Endoscopic Adenoidectomy Versus Conventional Adenoidectomy in Persistant Otitis Media With Effusion in Pediatrics

Original Article

Mostafa Talaat, Abdel-Moneim H. Hamad, Nouran M. Bhaa Eldin, Adel A. Abdullah, Khalaf Hamead

Department of Otorhinolaryngology, Faculty of Medicine, El Minia, Egypt.

ABSTRACT

Background: Adenoidectomy is one of the most common operations performed in pediatric population. Different techniques have been described for adenoidectomy.

Aim of the study: Prospective study to compare post-operative outcome of surgical management of patients with adenoid hypertrophy complicated by persistent otitis media with effusion (OME) by endoscopic adenoidectomy versus conventional adenoidectomy.

Patients and Methods: Sixty patients, (aged from 4 to 16 years) diagnosed as adenoid hypertrophy and persistent otitis media with effusion were randomly classified into two groups, with 30 patients in each group. Group A (endoscopic group): who had endoscopic adenoidectomy. Group B (conventional group): who had conventional adenoidectomy.
All patients had myringotomy and ventilation tubes insertion.

Results: In group (A) the mean age of subjects is 8.02 ± 3.91years. There are 17 males and 13 females. While in group B the mean age of subjects is 6.76 ± 3.21years. There are 17males and 13 females.
Endoscopic group has better significant results than conventional group regarding mean operative time, mean intraoperative blood loss, the presence of an adenoid remnant, injury of surrounding tissue and also improvement of the patients according to NOSE score.

Conclusion: Endoscopic adenoidectomy technique provides less intra-operative blood loss, less injury to the surrounding structures and less post-operative adenoid tissue remnants, also Endoscope allows good documentation, visualization, more improvement of nasal symptoms and improvement of quality of life, but endoscope is time consuming and costing. while conventional adenoidectomy has its advantages in its simplicity, low cost, and its availability in many places, but it has many disadvantages that makes endoscopic adenoidectomy is the best choice for pediatrics with adenoid hypertrophy..

Key Words: Adenidectomy, conventional, endoscopic, Otitis media with effusion.

Received: 19 January 2023, **Accepted:** 24 March 2023

Corresponding Author: Abdel-Moneim Hany Hamad, MD, Department of Otorhinolaryngology, Faculty of Medicine, El Minia, Egypt. **Tel.:** 01007665549, **E-mail**: abd.monem.ent@gmail.com

ISSN: 2090-0740, 2023

INTRODUCTION

Conventional Adenoidectomy become one of the most common operations performed in pediatrics when Wilhelm Meyer described it in 1885.[1,2]

Common indications for adenoidectomy are adenoid hypertrophy resulting in sleep disorders, nasal obstruction, otitis media with effusion and recurrent rhino sinusitis.[3,4]

Along this time, there are different techniques for adenoidectomy including microdebrider, endoscopy, suction diathermy, and laser. Each technique has its own advantage and disadvantage in complications, cost, operation time and outcomr.[5,6]

Adenoidectomy using curette cannot determine completeness of adenoid removal. It was described in early reports, that it is important to remove laterally based adenoid tissue in patients with adenoid and otitis media with effusion that cannot be done in adenoidectomy using curette.[7]

There are a lot of clinical trials to search for techniques and instruments for adenoidectomy with less blood loss and under good visualization of the field. Adenoidectomies have been performed using a variety of instruments.[5]

Inflammation of the middle ear with presence of endotympanic fluid excluding any clinical picture of acute otitis media is otitis media with effusion (OME).[8]

The most common predisposing factors for persistent otitis media with effusion not responding to medical treatment and managed by ventilation tubes are adenoid hypertrophy which is commonly seen and in patients of low socio economic standard and of excessive exposure to smoke.[9]

 DOI: 10.21608/ejentas.2023.188412.1603

Middle ear effusion is diagnosed by Tympanometry and its result of type B tympanogram.[10]

PATIENTS AND METHODS:

Study design:

The current study is a prospective study that was done at the department of Otorhinolaryngology, Minia University Hospital between December 2021 and June 2022 to compare post-operative outcome of surgical management of patients with adenoid hypertrophy by endoscopic adenoidectomy versus conventional adenoidectomy by curettage in pediatrics with persistent otitis media with effusion. A total number of 60 patients from pediatric and of both sexes were involved in the study. Following a comprehensive explanation of the operation, written informed consent was taken from parents of each patient. We selected patients with adenoid causing nasal obstruction and persistent otitis media with effusion.

Sampling Criteria:

In this study 60 patients having adenoid and persistent otitis media with effusion were screened from patients having nasal obstruction in outpatient clinic in the department of otorhinolaryngology Minia University Hospital. These patients were evaluated and studied. all the pediatric patients aged from (4 to 16 years) with adenoid and persistant otitis media with effusion were involved in the study.

Ethical approval:

Ethical permission was sought from a local faculty of medicine research ethics committee (FMREC) No: 205/2021. Accordig to committee protocol all patients consented for data retrieval for research purposes after ensuring the confidentiality, so the study poses no harm regarding the safety issues to the patients.

Participants:

The study participants were recruited from patients with adenoid hypertrophy and persistent otitis media with effusion in our outpatient clinic.

The patients were randomly classified into two groups, with 30 patients in each group.

Group A (endoscopic group): who had endoscopic adenoidectomy.

Group B (conventional group): who had conventional adenoidectomy.

All patients had myringotomy and ventilation tubes insertion.

Methods:

A- Evaluation of the patients

1- Detailed history of ear, nose and throat was taken for each patient. (with special attention to nasal and otological symptoms).

Asking parents about symptoms of nose and grading patients according to NOSE score (Nasal Obstruction Symptom Evaluation) (Figure 1).

Parents have completed questionnaire as indicated by circling to describe their current symptoms then summation of answers and multiplication by 5 were done to use a scale with a maximum score of 100 as a starting point for analysis:

- No obstruction :0 -5

- Mild degree of obstruction :5-25

- Moderate degree of obstruction :30-50

- Severe degree of obstruction :55-75

- extreme degree of obstruction; 80-100

2- General physical examination was done excluding systemic diseases.

3- Otorhinolaryngeal examination special attention to adenoid facies.

4- Complete nasal examination by anterior rhinoscopy using simple nasal speculum and endoscopic examination were done in cooperative pediatrics.

Endoscopic examination:

- For the examination, ribbon gauze soaked in ephedrine, saline (1:1000), and xylocaine was placed in both nasal cavities for 15 minutes.

- Then the examination was done by Nasal endoscopy (4-mm, 2.7mm diameter, 0, 30° nasal endoscope KARL STORZ Germany) was used in both nasal cavities to assess adenoid, to note any nasal and nasopharyngeal pathology (Figure 2).

4- Complete ear examination by otoscope or endoscope using sigelization (Figure 3).

5- Phoniatric evaluation of pediatrics to assess if there is contraindication for adenoidectomy and testing of closed nasality.

***Investigations:**

1- Audiological:

- Pure tone audiometry: (to evaluate hearing) was done using Madsen Astera Audiometer ,the audiometric testing was done in one-octave steps from 0.5-4 KHZ.

- Tympanometry to evaluate effusion (flat curve) was done using IPSI, sound pressure level (SPL) and external auditory canal volume were measured pre and post-operatively (Figures 4, 5, 6).

