Clinical outcomes of Adenoidectomy; Blind versus Mirror Approach

Mohammad Obeidat, MD *, Mona Ottom,MD *, Shadi Alghonmien, MD *, Ghaith Khorshid,MD *, Intithar Alrahamneh R.N.

ABSTRACT

Objectives: Adenoidectomy is one of the most common surgical procedures performed on children. Digital blinded examination intraoperatively has been practiced conventionally for years to assess adenoid remnants. Recently, the use of mirror assistant has become more frequent for the same purpose. The efficacy of this technique was measured by the persistence of symptoms and by fiber optic camera visualization for any residual adenoid tissue.

Methods: This prospective, randomized, single-center study included Forty-eight patients who were diagnosed with adenoid hypertrophy and planned for surgery. They were randomly assigned into two groups. Group A (n=25) consisted of the patients who underwent adenoidectomy with mirror assistance, and Group B (n=23) consisted of the patients who had the procedure performed by blind curettage approach. Six weeks post-surgery, all patients were evaluated regarding to the persistence of the obstructive symptoms and the presence of residual adenoid tissue by a fiber optic camera.

Results: The study included 48 patients. N=31 (64.6%) of the study sample were males, and N=17 (35.4%) were females. The mean age of patients was 6.125. N=22 (45%) of patients had remnant adenoid tissue and 7 patients (14.6%) experienced persistent or recurrent symptoms. In Group A, 5 patients (20%) had grade 1 adenoid remnants, and 20 (80%) had grade 0. However, 14 (60.9%), 3 (13%), and 6 (26%) suffered from grade 1, 2, and 0, respectively for Group B (p-value: 0.000). Group A had n-3 (12%) patients with persistent snoring and n=2 (8%) patients who had persistent mouth breathing, whereas Group B had n=4 (17.4%) with persistent snoring, and n=5 (21.7%) had persistent mouth breathing. The association was statistically insignificant between each group and the presence of snoring or mouth breathing p-values were (0.696) and (0.237), respectively.

Conclusion: This study revealed that using laryngeal mirror as an assistant tool during adenoidectomy had significantly reduced the rate of residual adenoid tissue postoperatively, in comparison to the classical blind digital examination. However, the association between each approach and persistence of obstructive symptoms were negative.

Keywords: laryngeal mirror, adenoids remnant, adenoidectomy

RMS August 2023; 30 (2): 10.12816/0061608

Introduction

Adenoidectomy is considered one of the most common surgical procedures for children; the main indications are obstructive symptoms like snoring, mouth breathing, and obstructive sleep apnea (OSA), along with otitis media with effusion, recurrent acute otitis media (AOM), and chronic rhinosinusitis (1).

From the Department of: * Department of otolaryngology
Correspondence should be addressed to:
Submission date: 28 Julay2021 , Acceptance date 19 August 2021 , Publication date: August 2023

Different factors may increase the risk of recurrence of adenoid hypertrophy and its associated symptoms. The first factor is related to a patient's medical status, like allergic rhinitis and atopy, age of the patient, the size of adenoids at the time of surgery, and gastroesophageal reflux disease (GERD) (2, 3). The second factor is related to the presence of adenoid remnants, which is associated with the surgical technique. Intraoperative examination was incorporated to evaluate the adenoids, for instance, digital exam and mirrors (4). Despite new surgical methods emerging in the last few years to perform adenoidectomy, for instance, using coblation, suction diathermy and endoscopic powered microdebridor techniques, adenoidectomy is often performed through the conventional blind cold curettage technique, which is considered to be cost effective and less time consuming (5). The drawbacks of using new surgical methods are longer operating time and high cost; additionally, special surgical skills are required (6, 7).

Adenoids are located in the hidden anatomical area of the posterior superior part of the nasopharynx; this makes direct visualization through the mouth unfeasible; therefore, using assistant methods like a fiber optic exam and lateral nasopharynx x-ray for examination in clinic helps physicians to make a better evaluation and estimation of adenoid size and the level of obstruction (8-10). However, assessment of adenoids intraoperatively is often performed by most otolaryngologists by the digital exam alone. Mirror assisted visualisation is practiced commonly to examine the nasopharynx and find out if there are any remnants that remained postoperatively. Some medical centers also use other more advanced methods during or at the end of adenoidectomy procedures, to visualize nasopharynx, such as trans-nasal endoscopes (11).

