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Impact of Adenoidectomy with or without Bilateral Endoscopic Inferior Turbinoplasty on Children with Bilateral Nasal Obstruction

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ORIGINAL ARTICLE

Impact of Adenoidectomy with or without Bilateral Endoscopic Inferior Turbinoplasty on Children with Bilateral Nasal Obstruction

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Abstract

Background: ***Some research shows that compared to adenoidectomy alone, nasal obstruction symptoms are much improved with concurrent inferior turbinate surgery.***

Aim and objectives: ***To investigate the role of bilateral endoscopic inferior turbinoplasty as an adjuvant procedure for patients undergoing adenoidectomy for relief of nasal obstruction and sleep-disordered breathing.***

Patients and methods: ***This Quasi-experimental study was done on 100 pediatric cases in the age group of 3-18 years who attended the ENT clinics in health insurance hospitals in Alexandria, Egypt. Cases were subdivided into two groups: Group A (50 patients) experienced routine adenoidectomy, and Group B (50 patients) experienced routine adenoidectomy combined with bilateral endoscopic turbinoplasty. All patients were indicated for adenoidectomy with symptoms of nasal obstruction despite three months of medical treatment. The outcome was evaluated by nasal endoscopy during the visits and by utilizing the Glasgow Children's Benefit Inventory (GCBI) questionnaire.***

Results: ***There was a highly statistically significant difference (p-value < 0.001) amongst studied groups (group A and group B) concerning catching colds and infections, absence time, sleeping at night, being lively throughout the day, and overall life.***

Conclusion: ***The adjuvant use of bilateral endoscopic inferior turbinoplasty in patients undergoing adenoidectomy to relieve nasal obstruction added statistically significant better results compared to adenoidectomy alone regarding catching colds and infections, absence time, self-consciousness, improvement of sleep, lively during the day as well as overall life.***

Keywords: Adenoidectomy; Bilateral Endoscopic Inferior Turbinoplasty; Bilateral Nasal Obstruction

1. Introduction

Nasal obstruction, snoring, and other sleep-disordered breathing symptoms are relatively common problems in the pediatric age group with high prevalence.[1]

Thirty percent or more of people see doctors for relief from nasal blockage. Nasal anatomy controls airflow via the turbinates and septum, in addition to the more traditional roles of heating, humidifying, and filtering inhaled air and olfactory perception. The ideal nasal airflow is achieved when the nasal passages are free of obstructions, the mucociliary function is intact, the airflow receptors are operating normally, and there is no inflammation of the mucosa. The feeling of reduced airflow and nasal blockage (functional nasal obstruction) might result from any one of these parameters.[2]

Airway closure by deviated nasal septum, hypertrophied inferior turbinates, hypertrophied adenoids, or any other causes that impede the nasal airflow results in sleep apnea syndrome, which is a serious problem in children, failure to thrive among the sequelae of sleep apnea syndrome, besides the greater risk of behavioral and learning problems.[3]

Most cases of upper airway blockage in children (sometimes younger or older) occur between 18 months and around five years of age and are caused by chronic hypertrophy of adenoid tissue. Nasal blockage and obstructive sleep apnea syndrome (OSAS) are possible components. The blocked choana can be seen during the diagnostic procedure using flexible endoscopy. Obstructive adenoid hypertrophy is best treated by adenoidectomy, which is often done in conjunction with tonsillectomy.[4]

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Adenotonsillectomy (AT) is the most common procedure in children, with good results in improving airway obstruction symptoms, with reported surgical cure rates exceeding 70%. However, during clinical practice, symptoms are recurring, and occasionally, there is adenoid tissue regrowth, especially below the age of five years.[5]

More and more research is showing that compared to adenoidectomy alone, nasal obstruction symptoms are much improved with concurrent inferior turbinate surgery, and the risk of complications is significantly reduced. The need for general anesthesia in subsequent procedures is reduced with simultaneous surgeries. Children who have nasal blockage may benefit from AT, inferior turbinate reduction surgery, or a combination of the two, according to recent research.[6]

Cheng et al. have found improvement in symptoms of OSAS with persistent severe allergic rhinitis (PSAR) when combining inferior turbinate reduction surgery with AT.[6]

This work aimed to investigate the role of bilateral endoscopic inferior turbinoplasty as an adjuvant procedure for patients undergoing adenoidectomy for relief of nasal obstruction and sleep-disordered breathing.

