Original Research
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Effectiveness of adenoidectomy on tympanostomy tubes retention duration

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Abstract

Background: The children with middle ear effusion need repeated re-tympanostomies. Adenoidectomy is an effective surgical intervention in the management of chronic otitis media with effusion in conjunction with insertion of tympanostomy tubes (TTs). To find out whether TTs in different positions decrease the rate of re-tympanostomies study was done.

Methods: The present study retrospectively evaluated the effectiveness of adenoidectomy on retention of Shepard TTs in antero-inferior quadrant (AIQ) and postero-inferior quadrant (PIQ) with chronic, persistent or recurrent otitis media. Eighty-five children (one-hundred and seventy ears) underwent bilateral myringotomy and TTs placement with and without adenoidectomy with informed consent.

Results: According to the TTs retention duration rate, there was a significant difference between adenoidectomy and non-adenoidectomy groups in AIQ.

Conclusion: It was concluded that TTs placement in the AIQ in conjunction with adenoidectomy showed better improvement and prolonged ventilation. This study suggests that adenoidectomy is an effective surgical intervention in the management of otitis media especially when it is performed in conjunction with insertion of TTs. This significantly decreases tube extrusion rate especially in an AIQ, which might be due to improving eustachian tube function that consequently reduces repeated otitis media.

Keywords: chronic secretory otitis media, adenoidectomy, tympanostomy tube.

Introduction

Obstruction of the Eustachian tube orifices is an important indication for adenoidectomy [1]. Thus resultant middle ear effusion is prevented by the elimination of the tubal obstruction. Conductive deafness associated with refractory serous or secretory otitis media is likewise an indication for adenoid surgery in conjunction with TTs insertion [2]. Myringotomy with insertion of TTs is currently the most common surgical procedure performed in children [3]. The length of time the middle ear is ventilated by functioning

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TTs varies on the basis of the epithelial migration pattern of the tympanic membrane [4]. Children with middle ear effusion are at higher risk of significantly increases in both the tube extrusion rate and the need for subsequent re-tympanostomies [5]. This study explored the efficacy of adenoidectomy on the duration of tympanostomy tube vs. location in children with persistent or recurrent otitis media who had not previously undergone tube placement [6].

Methods

Eighty-five children underwent bilateral TTs insertion in conjunction with and without adenoidectomy and TTs insertion; 42, 43 respectively, in Rasoul Akram hospital (Tehran university of medical sciences) with informed consent. The indication for surgery was bilateral symmetric chronic otitis media with effusion that documented by Type B tympanogram with hearing level less than 35db. Effusion was not been responsive to medical treatment for more than 3 months. In adenoidectomy and non-adenoidectomy groups 15, 11 patients with serous or non-secretory were excluded and 27, 32 patients were mucoid and TTs inserted in different position respectively. Patient's age ranges were 2-12 year. General anesthesia used in both groups, and all external ear canals were mechanically cleaned and irrigated with saline solution followed by a radial incision, and aspiration of the middle-ear mucoid effusions which were inclusion criteria for TTs insertion. The Shepard TTs with an internal diameter of 1mm had been used. Patients were to examined 2-4 weeks after tube placement and then at 3 months intervals, also tympanometry and otoscopy were performed. The date of extrusion was considered to be the date of the examination on which the tube was not open or extruded by tympanometry.

Statistical Analysis

Qualitative and quantitative variables are reported as frequency percentage and mean± standard deviation (SD), respectively. Kolmogorov-Smirnov Test was used to investigate if the variables had normal distribution and then Paired and independent sample t-tests were applied where appropriate. One way ANOVA for comparison between age-groups was used. A two-tailed P-value was considered statistically significant.

Results

Eighty-five children underwent bilateral myringotomy and TTs insertion in conjunction with and without adenoidectomy; 42 and 43 cases respectively, and aspiration of the middle-ear effusion. In adenoidectomy and non-adenoidectomy groups 15, 11 patients who were serous or non-secretory were excluded, and 27, 32 were mucoid and TTs inserted in different positions respectively. Thirty-five patients with seventy ears were included for evaluation; eighteen patients of adenoidectomy group and seventeen pa-

Table 1. The number of the ears operated in right (AIQ) and left (PIQ) both in adenoidectomy and non-adenoidectomy groups.

Duration	Adeno	Number of patients	Mean	Std.Deviation	Independent t-test
Left	Adenoidectomy	18	10	4.102	t=1.497
	Non-adenoidectomy	17	7.53	5.591	
					P=0.144
Right	Adenoidectomy	18	20.39	4.104	t=5.105
	Non-adenoidectomy	17	10.71	6.854	p<0.0001

Table 2. The effect of adenoidectomy on TTs duration in left ears in postero-inferior quadrant (PIQ) group in comparison with right ears in antero-inferior quadrant (AIQ) group showed more prolongation in the later.

	N	Mean duration	Std Deviation	Paired T-test
TTs Left	35	2.628571	1.086974	t= -4.65
TTs right	35	3.714286	1.226459	P<0.0001

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Table 3. The distribution of age range and the number of cases in both right (AIQ) and left (PIQ) ears.