2- Radiological: X-ray nasopharynx : for diagnosis and grading of adenoid (Figure 7)

the subjects were then categorized into 4 groups:

Grade 0 : (0-25%) no adenoid enlargement

Grade 1 : (25-50%) minimal adenoid enlargement

Grade 2 : (50-75%) moderate adenoid enlargement

Grade 3 : (75-100%) severe adenoid enlargement[11]

3- **Laboratory investigations:**

Pre-operative in the form of complete blood count, prothrombin time and concentration, activated partial thromboplastin time (APPT) were done in all patients.

Medical treatment :

• Watchful waiting for 3 months.

• Proper treatment of recurrent upper respiratory tract infection.

• Short course of systemic steroids, mucolytic, anti-oedemtous and anti - inflammatory drugs.

• Local intranasal steroids for patients with allergic symptoms.

B- Inclusion criteria:

1. Age of patient 4-16 years.

2. Patients who had adenoid hypertrophy causing persistant otitis media with effusion.

Children with bilateral OME that has persisted for 3 months or more and documented hearing difficulties with hearing loss (above 25 dB) of the ear on both sides, or children with unilateral or bilateral OME for 3 months or longer and observed pathological changes of the tympanic membrane such as atelectasis and adhesion according to Egyptian clinical practice guidelines.

3. Patients accepting the research procedure.

C- Exclusion criteria:

1. Patients refusing the research procedure.

2. Patients not fit for general anesthesia.

All of the patients were admitted inside the hospital 24 hours before surgery, all of them were applied informed written consent and antibiotics were taken. All operations were done by well experienced surgeons.

All surgeries were carried out using endotracheal intubation and general anesthesia.

In conventional adenoidectomy; Firstly patients were put in supine position then:

1- Boyle-Davis mouth gag is inserted, first examination of the adenoid tissue by digital palpation was done to, confirm diagnosis, determine the size and make adenoid tissue more medially to be easily removed then elevation of the soft palate.

2- An adenoid curette of the proper size and with a guard is inserted into the naso-pharynx until its free edge reaches the back of the nasal septum, and it is then forced backward to engage the adenoids. To prevent harm to the odontoid process, the head is gently flexed at this level.

3- Adenoids are removed with a gently sweeping motion, and lateral adenoid tissue is similarly removed with smaller curettes.

4- The presence of residual adenoid was verified with a postnasal or laryngeal mirror or 70 degree German endoscopy after palpating with a finger to confirm complete removal of adenoid tissue.

4- Gauze packing was administered from the mouth to the nasopharynx, and compression was used for 5 minutes to achieve hemostasis.

Patients who needed tonsillectomy underwent the operation after having their adenoids removed (Figures 8, 9).

In endoscopic adenoidectomy: firstly, The patient lied supine with the head slightly tilted to the right, facing the operating surgeon, then

1- To make the nasal passage easier during the operation, a topical solution containing 1% xylometazoline

was applied to the nasal cavity and was carried out under vision using a 2.7 mm diameter, 0-degree KARL STORZ German endoscope ,was passed transnasally. For more clear views of the nasopharynx before, during, and after the excision of adenoid tissue, a nasal endoscope was attached to a video camera.

2- With Blakesley-Well cutting forceps (Karl Stortz, Tuttliengen, Germany), which were inserted via the nose under close observation with a 2.7 mm telescope, adenoidal tissue obstructing the posterior choanae was gradually removed or by Micro-debrider (KARL STORZ) {Model:40701420}.

3- The field was made clear by simultaneous saline irrigation and aspiration, which cleared the blood and removed adenoid tissue.

4- Hemostasis was done by cauterization by suction diathermy (Figures 10, 11, 12).

Then in all patients myringotomy were done and insertion of ventilation tube of Grommet type (Shepard type Fluoroplastic REF:7020) (Figure 13)

Intra-operative parameters:

1- operative time:

It was calculated as:

In conventional adenoidectomy; total operation time is time period between application of mouth gag to its removal.

In endoscopic adenoidectomy: total operation time is time period between application of endoscope and its removal.

2- Blood loss:

In conventional adenoidectomy :it is calculated as each 3 inch soaked gauze correspond to 10 ml blood loss[12].

In endoscopic adenoidectomy: it is calculated by subtraction of what come in suction from the irrigation solution.

Post-operative parameters:

Early: observation of any anesthesia or nasal surgery complications

Observe patients for hemorrhage: primary ,reactionary and secondary

Late:

1- Full excision of the adenoid tissue, It was evaluated using.

-Nasal endoscopy 2 weeks after surgery in both groups (Figure 14).

Also endoscopic examination of surrounding structures to exclude injury.

2- Improvement of nasal obstruction by asking parents and patients according to NOSE score 2 weeks post operatively.

3- Testing of nasality in phoniatric unit 2 weeks post operatively.

4- Follow up tympanometry ,measuring of physical volume and examine patency of ventilation tube 3months and 6 months postoperatively.

5- lateral neck radiography 1 month after surgery in both groups.

Statistical analysis:

The analysis of the data was carried out using the IBM SPSS 26.0 statistical package software (IBM; Armonk, New York, USA). Normality of the data was tested using the Shapiro-Wilk tests. Data were expressed as mean, standard deviation (SD), minimum and maximum of range for quantitative measures, in addition to both number and percentage for categorized data. Mann-Whitney U test for comparison between two independent group for non-parametric data, independent t test were used for comparison between two independent group for parametric data, McNamar test were used to compare two related categorical group, Wilcoxon Test for comparison of two related numerical groups, Freidman test used for repeated measures for non-parametric data The Chi square test or Fisher's exact test were used to compare categorical variables. A *p-value* less than 0.05 was considered significant.

RESULTS:

1-Demographic data

In this study, there were 60 participants separated into two groups, group (A) and group (B), each of which had 30 participants. Group (A) for children who underwent endoscopic adenoidectomy while group (B) for those underwent conventional adenoidectomy.

Table (1) presents the demographic data of the participants in each group.

In group (A) the mean age of subjects is 8.02 ± 3.91years. There are 17 males and 13females. While in group B the mean age of subjects is 6.76 ± 3.21years. There are 17 males and 13 females (Figures 15, 16).

2- Difference between 2 groups in operation time

The mean operative time was significantly different between group (A) and group (B), mean (25.9 ± 3.76 Versus 11.53 ± 2.11 respectively) (*p<0.001*) (Table 2) (Figure 17).

3- Difference between 2 groups in intra-operative blood loss: Between group (A) and group (B), there was a significant difference in the mean intraoperative blood loss (in ml), mean (21.33± 8.9 Versus 29.33 ± 7.8 respectively) (*p<0.001*) (Table 3) (Figure 18).

4- The difference in post-operative endoscopic assessment as regarding presence of adenoid remnant and injury of surrounding tissue, It was assessed via nasal endoscopy 2 weeks after surgery in the two groups. Between group (A) and group (B), the presence of an adenoid remnant differed significantly with (*p=0.044*).

In Group A adenoid remnant was found in 1 patient while in Group B adenoid remnant was found in in 6 patients.

Also injury of surrounding tissue (as Eustachian tube opening, torus tubaris, or mucosa of the nasopharynx) was found in 2 patients of Group (B) with no significant difference (*p=0.246*) (Table 4) (Figure 19).

