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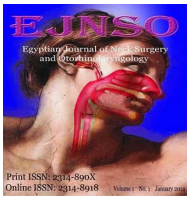

Effect of Pediatric Nasal Surgical Procedures done in Conjunction with Endoscopic Transnasal Adenoidectomy on the Postoperative Outcome

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ABSTRACT

Objective: to evaluate whether nasal surgical procedures done in conjunction with adenoidectomy in children affect the outcome of the procedure.

Patients and methods: Patients were classified into 2 groups. Group A included patients undergone adenoidectomy alone, and group B which included patients undergone adenoidectomy and surgical nasal procedure(s). Patients were followed up 1, 2, 4 weeks, 6 months and 1 year postoperatively for presence of edema, discharge, crusts, adhesions and overall nasal patency.

Results: No statistically significant differences were observed in the presence of postoperative edema, discharge, crusts, adhesions and nasal patency between the 2 groups.

Conclusion: Nasal surgical procedures can be done safely and effectively with endoscopic adenoidectomy in children.

Introduction:

Nasal breathing is essential in infants and children. Adenoid hypertrophy is common and can lead to chronic mouth-breathing and subsequent facial growth abnormalities especially in the first years of life [1-3]. These abnormalities include displacement of the mandible, narrowing of the dental arches, an anterior crossbite, maxillary overjet, and increased anterior face height. These changes further favour abnormal breathing, especially during sleep. Often obstructive sleep apnoea (OSA) develops, and nocturnal breathing abnormalities reinforce oral breathing; thus a vicious cycle of breathing problems and impaired facial growth develops [4].Adenoid hypertrophy can also lead to nasal discharge, snoring, sleep apnea and hyponasal speech [5]. Besides, it can also cause rhinosinusitis, recurrent otitis media, and otitis media with effusion [6]. Adenoidectomy is one of the most common procedures performed in children, either alone or in conjunction with tonsillectomy or insertion of ventilating tubes [7]. Dissatisfaction with adequacy and safety of conventional technique in removing the adenoid tissue has, led to the development of alternative

methods, including endoscope guided power-shaver adenoidectomy [8].

It is important to deal with the problem of nasal obstruction when impending sleep-disordered breathing (SDB) in children. Treatment should also be considered for enlarged inferior nasal turbinates causing significant narrowing of the functional nasal airway and increasing nasal resistance significantly [9]. Surgical reduction of the inferior turbinate is mandatory for severe childhood hypertrophic rhinitis refractory to medical treatment [8-10]. Sinusitis is a common finding in children with adenotosillar hypertrophy [11,12]. We have to answer the question whether nasal surgical procedures done in conjunction with adenoidectomy affect the outcome of surgery or not, thus the aim of this work is to evaluate the safety and efficacy of nasal surgical procedures with adenoidectomy in children.

Materials and Methods:

The study was done in Assiut University, Department of Otorhinolaryngology on 60 pediatric patients, 38 males and 22 females, from October 2010 to April 2013. Written informed consent was obtained from the guardians of all patients. The study protocol was approved by the local ethical committee. Patients were younger than 18 years. The most common presenting symptoms were nasal obstruction, snoring, sleep apnea, thick nasal discharge and conductive deafness. Patients with cleft palate, systemic diseases and previous surgeries were excluded from this study.

Clinical evaluation of patients was done by using the pediatric 2.7mm, 30° rigid endoscope. Patients underwent either x-ray nasopharynx lateral view (figure 1) or computerized tomography of the nose, paranasal sinuses and nasopharynx, 3 mm thickness; bone window; axial, coronal (figures 2, 3) and sagittal cuts; without contrast after two weeks of medical treatment in the form of antibiotics, systemic steroids, mucolytics and nasal decongestants. Treatment was tailored to each individual case accordingly.

Endoscopic-guided surgery was performed for each patient under general anesthesia with endotracheal intubation. Decongestion of nasal cavities was achieved by application of cotton pledgets soaked with 1:500,000 adrenaline when inferior turbinectomy was not indicated.

During surgery, visualization was achieved by using 4 mm 30 º rigid telescope (figure 4). Adenoidectomy and other procedures were done by using Microdebrider straight and curved irrigating blades 3.5, 4 mm 12º, aided by straight, 45º upbiting thrucutting forcepses. The sinuscope and the debrider blade or instruments were passed through the same nostril or, the sinuscope through one nostril and the blade/instrument through the other nostril. This was sometimes aided by the use of 40 º curved blade (RADenoid small blade 11 cm X 4 mm) through the oral cavity, with the application of the 30º rigid sinuscope through the nose or the 70º rigid sinuscope through the oral cavity which was kept open by use of Boyle- Davis mouth gag.

