup>[10]</sup> Adenoid hypertrophy was established by radiographic examination. The patients were divided into two groups: Bilateral tonsillectomy  $\pm$  adenoidectomy group and unilateral tonsillectomy  $\pm$  adenoidectomy group. In each case either unilateral or bilateral tonsillectomy was performed after the family was informed about advantages and disadvantages of unilateral tonsillectomy in accordance with wishes and informed consent of the parents. Approval of consultant pediatrician was also obtained for decision of operation. After examining each patient for pharyngeal lymph tissue under general anesthesia, adenoidectomy and/or tonsillectomy proceeded by the method of blunt and sharp dissection. Then all patients were followed for duration and severity of symptoms during one-year period. Statistical analysis was performed by the Chi square test with a P value of less than 0.05 considered significant.

### RESULTS

One hundred ninety seven children (96 girls: 101 boys) aged 3-18 years included in the study. Bilateral

TABLE I  
DISTRIBUTION OF PREOPERATIVE SYMPTOMS, TONSIL SIZE AND ADENOID HYPERTROPHY AMONG PATIENTS

Symptoms and Signs	Bilateral T±A (n=113)		Unilateral T±A (n=84)		$\chi^2$	p
	n	%	n	%		
Snoring	90	79	75	89	3.2	>0.05
Mouth breathing	102	90	75	89	0.05	>0.05
Frank difficulty in inspiration	20	17	19	22	0.73	>0.05
2 + tonsil	16	14	21	25	3.71	>0.05
3 + tonsil	40	35	29	34	0.01	>0.05
4 + tonsil	57	50	34	40	1.92	>0.05
Adenoid hypertrophy	74	65	50	59	0.73	>0.05

T: Tonsillectomy; A: Adenoidectomy.

TABLE II  
THE EFFECT OF BILATERAL AND UNILATERAL TONSILLECTOMY ON SNORING

Tonsillectomy±Adenoidectomy	Complete improvement		Mild improvement		No improvement		$\chi^2$	<i>p</i>
	n	%	n	%	n	%		
Bilateral (n=90)	76	84	9	10	5	5	6.18	<0.0
Unilateral (n=75)	52	69	18	24	5	7		

tonsillectomy was performed in 113 children between the ages 4 and 18 ( $10.1 \pm 6.6$  years), and unilateral tonsillectomy on 84 children, aged 3-8 ( $4.5 \pm 1.4$  years). While a statistically significant difference between the groups was found for age ( $p < 0.05$ ), there was no difference for sex ( $p > 0.05$ ). Differences between the two groups' preoperative symptoms, tonsil size and presence of adenoid hypertrophy did not attain statistical significance either (Table I). Adenoidectomy was also performed in 74 patients in the bilateral-tonsillectomy group and on 50 patients in the unilateral-tonsillectomy group. We did not find any statistical difference for adenoidectomy between the groups ( $p > 0.05$ ).

The effects on snoring of bilateral and unilateral tonsillectomy are shown in Table II. While complete improvement in snoring is seen more in bilateral tonsillectomy group, mild improvement is seen more in unilateral tonsillectomy group. A statistically significant difference was found according to complete or mild improvement of snoring between groups ( $p < 0.05$ ). However, when complete and mild improvement groups were evaluated together, no difference between them occurred ( $p > 0.05$ ). The effects of bilateral and unilateral tonsillectomy on

mouth breathing (Table III) also failed to attain statistical significance ( $p > 0.05$ ).

Bilateral tonsillectomy was performed in 20 (51%) of the 39 patients with frank difficulty in inspiration; the remaining 19 patients underwent a unilateral tonsillectomy. Frank difficulty in inspiration was completely improved in 10 patients from each group while mild improvement was observed in 5 patients in bilateral tonsillectomy and 4 in unilateral group. We did not find a significant difference for improvement of frank difficulty in inspiration between the groups ( $p > 0.05$ ). One year after their unilateral tonsillectomies, 3 patients required tonsillectomy to the other side: two had recurrent tonsillitis and one had severe compensatory hypertrophy with persistent frank difficulty in inspiration and mouth breathing.