5- Difference between 2 groups in improvement of nasal symptoms according to NOSE score 2 weeks post operatively.

The statistical results of the patients according to NOSE score are shown in Table 5. There is significant difference in NOSE score between group (A) and group (B) with *P-value* (0.044) (*p<0.001*) (Figure 20).

6- radiological assessment 1 month post operatively and detect difference between 2 groups.

When we compared difference in post-operative radiological assessment of adenoid remnant between group (A) and group (B) after removal of the adenoid tissue. In Group A, no adenoid enlargement (grade 0) was observed in 29 patients, grade 1 adenoid enlargement was observed in 1 patient.

While In Group B, no adenoid enlargement (grade 0) was observed in 24 patients, grade (1) adenoid enlargement was observed in 6 patients.

Significant differences between the groups were found in the post-operative radiological evaluation of the adenoid (*P< 0.001*) (Table 6) (Figure 21).

7- Difference between 2 groups in improvement of closed nasality 2 weeks post-operatively:

When we compared difference in post-operative improvement of closed nasality between group (A) and group (B) after the removal of the adenoid. In group A, no element of closed nasality was observed in 29 patients, mild nasality was observed in 1patient.

While in group B no element of closed nasality was observed in 24 patients, mild closed nasality was observed in 6 patients.

Significant difference between groups was determined in terms of closed nasality improvement post operatively (*P=0.044*) (Table 7) (Figure 22).

8- assessment of physical volume of middle ear in both groups 3 months and 6 months post operatively.

No significant difference existed between the two groups, the statistical results of the patients according to of assessment physical volume of middle ear are shown in Table 8. The physical volume was 2.50 ± 0.55 (mean ± SD) in group (A) 3 months post operatively and was found to be 2.56 ± 0.38 (mean ± SD) in group (B) 3months post operatively with *P-value (0.994)*. The physical was 3.36 ± 0.47 (mean ± SD) in the study group (A) 6 months post operatively and was found to be 3.18 ± 0.68 (mean ± SD) in control group (B) 6 months post operatively with *P-value (0.238)* (Figure 23).

9- Assessment of patency of ventilation tubes in both groups 3 months and 6 months post operatively.

No significant difference existed between the two groups. The statistical results of the patients according patency of ventilation tube are shown in Table 9. In group A, ventilation tubes were patent in 30 patients and 0 patient ventilation tubes were extruded 3 months post operatively while in group B,ventilation tubes was patent in 29 patients and was extruded in 1 patient with *P-value (0.0313)*.

6 months post-operatively, in group A,ventilation tubes were patent in 18 patients and extruded in 12 patients. while in group B ventilation tubes were patent in 20 patients and extruded in 10 patients with *P-value 0.295* (Figure 24).

Table 1: Demographic data

Demographic data	Conventional (n = 30)	Endoscopic (n = 30)	*p value*
Age (yrs.)			
• Mean ± SD	6.76 ± 3.21	8.02 ± 3.91	*0.180*
• Range	4 – 14	4 – 16	
Sex N (%)			
• Male	17 (56.7%)	17 (56.7%)	*>0.99*
• Female	13 (43.3%)	13 (43.3%)	

Table 2: Difference between the two groups in operation time

Operative time	Conventional (n = 30)	Endoscopic (n = 30)	*p value*
• Mean ± SD	11.53 ± 2.11	25.9 ± 3.76	*< 0.001**
• Range	7 – 16	18 – 36	

Table 3: Difference between 2 groups in intra-operative blood loss.

Blood loss	Conventional (n = 30)	Endoscopic (n = 30)	*p value*
• Mean ± SD	39.33 ± 7.8	21.33 ± 8.9	*< 0.001**
• Range	30 - 50	10 – 40	

Table 4: Differences between 2 groups in endoscopic assessment of adenoid postoperatively.

Post operative data	Conventional(n = 30)		Endoscopic(n = 30)		*p value*
	Positive	Negative	Positive	Negative	
Remnant	6(20%)	24(80%)	1(3.3%)	29(96.7%)	*0.044**
Injury to thesurroundings	2 (6.7%)	28 (93.3%)	0 (0%)	30 (100%)	*0.246*

Table 5: the difference between the two groups in improvement of nasal symptoms according to NOSE score post-operatively. according to NOSE score post-operatively.

Nose score	Conventional(n = 30)		Endoscopic(n = 30)		*p value*
	preoperative	2w post operative	preoperative	2w post operative	
➢ No obstruction	0 (0%)	24(80%)	0 (0%)	29(96.7%)	*C vs E (pre):*
➢ Mild	1 (3.3%)	6(20%)	1 (3.3%)	1(3.3%)	*0.336*
➢ Moderate	12 (40%)	0 (0%)	7 (23.3%)	0 (0%)	*C vs E (post):*
➢ Severe	10 (33.3%)	0 (0%)	9 (30%)	0 (0%)	*0.044**
➢ Extreme	7 (23.3%)	0 (0%)	13 (43.3%)	0 (0%)	

Table 6: Radiological assessment 1 month post operatively and detect difference

Radiologicaldata	Conventional(n = 30)		Endoscopic(n = 30)		*p value*
	X ray preoperative	X ray postoperative	X ray preoperative	X ray postoperative	
➢ Grade 0	0 (0%)	24(80%)	0 (0%)	29(96.7%)	*C vs E (pre):*
➢ Grade 1	0 (0%)	6(20%)	1 (3.3%)	1(3.3%)	*0.335*
➢ Grade 2	6 (20%)	0 (0%)	2 (6.7%)	0 (0%)	
➢ Grade 3	10 (33.3%)	0 (0%)	13 (43.3%)	0 (0%)	*C vs E (post):*
➢ Grade 4	14 (46.7%)	0 (0%)	14 (46.7%)	0 (0%)	*0.044**
p value	Pre vs post in Conventional: *< 0.001**		Pre vs post in Endoscopic: *< 0.001**		

Table 7: Difference between 2 groups in improvement of closed nasality 2 weeks post operatively.

Nasality	Conventional(n = 30)		Endoscopic(n = 30)		*p value*
	Nasality preoperative	Nasality postoperative	Nasality preoperative	Nasality postoperative	
➢ No	0 (0%)	24(80%)	0 (0%)	29(96.7%)	*C vs E (pre):*
➢ Mild	5 (16.7%)	6(20%)	5 (16.7%)	1(3.3%)	
➢ Mild to moderate	7 (23.3%)	0 (0%)	4 (13.3%)	0 (0%)	*0.391*
➢ Moderate	12 (40%)	0 (0%)	11 (36.7%)	0 (0%)	
➢ Moderate to sever	0 (0%)	0 (0%)	4 (13.3%)	0 (0%)	*C vs E (post):*
➢ Sever	2 (6.7%)	0 (0%)	3 (10%)	0 (0%)	
➢ Marked	4 (13.3%)	0 (0%)	3 (10%)	0 (0%)	*0.044**
p value	Pre vs post in Conventional: *0.001**		Pre vs post in Endoscopic: *< 0.001**		

Table 8: Physical volume assessment of middle ear 3 months and 6 months post operatively.