This is similar to the technique described by Somani et al. (2010) [4] to overcome the difficulty noted by some surgeons [10] in manipulating the microdebrider tip into the nasopharynx, especially with a telescope in same side of the nose. Thirty two patients have undergone adenoidectomy alone, while 28 patients have undergone adenoidectomy and intranasal surgical procedure(s). These procedures included 48 partial inferior turbinectomies, 8 partial middle turbinate resections, 20 uncinectomies, 18 middle meatal antrostomies, and 16 anterior ethmoidectomies. Four septoplasties were done. Nasal packing with merocel sponges was applied for few hours in cases of adenoidectomy alone and for 2 days when done with other procedures. Postoperative systemic treatment in the form of antibiotics and analgesic anti-inflammatory drugs for 10 days was given to all patients. Local treatment was also given to the patients in the form of

paraffin oil nasal drops and saline nasal spray for 2 months accordingly.
Patients were classified into 2 groups. Group A included patients undergone adenoidectomy alone, and group B which included patients undergone adenoidectomy and other procedure(s).

Clinical and endoscopic evaluation of patients was done 1, 2, 4 weeks, 6 months and 1 year postoperatively. Patients were evaluated clinically by detecting patency, partial or complete obstruction. Endoscopic evaluation was conducted for the presence of edema, discharge, crusts and adhesions (figures 5, 6, 7). Lund and Kennedy staging for rhinosinusitis (Lund and Kennedy, 1997) [13] was applied. According to this staging system, the endoscopic appearance of the nose was quantified for the presence of edema, crusts and adhesions (0= absent, 1= mild, 2= severe). Discharge was scored as (0= no discharge, 1= clear, thin discharge, 2= thick, purulent discharge).

Statistical analysis:

Statistical package for social sciences (SPSS), version 16 was used for data analysis; Chi-square was used to evaluate differences between groups. P-value < 0.05 was considered statistically significant.

Results:

Surgery was done in 60 pediatric patients. Of them, 38 (63%) were males and 22 (37%) were females. The average age was (9 ± 5 years). Adenoidectomy as a lone procedure was performed in 32 patients, whereas it was done with other procedures in 28 patients. Results after one year are summarized in table 1.

Edema (2 weeks postoperatively)

Only 2 (6%) of the children who underwent adenoidectomy alone had mild nasal edema while 3 (11%) of those who underwent other procedures in conjunction with adenoidectomy had mild edema. Severe postoperative edema was not detected in both groups. There is no statistically significant difference between the 2 groups (P value = 0.7).

Discharge (2 weeks postoperatively)

Nasal discharge was mild in 2 (6%) and marked in 3 (9%) of the children who underwent adenoidectomy alone in comparison with 3 (11%) and 2 (7%) respectively in those who underwent other procedures in conjunction with adenoidectomy. There is no statistically significant difference between the 2 groups (P value = 0.8).

Crusts (4 weeks postoperatively)

Three (9%) of the children who underwent adenoidectomy alone had mild crusts while 4 (14%) of those who underwent other procedures in conjunction with adenoidectomy had mild and 2 (7%) had severe crusts. There is no statistically significant difference between the 2 groups (P value = 0.2).

Adhesions (3 months postoperatively)

Only 1 (3%) of the children who underwent adenoidectomy alone had mild nasal adhesions while 2 (7%) of those who underwent other procedures in conjunction with adenoidectomy had mild nasal adhesions. Severe postoperative adhesions were not detected in either group. There is no statistically significant difference between the 2 groups (P value = 0.6).

Nasal patency (1 year postoperatively)

Three (9%) of the children who underwent adenoidectomy alone had partial nasal obstruction while 5 (18%) of those who underwent other procedures in conjunction with adenoidectomy had partial nasal obstruction. No cavities were found completely obstructed in the postoperative period in both groups. There is no statistically significant difference between the 2 groups (P value = 0.5).

Table (1): Postoperative clinical evaluation of children who undergone adenoidectomy with/without nasal surgical procedures

	Adenoidectomy alone (n=32)		**Adenoidectomy & nasal surgical procedures (n-28)**		**P-value**
	Number	**%**	**Number**	**%**	
Edema*					
0	30	94	25	89	0.7
1	2	6	3	11	
2	0	0	0	0	
Discharge**					
0	27	85	23	82	0.8
1	2	6	3	11	
2	3	9	2	7	
Crusts*					
0	29	91	22	79	0.2
1	3	9	4	14	
2	0	0	2	7	
Adhesions*					
0	31	97	26	93	0.6
1	1	3	2	7	
2	0	0	0	0	
Nasal patency					
No obstruction	29	91	23	82	
Partial obstruction	3	9	5	18	0.5
Complete obstruction	0	0	0	0	

*(0= absent, 1= mild, 2= severe)
**(0= no discharge, 1= clear, thin discharge, 2= thick, purulent discharge)
n number of children undergone adenoidectomy with/without nasal surgical procedures accordingly.