2. Patients and methods

This Quasi-experimental study was done on 100 pediatric cases in the age group of 3-18 years who attended the ENT clinics in health insurance hospitals in Alexandria, Egypt. Cases were subdivided into two groups: Group A (50 patients), who experienced routine adenoidectomy, and Group B (50 patients), who experienced routine adenoidectomy combined with bilateral endoscopic turbinoplasty. All patients were indicated for adenoidectomy with symptoms of nasal obstruction despite three months of medical treatment, and nasal endoscopy showed hypertrophied adenoid tissue. In usual circumstances, these patients would undergo adenoidectomy with no further investigation. Group A patients attended ENT clinics on Saturday, Monday, and Wednesday, while group B patients attended other days, considering Friday is off work. The days were switched every 2 weeks for achieving diversity. The time for recruiting lasts about 3 months. For Group B patients, a computed tomography CT exam was asked to estimate and affirm airway narrowing.

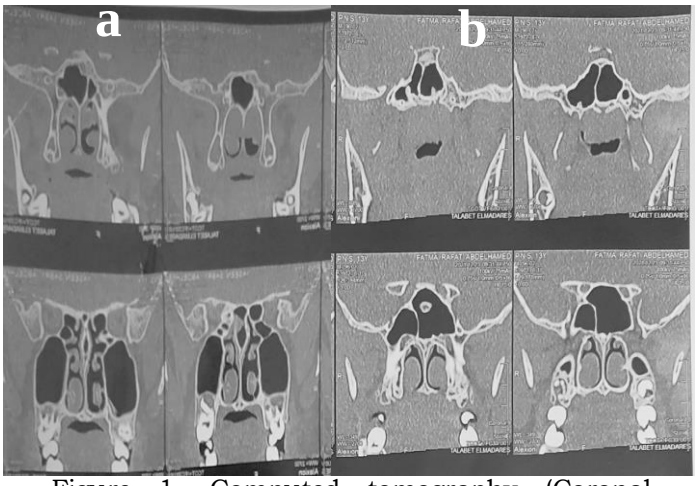

Figure 1. Computed tomography (Coronal section) showing: a) Unilateral HIT & Hypertrophied adenoids, b) Bilateral HIT & Hypertrophied adenoids.

Ethical approval: Before taking part in the research, each participant initially provided their informed consent to be included in the study. Both the Ethics Committee and the quality assurance office of the hospitals that participated in the study gave their approval to the protocol, which ensured that the research was carried out in line with the Declaration of Helsinki. Written consent was obtained from each subject - if possible - and their parents.

Inclusion criteria were children of both sexes, aged 3–18, attending ENT health insurance clinics, with nasal obstruction or sleep-disordered breathing, and having adenoid hypertrophy in lateral neck X-ray confirmed with nasal endoscopy, despite 3 months of medical treatment with intranasal corticosteroid and oral antihistaminic.

Exclusion criteria included patients who needed tonsillectomy, those with sinonasal pathology like a marked septal deviation or nasal polyposis, and those exhibiting symptoms that could indicate chronic or recurrent rhinosinusitis, such as fever, headaches, facial pain, rhinorrhea, antibiotic requirements, and purulence seen on nasal endoscopy. Participants were not included if they had any of the following conditions: immunodeficiency, disease affecting the central nervous system, history of sinonasal operations, craniofacial or nasal malformations, syndromes, tumors, or trauma.

Methods:

All the patients were subjected to full history taking, examination of the nasopharynx, and investigations. Anesthesiologists ensured that all patients were physically and mentally prepared for surgery.