Physical volume	Conventional (n = 30)		Endoscopic (n = 30)		*p value*
	Mean ± SD	Range	Mean ± SD	Range	
Preoperative	0.72 ± 0.10	0.6 - 1	0.73 ± 0.12	0.4 – 1	*0.708*
3 m post operative	2.56 ± 0.38	1.8 - 3.1	2.50 ± 0.55	1 - 3.3	*0.994*
6 m post operative	3.18 ± 0.68	1 - 3.9	3.36 ± 0.47	1.6 - 3.8	*0.238*
p value:					
(Among all)	*< 0.001**		*< 0.001**		
pre vs 3m post	*< 0.001**		*< 0.001**		
pre vs 6m post	*< 0.001**		*< 0.001**		
3m post vs 6m post	*0.009**		*0.001**		

Table 9: Assessment of patency of ventilation tubes in both groups 3 months and 6 months post operatively

Patency	Conventional (n = 30)		Endoscopic (n = 30)		*p value*
	Positive	Extruded	Positive	Extruded	
3 m post operative	29 (96.7%)	1 (3.3%)	30 (100%)	0 (0%)	*0.313*
6 m post operative	20 (66.7%)	10 (33.3%)	18 (60%)	12 (40%)	*0.295*
p value	3m vs 6m post in Conventional: *0.004**		3m vs 6m post in Endoscopic: *< 0.001**		

Nasal Obstruction Symptom Evaluation (NOSE) Instrument

→ **To the Patient** Please help us to better understand the impact of nasal obstruction on your quality of life by **completing the following survey**. Thank You!

Over the past 1 month, how much of a problem were the following conditions for you?

Please circle the most correct response

	Not a problem	*Very mild problem*	*Moderate problem*	Fairly bad problem	Severe problem
1. Nasal congestion or stuffiness	0	1	2	3	4
2. Nasal blockage or obstruction	0	1	2	3	4
3. Trouble breathing through my nose	0	1	2	3	4
4. Trouble sleeping	0	1	2	3	4
5. Unable to get enough air through my nose during exercise or exertion	0	1	2	3	4

Fig. 1: NOSE score (Nasal Obstruction Symptom Evaluation)

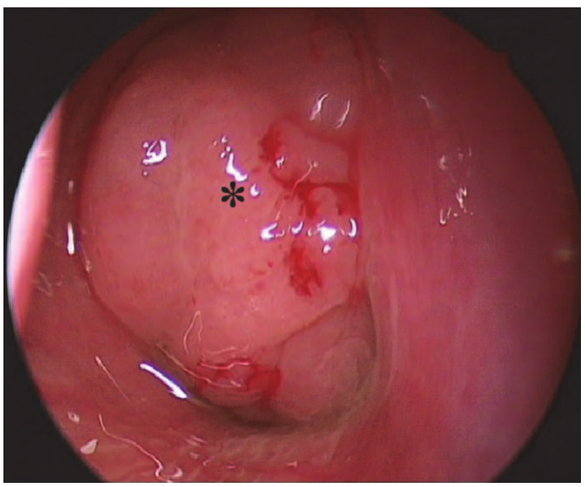

Fig. 2: Endoscopic Examination of naso-pharynx for adenoid

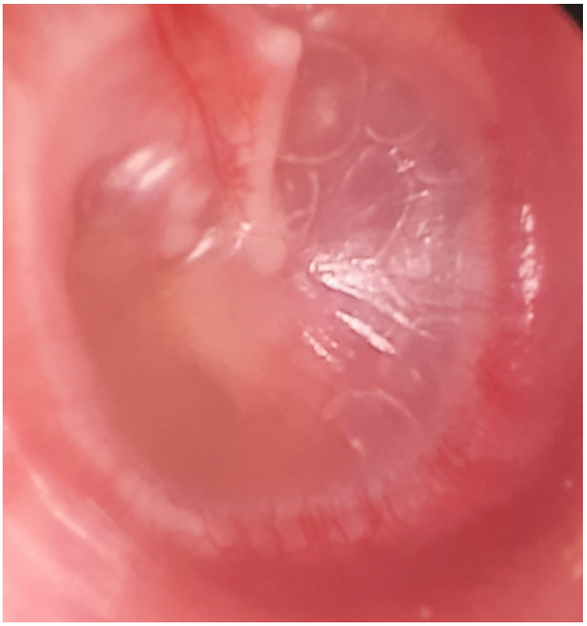

Fig. 3: Endoscopic examination of otitis media with effusion

Fig. 4: GSI device of tympanometry

Fig. 5: Madsen Astera Audiometer

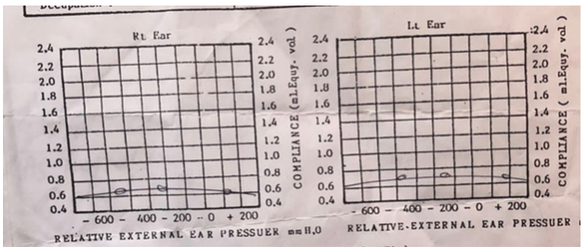

Fig. 6: flat curve tympanometry

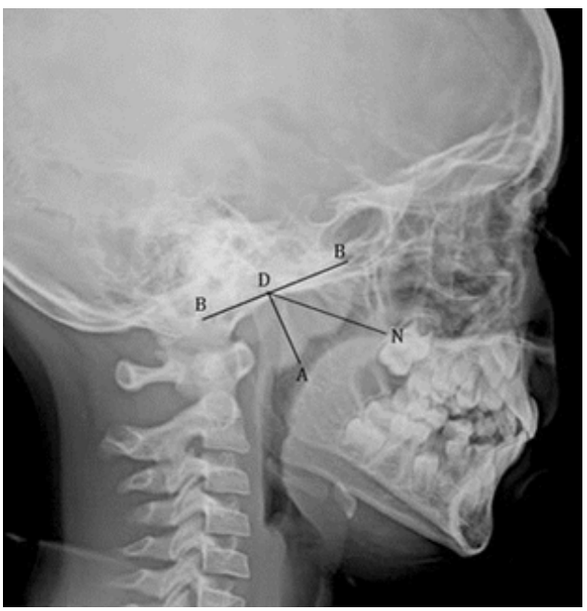

Fig 7: plain radiograph of nasopharynx lateral view (LNX) showing how adenoidal – nasopharyngeal ratio was calculated. BB: line drawn along straight part of anterior margin of basiocciput, AD:adenoid depth (perpendicular line from BB to most convex part of adenoid pad), ND : Nasopharyngeal depth (line between spheno-occipital synchondrosis to posterior edge of hard palate), ANR calculated by dividing AD with ND

The adenoid to nasopharyngeal ratio (ANR) was then calculated from all images by dividing AD with ND. The value was then documented in percentage by multiplying with 100. Based on the ANR, the subjects were then categorized into 4 groups.