Figure (1): X-ray nasopharynx (lateral view) shows enlarged adenoids (A adenoids).

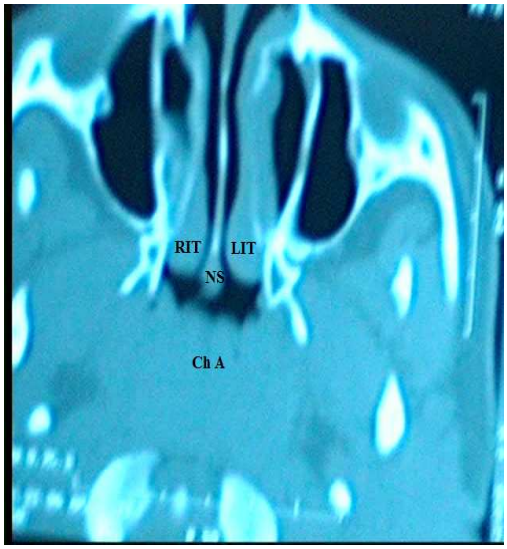

Figure (2): Axial CT of a girl showing hypertrophic inferior turbinates and choanal adenoids (NS nasal septum, Ch A choanal adenoids, RIT right inferior turbinate, LIT left inferior turbinate).

Figure (3): Coronal CT of the nasopharynx of the same patient in figure (4) showing enlarged adenoids (A adenoids).

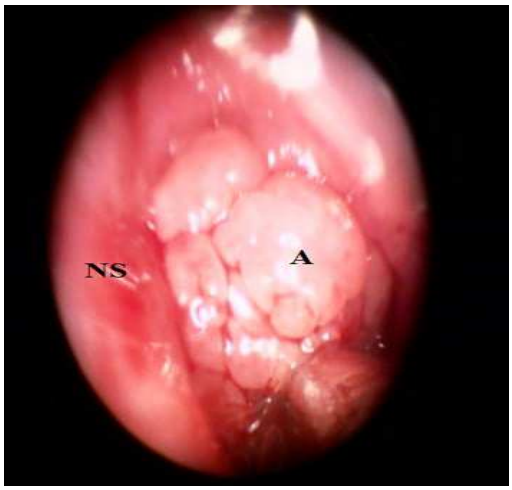

Figure (4): Preoperative view of the left nasal cavity and choana through the 30 ° endoscope showing enlarged adenoid (NS nasal septum, A choanal adenoid).

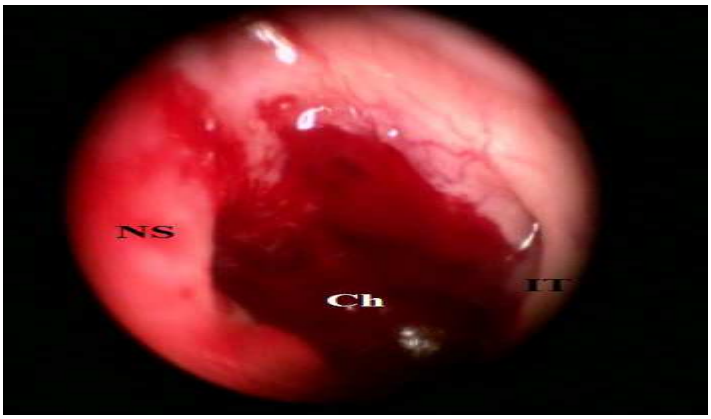

Figure (5): View of the left nasal cavity and choana through the 30 ° endoscope after adenoidectomy and left partial inferior turbinectomy of the same patient in figure (4)
(NS nasal septum, Ch left choana, IT inferior turbinate remnants)