Persistent or recurrent obstructive symptoms are the most concerning symptoms after adenoidectomy. The main underlying causes are the hypertrophied adenoid tissue due to remnants left behind or nasal cavity causes like allergic rhinitis or deviated nasal septum (12). However, performing adenoidectomy under the vision of rigid scopes or mirrors could decrease the risk of adenoid remnants. Mirrors are cheap and are an effective method to examine hidden anatomical areas like nasopharynx through the mouth; they are usually accompanied with digital examination to determine the size of adenoids intraoperatively. Nevertheless, their role in lowering the risk of adenoid remnants may need further study and evaluation (4, 13).

The assessment of the nasopharynx of children with persistent or recurrent symptoms can be performed by a fiber optic camera or lateral nasopharynx x-ray, which is usually done several weeks after surgery. Routine evaluation of patients postoperatively is not widely practiced (14). However, a small percentage of patients may present with recurrent or persistent symptoms. These patients might need a proper and thorough evaluation to identify the underlying cause of these recurrent obstructive symptoms, which could be adenoid hypertrophy, for which revision adenoidectomy is indicated (9, 15).

The aim of this study was to compare patients who underwent adenoidectomy with mirror assistant to those who were assessed by digital exam alone, and then correlate each different approach with the persistence of obstructive symptoms, and presence of adenoid remnants.

Methods

Study design

This prospective experimental randomized single-center study was conducted at Queen Rania Hospital for Children (QRHC) from October 2020 to March 2021. Forty-eight patients participated in this study, and all the patients underwent adenoidectomy and/or tonsillectomy. The indication for surgery was obstructive symptoms like snoring and mouth breathing; all patients were evaluated by fiber optic exam to confirm adenoids hypertrophy. Patients were divided into two groups randomly. For the first group (Group A), adenoidectomy was performed with mirror assistance. The second group (Group B) patients underwent adenoidectomy with the classical blind curettage technique. Revision cases and patients who were diagnosed with allergic rhinitis, deviated nasal septum, and chronic medical diseases and craniofacial anomalies were excluded from this study.

Surgical methods

All operations were performed by two specialists using the traditional curette technique; a mouth gag was inserted to visualize the oral cavity. A nasal catheter was inserted through the nose, and then it was picked up by straight forceps and tied to retract the soft palate; this technique made examination of adenoids by laryngeal mirror easier. Digital palpation was performed in all patients during the surgical procedure, and the laryngeal mirror assistant was used only for Group A to identify the exact location of adenoids. Then, curettes were applied under indirect vision to perform precise excision.

Outcome measures

Two parameters were used to assess the outcomes of each technique. First, was the persistence of obstructive symptoms (snoring and mouth breathing). The second, was the examination of postnasal space by a fiber optic camera, to visualize and document any remnants. The degree of obstruction by the adenoid tissue over the posterior choanae is estimated using the grading system proposed by Parikh: grade 0 if there are no remnants; grade 1 for adenoid tissue not in contact with adjacent structures; grade 2 for adenoid tissue in contact with torus tubarius; grade 3 for adenoid tissue in contact with vomer; grade 4 for adenoid tissue in contact with soft palate (at rest) (10).

A fiber optic exam was performed in the clinic blindly by another physician to evaluate adenoid remnants after six weeks of surgery. We applied local analgesia, 1% lidocaine, and decongestant (oxymetazoline 0.5%) nasal pack for our patients; after that, we assessed any adenoid remnants in addition to its size and location, which were documented for each patient.

Consent was obtained from all legal guardians to participate in this study. The ethical committee in Jordanian Royal Medical Services (JRMS) provided the ethical approval for this study.

Statistical methods

The data was analyzed with the SPSS statistical package (Version 24.0, SPSS Inc., Chicago, IL, US). Descriptive statistics included percentages for discrete variables and means, standard deviations and chi-square tests, and alpha level set at ≤ 0.05 deemed statistically significant.