Fig. 8: Conventional Adenoidectomy

Fig. 9: Adenoid Curette

Fig. 10: Endoscope and camera for endoscopic adenoidectomy

Fig. 11: Karl Storz Blakesley forceps

Fig. 12: Micro-debrider Instrument (KARL STORZ) [Model: 40701420, Voltage: 100 -240 V~, Frequency: 50/60 Hz, of Power: 150-200 watt, INT50%; t = 1min]

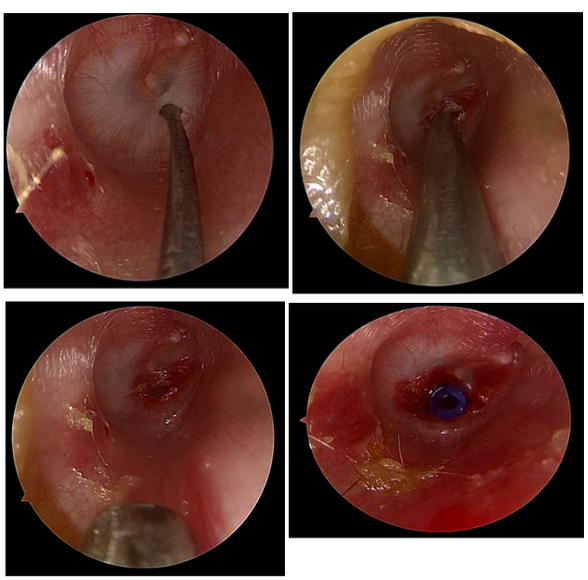

Fig. 13: Myringotomy and insertion of grommet tube

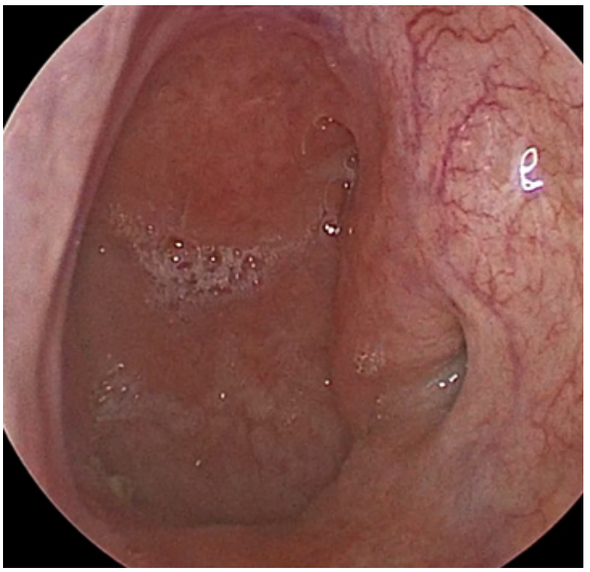

Fig. 14: Post-operative endoscopic assessment revealed no adenoid remnant

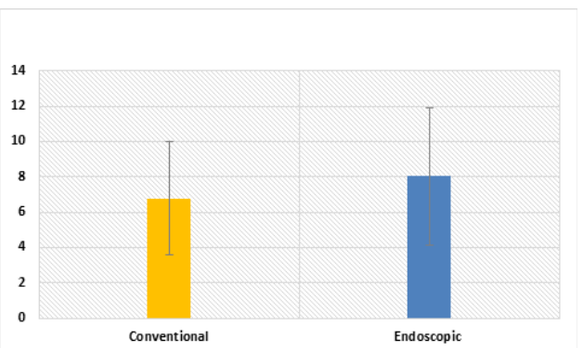

Fig. 15: mean of age

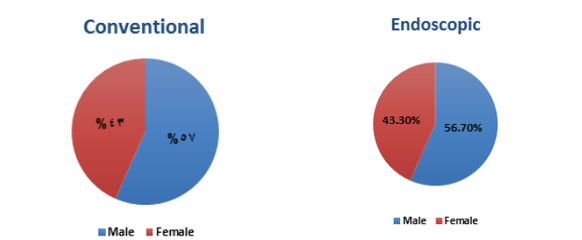

Fig. 16: Distribution of sex among cases.

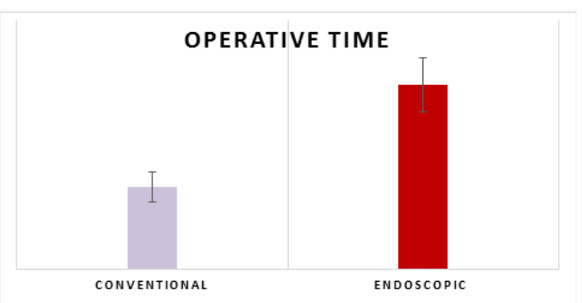

Fig. 17: Operative time

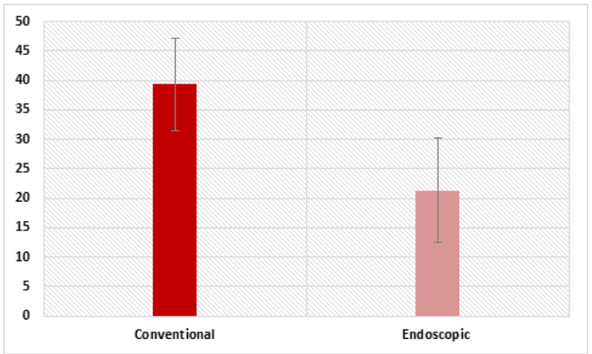

Fig. 18: blood loss

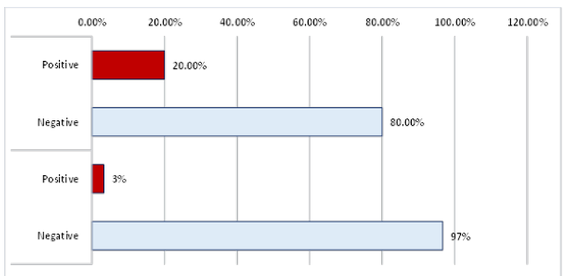

Fig. 19: Adenoid remnant

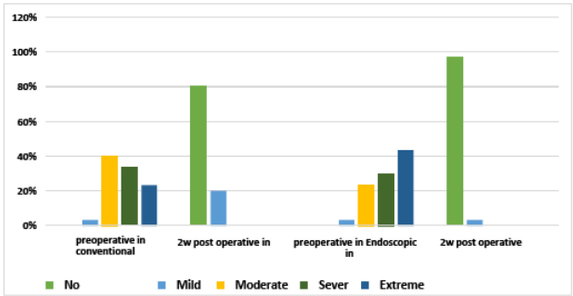

Fig. 20: Post- operative assessment of improvement of nasal symptoms according to NOSE score.