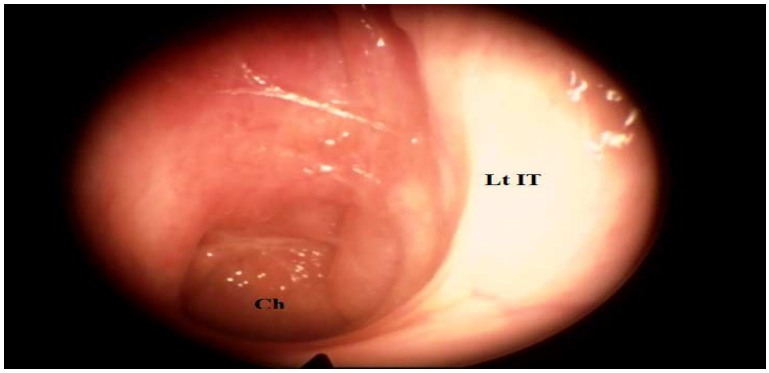

Figure (6): View of the left nasal cavity and choana through the 30 ° endoscope of the same patient in figures (2, 3) after adenoidectomy and partial inferior 3 months after surgery (Ch left choana, IT posterior part of trimmed inferior turbinate)

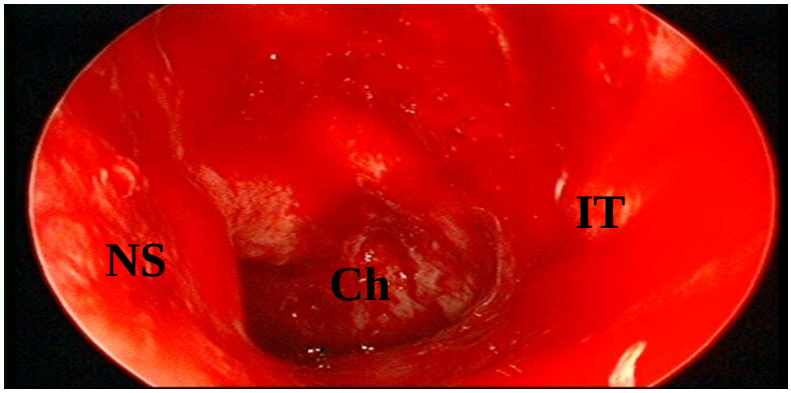

Figure (7): View of the left nasal cavity and choana of a sleep apnea patient through the 30 ° endoscope after adenoidectomy and partial inferior turbinectomy at the end of surgery (NS nasal septum, Ch left choana, IT posterior part of trimmed inferior turbinate)

Discussion:

Adenoidectomy is one of the commonly performed surgical procedures in children. [7,14]. Nasal obstruction in children is also caused by inferior nasal turbinate hypertrophy. Marked hypertrophy of the inferior turbinates is not an uncommon observation in children. In addition, it can cause snoring, noisy breathing, mouth breathing, and sleep apnea. [15] Functional endoscopic sinus surgery (FESS) is an effective treatment for chronic and recurrent pediatric sinusitis not responding to medical treatment. [11] FESS in children aims at correcting anatomic obstruction and addressing the ostiomeatal complex area, hence clearing the paranasal sinuses. This represents the idea that the frontal and maxillary sinuses are dependant on the pathophysiological conditions of the anterior ethmoid so FESS allows restoration of the mucociliary clearance and recovery of the sinus mucosa to its normal status. [11,16,17] In the current study, surgical procedures were done safely in all cases. No major postoperative complications such as severe hemorrhage, airway problems, stenosis or velopharyngeal insufficiency were detected. This agrees with a study conducted by El-Badrawy and Abdel-Aziz [18] who performed transoral endoscopic adenoidectomy using the adenoid curette in 300 patients. In the present study, only one patient complained of neck pain which was resolved within 2 weeks postoperatively. Adenoidectomy as a lone procedure was performed in 32 patients, whereas it was done with other procedures in 28 patients. The results are comparable in both groups. This agrees with a study done by Percodani *et al.,* [19] in which turbinate surgery was associated with an adenoidectomy, a septoplasty, and/or an ethmoidectomy in 22 out of 38 patients presented with nasal obstruction. Post-operative complications of their study are rare (no crusting rhinitis, one non symptomatic synechia). Functional obstructive symptoms were improved in near 90% of cases. The current study also reveals improvement of nasal patency in cases of adenoidectomy with and without other procedures in 91 and 82% of operated sides respectively. In addition, the non-obstructive synechiae were found in only 3 to 7% of cases.

Preliminary results of a study done by Langille and El-Hakim [20] indicate that inferior turbinoplasty with or without adenoidectomy is a safe, beneficial procedure for chronic rhinitis in children, so is adenoidectomy with other procedures according to the current study.

Results of this study are in accordance with published literature results [21-27] using the radiofrequency or microdebrider that revealed no cases of serious postoperative hemorrhage, excessive dryness or long-term nasal crusting. In conclusion, endoscopic nasal surgical procedures could be, safely and effectively, done in combination with adenoidectomy in children.

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