Surgical procedures: All operations were performed under general anesthesia using straight (0°) and angled (30°) telescopes of 2.7 mm and 4 mm diameter. Group A: Underwent conventional

adenoidectomy using curettage technique under vision using transnasal endoscopy and hemostasis using bipolar cautery and packing for 10 minutes. Group B: Under nasal endoscopy, packing the nasal with cotton soaked with adrenalin .001. A bipolar radiofrequency procedure was subsequently performed on the anteromedial aspect of the lower turbinate. The two nasal passages were sealed for a full day.

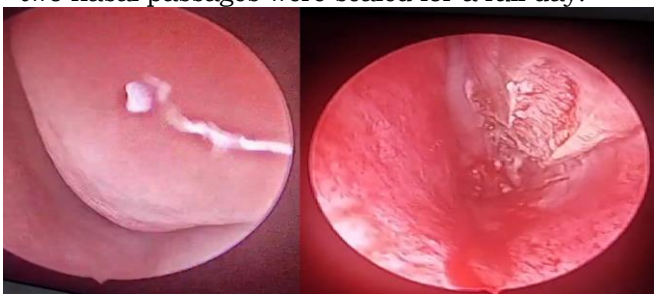

Figure 2. Endoscopic view pre- and post-hypertrophied inferior turbinates reduction.

Patient evaluation: The follow-up period was 6 months, with clinic visits in the first week, 3 months, and 6 months later. The outcome was evaluated by nasal endoscopy during the visits and by utilizing the Glasgow Children's Benefit Inventory (GCBI) questionnaire. A draft questionnaire was given to the parents. The parents were pre-instructed on how to fill out the questionnaire and were helped by the physician at the clinic. With the emphasis on using the Arabic version of the GCBI questionnaire.

The GCBI is designed to retrospectively measure the health-related QoL benefits following medical interventions in children. It was developed by reviewing existing quality-of-life measures, literature, and parental interviews. The last survey, which is 24 questions long, looks at how a certain intervention affected different parts of a kid's routine. Any kid, regardless of age, can benefit from it as it does not target any particular symptoms. The Arabic version of the GCBI questionnaire has proven to be a reliable tool for evaluating the retrospective QoL following medical interventions in pediatric patients. Its high internal consistency and the significant variance explained by its factors demonstrate its validity for Arabic-speaking populations. This adaptation of the GCBI allows for broader application in diverse cultural contexts, ensuring that children's health outcomes can be accurately assessed across different linguistic groups.

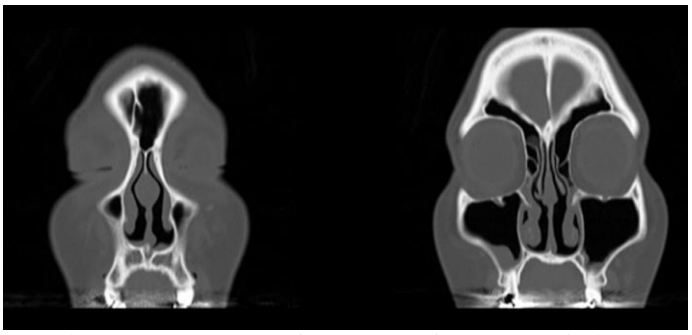

Figure 3. Computed tomography (coronal view), showing reduction of inferior turbinate 1-month post-operative.

Statistical analysis: Statistical Program for Social Science (SPSS) version 24 was utilized in order to analyze the data. The frequency and percentage of occurrence have been employed to convey the qualitative data. Because the data did not follow a normal distribution, the median (interquartile range) was utilized to describe the quantitative data (age). Find the median by ranking all of the data points and selecting the one that is in the middle (or, if there are two middle numbers, by taking the mean of those two figures). The median is the number that is about in the center. The interquartile range, often known as IQR, is a statistical dispersion measure that quantifies the extent to which the data is spread out. The distinction between the 75th and 25th percentiles of the data is what is meant to be understood by this term. The following tests were done: Mann Whitney U test (MW), which was used when contrasting between two groups (for abnormally distributed data). The chi-square test was used to contrast non-parametric data. Probability (P-value): P-value < 0.05 was regarded as significant, P-value < 0.001 was regarded as highly significant, and P-value > 0.05 was regarded as insignificant.