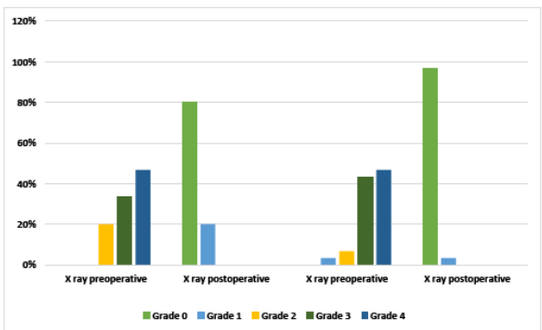

Fig. 21: Radiological assessment

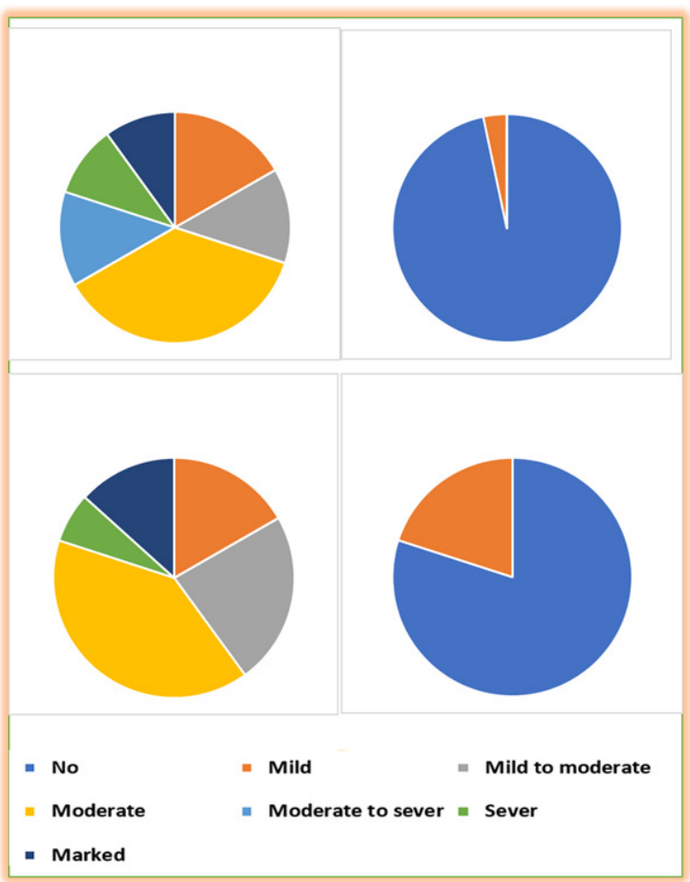

Fig. 22: Closed nasality assessment

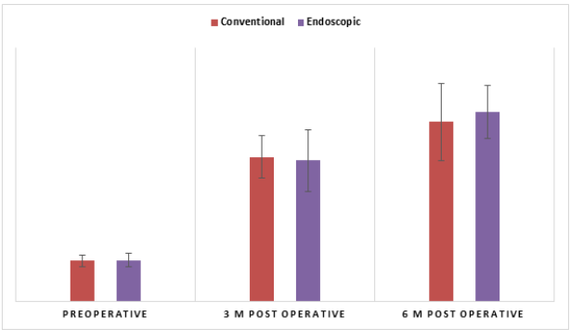

Fig. 23: Physical volume

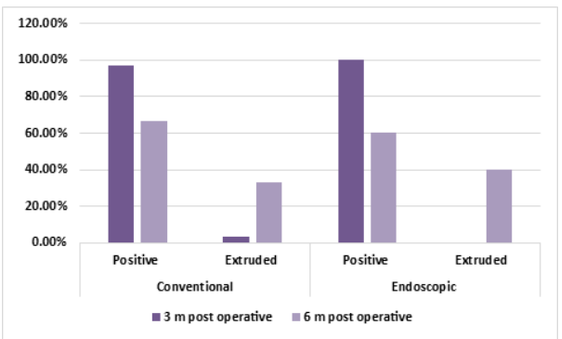

Fig. 24: Patency

DISCUSSION

Adenoidectomy is the most popular procedure to be done especially in pediatrics. Adenoidectomy is done alone or with other procedures include tonsillectomy and/myringototmy and ventilation tube insertion[13].

The most common indications for adenoidectomy in our study are sleep problems, snoring and mouth breathing, nasal congestion and nasal obstruction. adenoidectomy operation is done for removal of hypertrophied adenoid tissue obstructing the nasopharynx and the Eustachian tube opening resulting in relieving of obstruction of the nose[14].

Conventional adenoidectomy using a curette is a blind technique that removes mainly the central part of adenoid tissue. The lateral part of adenoid tissue obstructing the Eustachian tube opening and the most superior part of adenoid tissue in the nasopharynx cannot be reached by the adenoid curette[14].

In addition to this the incidence of damage to the surrounding structures in adenoidectomy using curette is high as it is a blind technique cannot allow good visualization of field operation[14].

The most ideal technique for adenoidectomy is complete removal of adenoid tissue with good visualization of operation field and with low operation time, low intra-operative blood loss, low incidence of damage of surrounding structures, low complications, good documentation of operation and low post-operative pain[15].

In our study the patients were randomly classified into two groups, with 30 patients in each group, Group (A) who had endoscopic adenoidectomy and Group (B) who had conventional adenoidectomy, all patients had myringotomy and ventilation tubes insertion.

In our study ,we suggest that the surgical time was significantly longer for endoscopic adenoidectomy than for the conventional adenoidectomy, time of endoscopic adenoidectomy is calculated from application of endoscopy to its removal after introduction of cotton bled gets soaked with adrenaline into the nasal cavity for decongestion and good visualization of nasopharyngeal region, also application of additional instruments, fine skills of surgeon and complete removal of adenoid tissue under vision increase the operation time in endoscopic adenoidectomy than in conventional adenoidectomy. In conventional adenoidectomy operation time is calculated from application of mouth gag to its removal including removal of adenoid tissue by curette. However, with each passing case in endoscopic adenoidectomy, there was an increase in expertise, improved skills and greater precision. and the mean operative time between the two groups differed significantly. ($p<0.001$). in other words, endoscopic adenoidectomy is time consuming.

That is agree with Juneja, Meher[14] performed a randomized controlled trial, Fifty patients (aged 4-12 years) with nasal signs and symptoms due to adenoid hypertrophy, indicated for adenoidectomy were selected and patients also who indicated for tonsillectomy or myringotomy with or without ventilation tube insertion along with adenoidectomy and there was a significant difference in mean operative time (*P-Value <0.05*) that was longer in endoscopic adenoidectomy than in conventional adenoidectomy.

Another research was done Hussein and Al-Juboori[16] and agree with our study, in this study forty patients with adenoid hypertrophy indicated for adenoidectomy were chosen and classified randomly into two groups twenty patient in each group and revealed that operation time in endoscopic adenoidectomy is longer than in conventional adenoidectomy. and there was significant difference between two groups in mean operative time ($p<0.001$).

Another researches were done Feng and Yin, Costantini, Salamenca, Bidaye, Vaid, Elsherif, AbdelRaaof[3, 17-20] and agree with research that operation time in endoscopic adenoidectomy is more

longer than in conventional adenoidectomy. and there was a significant difference between 2 groups in mean operative time (*p<0.001*).

Our results disagree with results of Stanislaw[21] who claimed that powered adenoid surgery was 20% faster than curette adenoid surgery in his study of 200 patient with adenoid hypertrophy and adenoidectomy was done endoscopic ally in 100 patient and conventionally in 89 patient.

In our study we suggest that the amount of intra-operative blood loss in conventional adenoidectomy is more than that of endoscopic adenoidectomy as endoscope allows direct visualization of the bleeding points .the amount of intra-operative blood loss was calculated in conventional technique as each 3 inch soaked gauze correspond to 10 ml blood loss and in endoscopic technique by subtraction of what come in suction from the irrigation solution. The range of blood loss was 10-40ml in endoscopic adenoidectomy and 30-50ml in conventional adenoidectomy with significant difference between the two groups of *p<0.001*.

Our findings agree with Stainslaw, Kotti study at which the mean operative blood loss was 17.5 mL for endoscopic adenoidectomy which was 27% less than the 24.0 mL for conventional adenoidectomy of (*P<0.001*). and agree with study by Murray, Fitzpatrick that was done on 140 patients, 40 of them conventional adenoidectomy was done and 100 of patients had endoscopic assisted adenoidectomy, at which blood loss range 0.3-6.7 ml/kg in conventional group and 0.4-9.4 in endoscopic group of significant difference between the two groups. In Abdelmaksoud, Ghalan study, at which 218 patients under went adenoidectomy 106 by endoscopic technique and 112 by conventional technique and intra-operative blood loss is more in conventional adenoidectomy than endoscopic adenoidectomy[21-24].