Results

This study included 48 patients who underwent adenotonsillectomy of which 8 patients had adenoidectomy only. The study sample consisted of n=31 (64.6%) male and n=17 (35.4%) female patients. The mean age of patients was
6.125 and the range of age was (2–14) years; the standard deviation of age (SD) was 3. Further details for each group are described in **Table I**.
In Group A, patients underwent adenoidectomy with laryngeal mirror assistant: n=25 (52.1%), while in Group B, patients underwent adenoidectomy without laryngeal mirror assistant: n=23 (47.9%). Adenoid remnants were found in 22 patients, who were examined by a fiber optic camera six weeks postoperatively, and the location was in the pharyngeal roof and near the choanal opening in 19 (39.6%) patients (grade 1). Adenoid remnants were also found along and touching the torus tubarius in 3 (6.3%) patients (grade 2). We did not encounter any patient in the first 6 weeks of follow up with grade 3 or grade 4. Mouth breathing and snoring were both reported in 6 (12.5%) patients, one patient had only snoring without mouth breathing, and one patient had mouth breathing without snoring.

Regarding the association between study group and adenoid remnant presence, it was found that five patients (20%) in Group A had adenoid remnants of grade 1, while 20 (80%) patients had grade 0. Group B included 14 (60.9%) patients who had grade 1, 3 (13%) patients had grade 2, and 6 (26%) patients had grade 0. Analysis of data by Fisher chi-square test showed a statistically significant association between Group A and Group B, regarding incidence of adenoid remnants. Consequently, Group A presented higher percentage of grade 0. X^2 (2) =14.82, $p \leq 0.001$, in addition we found that the Cramer's V for effect size showed a moderate association between two variables. (**Table II**).
The analysis of the association between obstructive symptoms (snoring and mouth breathing) between each group in this study found that Group A included 3 (12%) patients who complained of snoring after six weeks of surgery, while in Group B, 4 (17.4%) patients experienced snoring. The results showed that there were no statistically significant association between study groups and presence of snoring. (p-value=0.696) (**Table III**).

On the other hand, Group A included 2 (8%) patients who had mouth breathing during sleep, whereas Group B had 5 (21.7%) patients. The results showed that there were no statistically significant associations between study groups and presence of mouth breathing. (P-value=0.273) (**Table IV**).

Table I: Summary table of sociodemographic characteristics of patients.

Group	Males n (%)	Females n (%)	Total n	Age mean (SD)
A(mirror)	17(68)	8(32)	25	5.96(2.94)
B (no mirror)	14(60.8)	9(39.2)	23	6.4(2.9)

Table II: Adenoid remnants and its association with each group. Fisher chi square analysis results, frequency, percentage, and p-value are displayed.

Grade	Group A n (%)	Group B n (%)	Cramer's V	p-value
Grade0	20(80)	6(26)	0.554	0.000
Grade 1	5(20)	14(60.9)		
Grade 2	0	3(13)		

Table III: post-operative snoring and its association with each group. Fisher chi square analysis results frequency, percentage and p-value are displayed.

Group Symptom	Group A n (%)	Group B n (%)	p-value
Snoring	3(12)	4(17.4)	0.696
No Snoring	22(88)	19(82.6)	

Table IV: post-operative mouth breathing and its association with each group. Fisher chi square analysis results frequency, percentage and p-value are displayed.

Group Symptom	Group A n (%)	Group B n (%)	p-value
Mouth breathing	2(8)	5(21.7)	0.237
No mouth breathing	23(92)	18(78.3)	

Discussion

Adenoid hypertrophy is the most common cause of upper airway obstruction in pediatric patients; therefore, adenoidectomy is the surgical procedure of choice to relieve these symptoms and improve patients' quality of life and prevent the medical sequelae of upper airway obstruction (10). Recurrence or persistence of obstructive symptoms can happen after surgery. It could occur if the residual adenoid tissue in choanal opening, pharyngeal roof or torus tubarius remained after the surgery. In this case, persistent obstructive symptoms could emerge. In this study, our patients were reviewed after 6 weeks, to figure out the association between persistence of obstructive symptoms and existence of adenoid remnants.