3. Results

Table 1 displayed statistically significant (p-value = 0.004) decreased age in group A (median = 8 years, IQR = 7 – 10 years) when compared with group B (median = 10 years, IQR = 8 – 12 years).

Table 1. Comparison between studied groups as regard age.

		GROUP A (N = 50)	GROUP B (N = 50)	STAT. TEST	P-VALUE
AGE (YEARS)	Median	8	10	MW =	0.004 S
	IQR	7 - 10	8 – 12	838.5	
MEAN±SD		9.41±2.48	8.66±2.39	10.2±2.32	

MW: Mann Whitney U test, S: p-value < 0.05 is considered significant.

Table 2 displayed highly statistical significant variance (p-value < 0.001) amongst studied groups (group A and group B) concerning catching colds & infections.

Table 2. Comparison among studied groups concerning catching colds and infections

		GROUP A (N = 50)		*GROUP B (N = 50)*		*STAT. TEST*	*P-VALUE*
CATCHING COLDS AND INFECTIONS	*Several*	*1*	*2%*	*0*	*0%*	X^2 = *26.7*	< *0.001 HS*
	Much more	*5*	*10%*	*1*	*2%*		
	Same	*39*	*78%*	*20*	*40%*		
	Much lesser	*2*	*4%*	*13*	*26%*		
	Minimal	*3*	*6%*	*16*	*32%*		

Table 3 displayed highly statistical significant variance (p-value < 0.001) amongst examined groups (group A and group B) concerning absence time.

Table 3. Comparison among studied groups regarding absence time

		GROUP A (N = 50)		GROUP B (N = 50)		STAT. TEST	P-VALUE
ABSENCE TIME	Several	1	2%	0	0%	X^2 = 24.5	< 0.001 HS
	Much more	4	8%	0	0%		
	Same	41	82%	26	52%		
	Much lesser	1	2%	18	36%		
	Minimal	3	6%	6	12%		

Table 4 displayed highly statistical significant variance (p-value < 0.001) amongst examined groups (group A and group B) concerning sleeping night.

Table 4. Comparison between studied groups as regard sleeping night.

		GROUP A (N = 50)		GROUP B (N = 50)		STAT. TEST	P-VALUE
SLEEPING NIGHT	Very bad	7	14%	0	0%	X^2 = 41.01	< 0.001 HS
	Bad	3	6%	0	0%		
	Neutral	32	64%	11	22%		
	Good	4	8%	25	50%		
	Excellent	4	8%	14	28%		

Table 5 displayed highly statistical significant variance (p-value < 0.001) amongst examined groups (group A and group B) as regard Being lively throughout day.

Table 5. Comparison between studied groups as regard Being lively during day.

		GROUP A (N = 50)		GROUP B (N = 50)		STAT. TEST	P-VALUE
BEING LIVELY DURING DAY	Neutral	46	92%	21	42%	X^2 = 29.2	< 0.001 HS
	Good	4	8%	18	36%		
	Excellent	0	0%	11	22%		

Table 6 displayed highly statistical significant variance (p-value < 0.001) amongst examined groups (group A and group B) concerning overall life.

Table 6. Comparison between studied groups concerning overall life

		GROUP A (N = 50)		GROUP B (N = 50)		STAT. TEST	P-VALUE
OVERALL LIFE	Bad	4	8%	0	0%	X^2 = 30.9	< 0.001 HS
	Neutral	28	56%	8	16%		
	Good	15	30%	19	38%		
	Excellent	3	6%	23	46%		

4. Discussion

In the current research, the mean age for all subjects, group A and group B were 9.4±2.5, 8.6±2.3, and 10.2±2.32, respectively. The mean age in the Mourad et al.[7] study at the time of surgical intervention was 10.7 ± 2.7 years for all subjects, 10.7 ± 2.5 years for the IT-only subgroup, and 10.9 ± 3.1 years for the IT and Ad subgroup. However, the mean age ranged from 7.2 in one study, Segal et al.,[8] to 13.5 in another, and it treated Percodani et al.,[9].