These findings didn't agree with study conducted by Singh *et al*, 2019 at which sixty patients of adenoid hypertrophy, 30 of them underwent endoscopic adenoidectomy and 30 patients underwent conventional adenoidectomy at which intra-operative blood loss in endoscopic adenoidectomy is more than in conventional adenoidectomy three times[25].

While in Modi and Wahane study that recruit 32 patients, 16 patient in each group first group underwent conventional adenoidectomy and other group underwent endoscopic adenoidectomy and showed that intraoperative blood loss is the same in the two groups with no significant difference between the two groups[15].

Post- operative assessment of complete removal of adenoid tissue by endoscopic examination of naso-pharynx in both groups 2 weeks post-operatively in our study we suggests that endoscopic adenoidectomy was more efficient than conventional adenoidectomy in completeness of adenoid removal as endoscope allow good visualization of adenoid and any remnant of adenoid tissue can be removed under direct vision this make endoscopic technique more accurate.

while the common disadvantage of the conventional adenoidectomy method is that it is a blind technique done without complete exposure of operative field which may lacerate the choana, Eustachian tube opening, torus tubaris, or mucosa of the nasopharynx. There was significant difference between the two groups in our study with *p value* 0.044, adenoid remnant was found in 1 patient in Group A while in Group B adenoid remnant was found in in 6 patients. Also there was 2 patients with injury of surrounding tissues as Eustachian tube leads to its scaring and dysfunction were found in group of conventional adenoidectomy with no significant difference between the two groups in our study.

This agree with Stanislaw, Koltai study that presence residual of adenoid tissue is found in adenoidectomy using curette while in endoscopic adenoidectomy, adenoid remnant wasn't found.

In Datta and singh, Hussein and Al-Juboori study that include forty patients with adenoid hypertrophy half of them with conventional adenoidectomy and other half with endoscopic adenoidectomy and revealed that the removal of adenoid tissue is almost complete in group of endoscopic adenoidectomy while in conventional adenoidectomy there was 4 cases had adenoid with *P value <0.035* injury to soft tissue structures including uvula was documented in patients with conventional adenoidectomy.

In Bidave, Vaid study of sixty patients with adenoid hypertrophy, it was documented that there is no adenoid residual tissue post-operative in endoscopic assisted adenoidectomy while there was residual adenoid tissue by forty percent in conventional adenoidectomy.

In Juneja, meher study there was of residual adenoid tissue in patients with conventional adenoidectomy while in endoscopic adenoidectomy there was no residual adenoid tissue that make a significant difference between the two groups of 50 patients.

In Abo elmagd, khalifa study there was significant residual adenoid tissue in conventional adenoidectomy group by 5 cases and 1 case in endoscopic adenoidectomy group[14, 16, 18, 20, 21, 26].

Assessment of improvement of nasal symptoms according to NOSE score 2 weeks post operatively was done and compared between 2 groups, in our study we asked parents about improvement of nasal symptoms including nasal congestion, nasal obstruction, trouble breathing,trouble sleeping and unable to get enough air through nose during exercise all these symptoms resulted from obstruction of nasopharnyx by hypertrophied adenoid tissue and in our study there was a significant difference between 2 groups ($p< 0.001$), there was marked improvement of nasal symptoms in patient with endoscopic adenoidectomy group than in conventional adenoidectomy group. Grading according to NOSE score post operatively 29 patients have grade zero (no obstruction) and one patient with grade one(mild obstruction)in endoscopic adenoidectomy group while in conventional adenoidectomy group 24 patients have grade zero (no obstruction) and 6 patients with grade one (mild obstruction).

This agree with Huang, Zhang study that there were statistically significant differences in nasal blockage and congestion between the two groups (*P* less than 0.05). The endoscopic adenoidectomy group's outcome was superior to that of the conventional adenoidectomy group[27].

Also agree with Junega, Meher study at which follow-up was done and there was no residual disease was found in group of endoscopic adenoidectomy However in group of conventional adenoidectomy 23 patients (77%) presented with residual disease causing nasopharyngeal symptoms and sleep-disordered breathing. Thus, it was found that the conventional approach considerably increased the likelihood of persistent symptoms compared to the endoscopic treatment (*p value* less than 0.001)[14].

Our findings were also dissimilar with Ferreira, Mangussi-Gomes study at which 33 patients were involved in this study and sub grouped into 3 groups, group one of conventional adenoidectomy, group two of endoscopic adenoidectomy with microdebrider and group three endoscopic adenoidectomy by coblation and revealed that ,there was a significant improvement of nasal symptoms and quality of life but with no significant difference between the three groups ($p > 0.05$)[28].

Also, it was dissimilar with Songu study at which 38 patients of adenoid hypertrophy,endoscopic adenoidectomy was done in half of them and conventional adenoidectomy was done in the other half, in both groups the improvement of nasal symptoms was equal in both groups with no significant difference between the two groups[29].

Assessment of improvement of closed nasality by assessment of nasality pre and 2 weeks post – operatively in phoniatric unit in our department and compared between 2 groups, in our study there was a significant difference between the two groups ($p< 0.044$). In endoscopic adenoidectomy group there was marked improvement as regarding there was 29 patients with no element of closed nasality and one patient with mild degree of closed nasality post operatively .while in conventional adenoidectomy group 24 patients with no element of closed nasality and 6 patients with mild degree of closed nasality.

In our study assessment of completeness adenoid removal was assessed also by radiology via x-ray nasopharynx lateral view and measuring adenoid tissue in x-ray was done, in endoscopic adenoidectomy group 29 patients with grade zero and one patient with grade one while in conventional adenoidectomy 24 patients with grade zero while in 6 patients with grade 1 and there was a significant difference between the two methods ($P< 0.001$).

All patients in our study had bilateral myringotomy and insertion of Grommet ventilation tubes and there was significant improvement of otitis media with effusion that was detected by measuring of physical volume of both ears 3 months and 6 months post-operatively by tympanometry in both groups but with no significant difference between the two groups *p-value* (0.238), also in these visits follow up of patency of ventilation tubes was done in both groups.

This study was dissimilar with Shenoy, Giri study that was done in patients with adenoid hypertrophy affecting middle ear function, 50 patients were in this study classified into two groups, group with conventional adenoidectomy and group with endoscopic adenoidectomy, follow up middle ear function post-operatively was done in both groups and there was a significant difference between the two groups and prove that improvement of middle ear function was more in endoscopic adenoidectomy than conventional adenoidectomy[30].

Also we noticed in our study that parents of patients with conventional adenoidectomy complain of open functional nasality that was not noticed in endoscopic adenoidectomy group.

Also there was a great attention toward post-operative pain that in endoscopic adenoidectomy group, the use of pain killers was less than that in conventional adenoidectomy group by asking the parents.

Endoscopic adenoidectomy has the magic role in treatment of adenoid hypertrophy in pediatrics with palatal problems as reduced palatal mobility, slight sub mucous cleft palate, short hard palate, and short soft palate and also in patients which partial adenoidectomy is recommended.