## DISCUSSION

Recurrent or chronic tonsillitis and CTH are the most common indications of tonsillectomy.<sup>[11]</sup> Although adenotonsillectomy is still one the most frequently performed operation in pediatric age, it is reported that the number of it is decreasing.<sup>[12-13]</sup> As well definition of obstructive sleep apne syndrome

TABLE III  
THE EFFECT OF BILATERAL AND UNILATERAL TONSILLECTOMY ON MOUTH BREATHING

Tonsillectomy ± Adenoidectomy	Improvement				$\chi^2$	<i>p</i>
	Yes		No			
	n	%	n	%		
Bilateral (n=102)	89	88	13	12	0.17	>0.05
Unilateral (n=75)	67	89	8	11		

in the recent years, the indications of adenotonsillectomy are being changing. Although major indication of adenotonsillectomy is recurrent or chronic tonsillitis until 1970, CTH as an indication is increasing nowadays. Rosenfeld et al.<sup>[13]</sup> reported that while the rate of tonsillectomy due to infection was 100% in 1978, it was 81% in 1986. However the rate of tonsillectomy due to CTH was 19% in 1986. On the other hand, Erişen et al.<sup>[12]</sup> reported that CTH as an indication of tonsillectomy take place more in children under age 5.

Tonsillectomy has frequently been performed bilaterally since its first description. There is limited information in the literature about the indications for and results of unilateral tonsillectomy other than the well-known absolute indications: unilateral-tonsil neoplasm and peritonsillar abscess.<sup>[1,11]</sup> Gray<sup>[5]</sup> first reported a series comprising 54 cases (average patient age 4.2 years) of unilateral tonsillectomy performed for obstruction and recurrent infection. On the basis of those findings, he concluded that unilateral tonsillectomy performed (with adenoidectomy, if indicated) on children under five years can relieve obstructive and infective symptoms, decrease the inevitable scarring to the palate and preserve the remaining tonsil to bear the brunt of the compensatory hypertrophy.<sup>[5]</sup> Laubscher<sup>[7]</sup> reported that unilateral tonsillectomy had been performed on children (some younger than two) with sleep apnea caused by adenotonsillar hypertrophy, whereby a passage for breathing is provided but the essential function of lymphoid tissue in such a small patient is preserved.

In the series reported by Gray,<sup>[5]</sup> 14 (25%) children required removal of the second tonsil; nine for further hypertrophy and obstruction, five for recurrent infection. The number of adenoidectomies performed in that series was 27 (50%). Many more had anterior or partial removal. Following adenoidectomy, rapid hypertrophy of the tonsils ensued in eight cases, requiring unilateral tonsillectomy.

In our clinic, unilateral tonsillectomy is not performed on children with chronic or recurrent tonsillitis because we believe that compensatory hypertrophy causing airway obstruction and recurrent infection will be developed in the remaining tonsil. Therefore, we think that the differential diagnosis of CTH versus chronic recurrent tonsillitis in children should be made prior to tonsillectomy. In our series,

one year after unilateral tonsillectomy three patients required further surgery due to recurrent tonsillitis or persistent frank difficulty in inspiration and mouth breathing. In the case of the child with obstruction, the most important factor was compensatory hypertrophy of the remaining tonsil, which had enlarge from 3+ to 4+ between the first and second operation. So, if acute tonsillitis causes fever attacks in children with adenotonsillar hypertrophy, unilateral tonsillectomy should not be performed.

Most parents had anxieties about tonsillectomy for their children, particularly the younger ones. Their greatest concerns had to do with symptoms and problems persisting after tonsillectomy as well as an increased incidence of infection such as pharyngitis, bronchitis and pneumonia, along with an increased risk of lymphoma (Waldeyer's ring being part of the alimentary tract lymphoid tissue, the basic function of which is antibody formation<sup>[1]</sup>). In our study, the mean age of the children undergoing unilateral tonsillectomy was lower than that of children in the bilateral-tonsillectomy group. This finding suggested that parents would tend to choose unilateral tonsillectomy for younger children, in whom the remaining tonsil eases parental anxieties.

The primary problems are related to respiratory and alimentary distress caused by obstruction of the upper aerodigestive tract in CTH. Persistence of this obstruction causes nasal, paranasal sinus, middle ear and upper respiratory tract infections. The purpose of the surgical intervention in CTH is to remove the obstruction, precisely. Is this accomplished with unilateral tonsillectomy (with or without adenoidectomy)? In this study we did not observe a statistically significant difference between bilateral and unilateral tonsillectomy for the symptoms observed during the postoperative period, which suggests that unilateral tonsillectomy is as effective as the bilateral procedure in the context of CTH.

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