Complete resection of adenoid tissue could decrease the risk of early post-operative complications. Therefore, a good visualization of adenoid tissues intraoperatively, by using different tools like mirrors or endoscopes, decrease the frequency of adenoid remnants, which is considered a paramount factor to decrease the risk of primary adenoids bleeding that occurs within 24 hours of the surgery (16). Moreover, using assistant tools will make the procedure safer, as under direct vision, can avoid damaging vital adjacent structures like eustachian tube orifice and decrease the possibility of eustachian tube dysfunction, which is detected by early presentation of ear symptoms like otalgia and aural fullness or by abnormal tympanometry test results (17). Furthermore, direct visualization can also avoid injury to submucosal plane or deeper muscle tissue and decrease the risk of intraoperative bleeding (18).

The decision to choose between each visualization tool depends on the surgeon's preference; however, each tool has its own advantages. For instance, the laryngeal mirror is a cheaper tool, readily available, and it does not require to approach the adenoids through the nose like endoscopes, which could result in synechia and crusting, especially if powered instruments are used for adenoidectomy like microdebrider. Additionally, in significant proportion of patients, it is difficult to get access through the nose if there is deviated nasal septum or inferior turbinate hypertrophy (19).

Hypertrophied adenoid remnants beside other rhinogenic factors like allergic rhinitis may cause recurrent symptoms, which need longer time to occur. Hence, it is recommended to evaluate the association between the risk of residual adenoid tissue re-growth and the risk of recurrence of obstructive upper airway symptoms after several months to years of surgery(12). Revision adenoidectomy incidence and the main underlying factors associated with it have been studied previously. Grindle et al. studied the incidence of revision adenoidectomy among 23,612 patients in a 5-year period. The rate was 1.3%, and the most common indication in revision cases was adenoid hypertrophy. A 2008 study by Joshua et al. on long-term follow-up after adenoidectomy failed to define a specific rate for revision adenoidectomy but suggested that adenoid regrowth or persistence is related to the surgical difficulty encountered due to the indirect access to the adenoid pad (20). In another study, the incidence of adenoid regrowth was 19.1% within a 12–24-month period. It was discovered that the incidence was higher in children below 5 years of age and in those patients who were treated postoperatively with antibiotics on numerous occasions (12).

In a study by Emerick et al, the authors concluded that there was a significant association between tubal tonsillar hypertrophy in previously operated patients and the recurrent and persistent symptoms;

they identified residual adenoid tissue as a recognized potential risk (21); However, in our study, residual adenoid tissue was significantly higher in Group B that comprised 3 patients with grade 2 (adenoids remnants in torus tubarius), but Group A did not comprise any patients with grade 2.

Laryngeal mirror is a cheap instrument, and we believe it is ideal to be used in adenoidectomy to assist in visualizing adenoid tissue in hidden anatomical areas like nasopharyngeal roof and along torus tubarius. Ark et al., in a study, found that only 20% of patients had no residual tissue after blunt curettage and digital palpation, after which a laryngeal mirror was used to remove residual adenoid tissue. Then, the median proportion of residual adenoid tissue volume to total adenoid tissue volume was calculated, which was 19.98% (4); However, we also have to consider nasal endoscopy for intraoperative evaluation, especially in patients with a history suggestive of adenoidal hypertrophy where mirror examination of posterior choana was negative (22).

The limitations of the study were the subjective assessment of obstructive symptoms postoperatively and the short follow up period. More patients need to be studied to reach a firm conclusion to abandon the blind classical curettage approach to removed adenoidal tissue.

Conclusion

This study concluded that using a laryngeal mirror as an assistant direct visualization tool during adenoidectomy procedures decreased the rate of residual adenoid tissue postoperatively in comparison to a blind indirect method. However, we encountered negative association between obstructive symptoms persistence and laryngeal mirror approach during 6 weeks of follow-up. Nevertheless, the laryngeal mirror assistant is efficient, cheap and a valuable instrument to visualize adenoid tissue precisely; hence, we recommend practicing it routinely.

References

1.Randall DA. Current Indications for Tonsillectomy and Adenoidectomy. J Am Board Fam Med. 2020;33(6):1025-30.

2.Paramaesvaran S, Ahmadzada S, Eslick GD. Incidence and potential risk factors for adenoid regrowth and revision adenoidectomy: A meta-analysis. Int J Pediatr Otorhinolaryngol. 2020;137:110220.