From the advantages of conventional adenoidectomy technique its simplicity, its low cost and its availability in many places while endoscopic adenoidectomy is the procedure of choice if the cost and availability of instruments can be afforded.

CONCLUSION

In conclusion, there are many advantages of Endoscopic adenoidectomy technique that it provides less intra-operative blood loss, less injury to the surrounding structures, less post-operative adenoid tissue remnants and less post-operative pain, also Endoscope allows good documentation, visualization, more improvement of nasal symptoms and improvement of quality of life.

But endoscope is time consuming and costing. while conventional adenoidectomy has its advantage in its simplicity, low cost and its availability in many places but it has many disadvantage that makes endoscopic adenoidectomy is the best choice for pediatrics with adenoid hypertrophy.

CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Meyer T. Meyer and the adenoids. Arch Otolaryngol. 1969;90(3):383-6.

2. Al-Mazrou KA, Al-Qahtani A, Al-Fayez AI. Effectiveness of transnasal endoscopic powered adenoidectomy in patients with choanal adenoids. International Journal of Pediatric Otorhinolaryngology. 2009;73(12):1650-2.

3. Costantini F, Salamanca F, Amaina T, Zibordi F. Videoendoscopic adenoidectomy with microdebrider. Acta otorhinolaryngologica italica. 2008;28(1):26.

4. Ungkanont K, Damrongsak S. Effect of adenoidectomy in children with complex problems of rhinosinusitis and associated diseases. International journal of pediatric otorhinolaryngology. 2004;68(4):447-51.

5. Tarantino V, D'Agostino R, Melagrana A, Porcu A, Stura M, Vallarino R, *et al*. Safety of electronic molecular resonance adenoidectomy. International journal of pediatric otorhinolaryngology. 2004;68(12):1519-23.

6. Özkiriş M, Karaçavuş S, Kapusuz Z, Saydam L. Comparison of two different adenoidectomy techniques with special emphasize on postoperative nasal mucociliary clearance rates: coblation technique vs. cold curettage. International Journal of Pediatric Otorhinolaryngology. 2013; 77(3):389-93.

7. Wright ED, Pearl AJ, Manoukian JJ. Laterally hypertrophic adenoids as a contributing factor in otitis media. International journal of pediatric otorhinolaryngology. 1998;45(3):207-14.

8. Tos M. Epidemiology and natural history of secretory otitis. Otology & Neurotology. 1984;5(6):459-62.

9. Lee JY, Kim S-H, Song CI, Kim YR, Kim Y-J, Choi JH. Risk factors for persistent otitis media with effusion in children: a case-control study. Yeungnam University Journal of Medicine. 2018;35(1):70-5.

10. Onusko EM. Tympanometry. American family physician. 2004;70(9):1713-20.

11. Moideen SP, Mytheenkunju R, Govindan Nair A, Mogarnad M, Afroze MKH. Role of adenoid-nasopharyngeal ratio in assessing adenoid hypertrophy. Indian Journal of Otolaryngology and Head & Neck Surgery. 2019;71:469-73.

12. Tripathy A, Thomas J, Krishnan L, Singh H, Ghate G. A comparison of traditional curettage adenoidectomy vis-à-vis endoscopically assisted powered adenoidectomy. European Journal of Molecular & Clinical Medicine.9(07):2022.

13. Curtin J. The history of tonsil and adenoid surgery. Otolaryngologic Clinics of North America. 1987;20(2):415-9.

14. Juneja R, Meher R, Raj A, Rathore P, Wadhwa V, Arora N. Endoscopic assisted powered adenoidectomy versus conventional adenoidectomy–a randomised controlled trial. The Journal of Laryngology & Otology. 2019;133(4):289-93.

15. Modi RR, Wahane V. Comparison of endoscopic-assisted adenoidectomy with conventional method. An International Journal Clinical Rhinology. 2011;4(2):75-8.

16. Hussein IA, Al-Juboori S. Conventional versus endoscopic-assisted adenoidectomy: a comparative study. Med J Babylon. 2012;9(3):570-82.

17. Feng Y, Yin S. Comparison of the powered-assisted adenoidectomy with adenoid curette adenoidectomy. Lin Chuang er bi yan hou ke za zhi= Journal of Clinical Otorhinolaryngology. 2006;20(2):54-7.

18. Bidaye R, Vaid N, Desarda K. Comparative analysis of conventional cold curettage versus endoscopic assisted coblation adenoidectomy. The Journal of Laryngology & Otology. 2019;133(4):294-9.

19. Elsherif A, Abdul Raaof AMN, Issa SH. Comparative study of adenoidectomy by endoscopic transoral suction coagulation versus the traditional method. The Egyptian Journal of Hospital Medicine. 2020;81(7):2405-9.

20. Abo Elmagd EA, Khalifa MS, Abeskharoon BK, El Tahan AA. Comparative study between conventional adenoidectomy and adenoidectomy using micro-debrider. The Egyptian Journal of Otolaryngology. 2021;37(1):1-5.

21. Stanislaw P, Koltai PJ, Feustel PJ. Comparison of power-assisted adenoidectomy vs adenoid curette adenoidectomy. Archives of Otolaryngology–Head & Neck Surgery. 2000;126(7):845-9.

22. Abdelmaksoud AA, Gahlan AA, Aref Z, Tayee UK. Endoscopicaly assisted microdebrider adenoidectomy versus conventional curettage adenoidectomy. SVU-International Journal of Medical Sciences. 2021;4(2):212-8.

23. Murray N, Fitzpatrick P, Guarisco JL. Powered partial adenoidectomy. Archives of Otolaryngology–Head & Neck Surgery. 2002;128(7):792-6.

24. Rodriguez K, Murray N, Guarisco JL. Power-assisted partial adenoidectomy. The Laryngoscope. 2002;112(S100):26-8.

25. Singh S, Padiyar BV, Sharma N. Endoscopic-assisted powered adenoidectomy versus conventional adenoidectomy: A Randomized Study. Dubai Medical Journal. 2019;2(2):41-5.

26. Datta R, Singh V. Conventional versus endoscopic powered adenoidectomy: a comparative study. Medical Journal Armed Forces India. 2009;65(4):308-12.

27. Huang H, Zhang L, Zhang Q, Zhong J, Fu L, Mou Y. Comparison of the efficacy of two surgical procedures on adenoidal hypertrophy in children. Archives de Pédiatrie. 2020;27(2):72-8.

28. Ferreira MS, Mangussi-Gomes J, Ximendes R, Evangelista AR, Miranda EL, Garcia LB, *et al*. Comparison of three different adenoidectomy techniques in children-has the conventional technique been surpassed? International journal of pediatric otorhinolaryngology. 2018;104:145-9.

29. Songu M, Altay C, Adibelli ZH, Adibelli H. Endoscopic-assisted versus curettage adenoidectomy: A prospective, randomized, double-blind study with objective outcome measures. The Laryngoscope. 2010;120(9): 1895-9.

30. Shenoy V, Giri O, Bajpai S, Kamath MP, Bhat J. EFFECT OF CONVENTIONAL Vs ENDOSCOPIC MICRODEBRIDER ASSISTED ADENOIDECTOMY ON MIDDLE EAR FUNCTION. Authorea Preprints. 2020.