Duration	Age range	Number	Mean	Std.Deviation	One Way ANOVA test
Left	<2year	1	14		F:0.356
	2-5year	15	8.6	5.289	
	6-12year	18	8.67	4.971	P:0.785
	>12year	1	9		
	Total	35	8.8	4.969	
Right	<2year	1	3		F:1.377
	2-5year	15	14.67	6.532	
	6-12year	18	17.11	7.828	P:0.268
	>12year	1	18		
	Total	35	15.69	7.391	

tients of non-adenoidectomy group. Patients' age range was between 2-12 year including 18 (51.4%) female and 17 (48.6%) male. Sixteen patients were 2-5 year and nineteen patients were 6-12 year, 45.7% and 54.3% respectively. The number of left ears with TTs duration (PIQ) in adenoidectomy group were 18 with mean: 10(±4.102) months and 17 in non-adenoidectomy group with mean: 7.53 (±5.591) which was not statistically significant (Fig 1). The numbers of right ears TTs duration (AIQ) in adenoidectomy group were 18 with mean 20.39 (±4.104) months, and 17 in non-adenoidectomy group with mean 10.71(± 6.854) months was statistically significant ($p<0.05$, Fig. 2). The patients' age range were <2 year, 2-5 year, 6-12 year, > 12 year and including cases in groups were 1, 15, 18, 1 respectively, there was no difference between female and male in right and left ears TTs duration and also no difference between age groups (Table 3). Independent t-test showed significant difference between duration in AIQ and PIQ ears groups for adenoidectomy in comparison to non-adenoidectomy patients ($p<0.05$) (Fig1, Table1).

Discussion

Obstructed airway by enlarged adenoid has already been mentioned as an indication for adenoidectomy [2]. Eustachian tube orifices obstruction by adenoid tissue is another important indication for adenoidectomy [1]. Conductive deafness associated with refractory secretory otitis media due to obstruction of the eustachian tube orifices is likewise to indicate for adenoid surgery in conjunction with TTs insertion [2]. Sustained middle ear ventilation could be achieved by selecting the appropriate tube, site and incision [7].

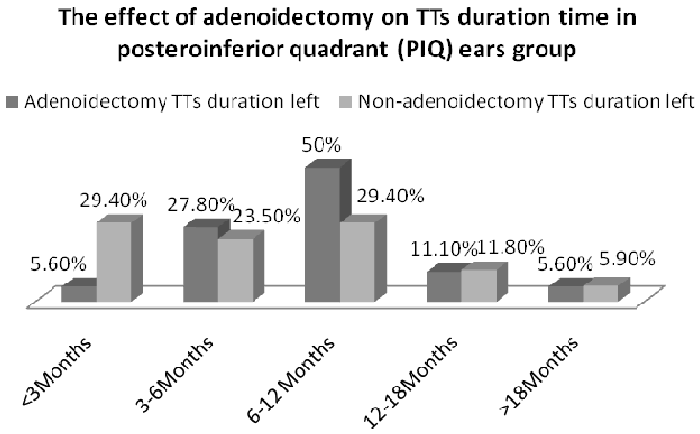


Fig.1. The posteroinferior quadrant (PIQ) TTs placement retention in adenoidectomy and non-adenoidectomy groups was almost the same.

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Stinson found clues to the premature extrusion of a foreign body in the tympanic membrane; information went essentially unrecognized for many years [8]. Turner found that the epithelium of the anteroinferioer quadrant and of both posterior quadrants migrated toward the posterior border of the tympanic membrane [9]. To evaluate the efficacy of adenoidectomy on the duration of TTs placement in children with persistent or recurrent otitis media who had not previously undergone tube placement was determined [6]. The children with middle ear effusion are at higher risk of repeated post-TTs otorrhea episodes during the first insertion of TTs significantly increases both the tube extrusion rate and the need for subsequent retympanostomies [5]. The different tube designs should be considered when prolonged middle ear ventilation is desired [10]. This study concluded that TTs placement on the AIQ in conjunction with adenoidectomy remained more functional than the left (Fig.2), and showed better improvement and prolonged ventilated and decreased episode of otorrhea. Although this significantly decreased tube extrusion rate especially in an AIQ (Fig.2), which might be due to improving eustachian tube function [11], but it needs further investigations.

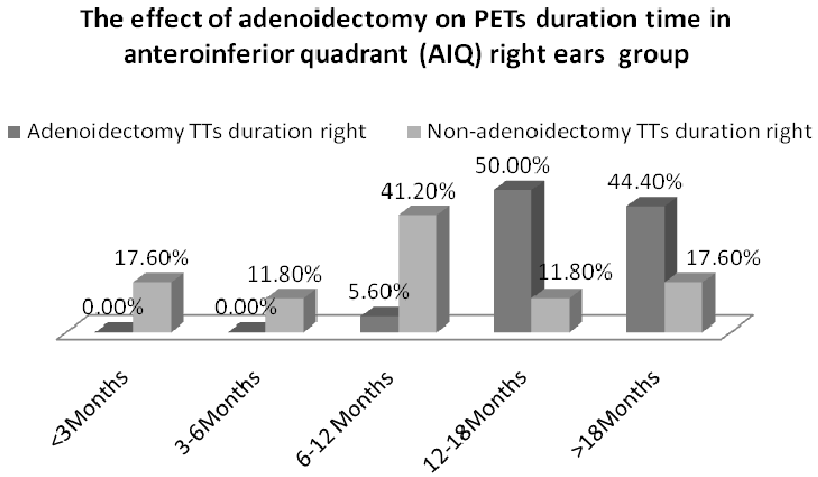


Fig.2. The antero-inferior quadrant (AIQ) TTs placement retention in the adenoidectomy group is more prolonged than non-adenoidectomy group.

Conclusion

The location of a myringotomy for insertion of a (TTs) should not be determined to expect increase duration of action, and different tube designs should be considered when prolonged middle ear ventilation is desired. This study concluded that the TTs placement in the AIQ in conjunction with adenoidectomy showed better improvement and prolonged ventilation and the difference was statistically significant $p<0.05$ Kolmogorov-Smirnov Test. It is concluded that the TTs placement on the AIQ in conjunction with adenoidectomy remained more functional than the PIQ.

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