3.Johnston J, Mahadevan M, Douglas RG. Incidence and factors associated with revision adenoidectomy: A retrospective study. Int J Pediatr Otorhinolaryngol. 2017;103:125-8.

4.Ark N, Kurtaran H, Ugur KS, Yilmaz T, Ozboduroglu AA, Mutlu C. Comparison of adenoidectomy methods: examining with digital palpation vs. visualizing the placement of the curette. Int J Pediatr Otorhinolaryngol. 2010;74(6):649-51.

5.Zainea V. Conventional curettage adenoidectomy versus endoscopic assisted adenoidectomy. Maedica (Bucur). 2011;6(4):328-9.

6.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? Int J Pediatr Otorhinolaryngol. 2018;104:145-9.
7.Sethi N, Egan P, Ward VM. Suction diathermy adenoidectomy performed in the district general hospital. J Laryngol Otol. 2014;128(1):78-81.
8.Sharifkashani S, Dabirmoghaddam P, Kheirkhah M, Hosseinzadehnik R. A new clinical scoring system for adenoid hypertrophy in children. Iran J Otorhinolaryngol. 2015;27(78):55-61.
9.Baldassari CM, Choi S. Assessing adenoid hypertrophy in children: X-ray or nasal endoscopy? Laryngoscope. 2014;124(7):1509-10.
10.Pagella F, Pusateri A, Chu F, Cairello F, Benazzo M, Matti E, et al. Adenoid assessment in paediatric patients: the role of flexible nasal endoscopy. Int J Immunopathol Pharmacol. 2011;24(4 Suppl):49-54.
11.Chisholm EJ, Lew-Gor S, Hajioff D, Caulfield H. Adenoid size assessment: a comparison of palpation, nasendoscopy and mirror examination. Clin Otolaryngol. 2005;30(1):39-41.
12.Lesinskas E, Drigotas M. The incidence of adenoidal regrowth after adenoidectomy and its effect on persistent nasal symptoms. Eur Arch Otorhinolaryngol. 2009;266(4):469-73.
13.Phillips DE, Bates GJ, Parker AJ, Griffiths MV, Green J. Digital and mirror assessment of the adenoids at operation. Clin Otolaryngol Allied Sci. 1989;14(2):131-3.
14.Yildirim YS, Apuhan T, Aksoy F, Veyseller B, Ozturan O. Is transnasal endoscopic examination necessary before and after adenoidectomy? Indian J Otolaryngol Head Neck Surg. 2014;66(Suppl 1):257-60.
15.Grindle CR, Murray RC, Chennupati SK, Barth PC, Reilly JS. Incidence of revision adenoidectomy in children. Laryngoscope. 2011;121(10):2128-30.
16.Milosevic DN. Postadenoidectomy hemorrhage: a two-year prospective study. Vojnosanit Pregl. 2012;69(12):1052-4.
17. Atilla MH, Kaytez SK, Kesici GG, Bastimur S, Tuncer S. Comparison between curettage adenoidectomy and endoscopic-assisted microdebrider adenoidectomy in terms of Eustachian tube dysfunction. Braz J Otorhinolaryngol. 2020;86(1):38-43.
18.Demirbilek N, Evren C, Altun U. Postadenoidectomy hemorrhage: how we do it? Int J Clin Exp Med. 2015;8(2):2799-803.
19.Bross-Soriano D, Schimelmitz-Idi J, Arrieta-Gomez JR. [Endoscopic adenoidectomy; use or abuse of the technology?]. Cir Cir. 2004;72(1):15-9; discussion 21-2.
20.Joshua B, Bahar G, Sulkes J, Shpitzer T, Raveh E. Adenoidectomy: long-term follow-up. Otolaryngol Head Neck Surg. 2006;135(4):576-80.
21.Emerick KS, Cunningham MJ. Tubal tonsil hypertrophy: a cause of recurrent symptoms after adenoidectomy. Arch Otolaryngol Head Neck Surg. 2006;132(2):153-6.
22.Eweiss A, Al Yaghchi C, Sharma S, Wong PY. Assessment of posterior choanal obstruction caused by adenoidal hypertrophy: Intra-operative mirror versus rigid nasendoscopic examination. Int J Pediatr Otorhinolaryngol. 2018;110:144-6.