In the present study, we found that IT added statistically significant better results to Ads regarding colds, infections, and absence time. In addition, significant improvement in sleep was reported in the IT group, which led to significantly improved daytime and Overall life in comparison with the group treated with routine Ad only.

In accordance with the Langille and El-Hakim[10] study, Patients benefited in all domains (median GCBI 28.1, range -6.3 to 93.8), which allowed them to determine QOL improvement, symptom control, and safety after it (IT) with or without adenoidectomy (Ad) in children who presented with chronic rhinitis (CR) refractory to medical treatment. They also concluded that IT has an effect on QOL that is similar to that of standard otolaryngology procedures. Additionally, our sleep results were consistent with those of Langille and El-Hakim[10], who found that 76% of patients had an improvement in their sleep quality following the procedure.

Along the same line, our results supported Mourad et al.[7] findings in their retrospective case series study among 60 cases who had CR; Forty-two patients had IT only while 18 had IT, and Ad they used GCBI to assess QOL improvement. With a median GCBI score of 22.9 (6.3, 39.6) across all domains, there was an overall favorable advantage. Both with and without Ad, the outcomes shown by Mourad et al.,[7] showed that QOL improved with IT.

Additionally, our results were validated by other studies that employed various evaluation methodologies. For example, Mun et al.[11] sought to examine the effectiveness of concurrent coblation-assisted turbinoplasty with AT (T&AdT) in patients suffering from allergic rhinitis (AR). The 104 children who had AT AdT and the 67 children who had T&AdT were all part of this research. Both sets of patients showed significant improvements across the board following surgery in terms of their snoring, mouth breathing, nasal blockage, rhinorrhea, itching, and sneezing symptoms. When compared to the AdT group, the T&AdT group had a statistically significant reduction in nasal blockage and mouth breathing. Postoperative improvements in snoring, rhinorrhea, itching, and sneezing were not significantly different between the two groups.

Concurrent turbinoplasty was substantially linked to postoperative obstructive symptoms, such as mouth breathing and nasal obstruction, in multiple regression analyses. Their research led them to the conclusion that individuals with AR and adenotonsillar hypertrophy may benefit from concomitant turbinoplasty for the improvement of obstructive symptoms.

Osman and Abd Elrahim[12] sought to determine if nasal surgical procedures (such as IT) performed in combination with adenoidectomy in children impact the procedure's result; other publications described the procedure's postoperative outcome and problems. After the operation, patients were checked again at 1, 2, 4, 6, and 12 weeks. In terms of postoperative edema, discharge, crusts, adhesions, and nasal patency, they could not find any statistically significant differences between the two groups.

In a research conducted by Percodani et al.,[9] 22 out of 38 patients who first presented with nasal blockage had turbinate surgery in conjunction with an adenoidectomy, septoplasty, and an ethmoidectomy. No cases of crusting rhinitis and one case of asymptomatic synechia were reported as postoperative complications in their investigation.

This study confirms the preliminary findings of a previous one by Langille and El-Hakim[10], which found that adenoidectomy in conjunction with inferior turbinoplasty is a safe and effective treatment for persistent rhinitis in children.

4. Conclusion

The adjuvant use of bilateral endoscopic inferior turbinoplasty in patients undergoing adenoidectomy to relieve nasal obstruction added statistically significant better results to adenoidectomy regarding colds and infections, absence time, and self-consciousness. In addition, there was a significant improvement in sleep, lively during the day, and overall life in comparison with the group treated with routine Ad only. However, the other parameters show statistically insignificant differences between both groups.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article

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Conflicts of interest

There are no conflicts of interest.

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