The Efficacy of the Conventional Adenoidectomy and Necessity of the Endoscopic Complementary Adenoidectomy

Konvansiyonel Adenoidektominin Etkinliği ve Endoskopik Tamamlayıcı Adenoidektominin Gerekliliği

Fatma Tülin KAYHAN, MD,[a]
Kamil Hakan KAYA, MD,[a]
İbrahim SAYIN, MD[a]

[a]Department of Otolaryngology, Bakırköy Training and Research Hospital, İstanbul

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Yazışma Adresi/*Correspondence:*
Fatma Tülin KAYHAN, MD
Bakırköy Training and Research Hospital, Department of Otolaryngology, İstanbul, TÜRKİYE/TURKEY
ftulinkayhan@gmail.com

ABSTRACT Objective: This study was performed to evaluate efficacy of the conventional adenoidectomy (CA) and necessity of the endoscopic complementary adenoidectomy (ECA). **Material and Methods:** Eighty-one children were prospectively evaluated under general anesthesia, with 2.7 or 4.0 mm 0 degree rigid endoscopes prior to adenoidectomy. The endoscopic findings were recorded. After CA, nasopharynx was examined with mirror and rigid endoscope for any residual adenoid tissue (RAT) and its localization. RAT was removed under endoscopic visualization with forceps. Blood loss and operative time for CA and ECA were recorded. **Results:** RAT was seen in 60.5% of the patients with mirror and 85.2% with endoscope after CA. The difference was statistically significant between methods ($p<0.01$). The mean blood loss for CA was 27.06 ± 11.41 ml and for 39.78 ± 15.69 ml ECA The mean time required to complete the adenoidectomy was 10.47 ± 4.31 minutes while for ECA it was 18.84 ± 7.61 minutes. No postoperative complications were seen in this study. **Conclusion:** CA was effective in 14.8% of patients. This findings show the need for an endoscopic complementary adenoidectomy. This technique did not increase the medical costs and provided a direct view to remove RAT. Under direct visualization, bleeding may be stopped effectively and unnecessary trauma may be avoided without any complication.

Key Words: Endoscopy; adenoidectomy

ÖZET Amaç: Bu çalışmada konvansiyonel adenoidektominin etkinliğini ve endoskopik tamamlayıcı adenoidektominin gerekliliğini değerlendirmek amaçlanmıştır. **Gereç ve Yöntemler:** Seksen bir çocuk olgu prospektif bir düzende genel anestezi altında adenoidektomi öncesinde 2.7 veya 4.0 mm 0 derece rijid endoskopla değerlendirildi. Endoskopik bulgular kaydedildi. Konvansiyonel adenoidektomi sonrasında nazofarenks rezidü adenoid doku varlığı ve lokalizasyonu için ayna ve rijid endoskopla incelendi. Rezidü adenoid doku endoskopik görüntü altında forsepsle temizlendi. Konvansiyonel adenoidektomi ve endoskopik komplementer adenoidektomi sırasındaki kan kaybı ve işlem süresi kaydedildi. **Bulgular:** Rezidü adenoid doku varlığı ayna ve endoskopik inceleme durumları arasında karşılaştırıldı. Konvansiyonel adenoidektomi sonrasında ayna grubundaki hastaların %60.5'inde, endoskopi ile incelenenlerin %85.2'sinde rezidü adenoid doku gözlendi. Her iki metod arasındaki fark istatistiksel olarak anlamlıydı ($p<0,01$). Konvansiyonel adenoidektomide ortalama kan kaybı 27.06 ± 11.41 ml, endoskopik komplementer adenoidektomide 39.78 ± 15.69 ml idi. konvansiyonel adenoidektomi'de total adenoidektomi için geçen ortalama süre 10.47 ± 4.31 dk; ve endoskopik komplementer adenoidektomide 18.84 ± 7.61 dk idi. Çalışmada hiç postoperatif komplikasyon gelişmedi. **Sonuç:** Konvansiyonel adenoidektomi hastaların %14.8'inde etkiliydi. Bu sonuçlar komplementer adenoidektominin gerekliliğini göstermiştir. Bu teknik tıbbi maliyeti artırmamıştır ve rezidü adenoid doku temizleyebilmede doğrudan görebilme olanağı sunmuştur. Doğrudan görerek kanama etkin bir şekilde durdurulabilmekte ve komplikasyonsuz olarak gereksiz travmadan kaçınabilmeyi sağlamaktadır.

Anahtar Kelimeler: Endoskopi; adenoidektomi

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Adenoidectomy is a frequently performed surgical procedure in otolaryngology. This procedure is indicated in children with obstructive adenoid hypertrophy, obstructive sleep apnea, otitis media with effusion, recurrent otitis media, sinusitis, and recurrent adenoiditis.[1] Orofacial growth disturbance or cor pulmonale associated with upper airway obstruction are also indications for adenoidectomy. Adenoidectomy can be performed with or without other surgical procedures such as tonsillectomy or tympanostomy tube insertion.Most of the otorhinolaryngologists perform conventional procedure for adenoidectomy, transorally with an adenoid curette, adenotome or adenoid punch forceps. Because of the visual restrictions, the conventional method of adenoidectomy has inherent limitations during removal of adenoid tissue.[2] A number of modifications have been reported for this procedure. However, neither the conventional procedure nor its modifications allow the operation to be performed under direct visualization.

Endoscopic equipment is frequently used in otorhinolaryngology and it allows direct visualization. Recent studies introduce a combined method of conventional and endoscopic adenoidectomy for the treatment of nasal obstruction due to adenoid vegetation.[2,3]

Surgical techniques for adenoidectomy must be assessed routinely to ensure the use of optimal methods.[1] Ellure et al. proposed that variables to consider in conducting such an evaluation include the surgeon's ability to visualize the adenoid pad directly during surgery, precision and ease of the method, amount of blood loss, operating time, efficacy of tissue removal, postoperative reduction in nasal symptoms, complications, and cost.[1] Many of these factors are independent and several are difficult to measure objectively, they provide a set of criteria for comparing.[1] This study was performed to compare conventional adenoidectomy and endoscopic complementary adenoidectomy.

MATERIAL AND METHODS

This study was conducted on the pediatric population and adult adenoidectomies were excluded from the study. Eighty-one patients were included in the study. Adenoidectomy procedure was performed either alone or in combination with tonsillectomy, and/or ear ventilation tube insertion. The operation was performed by the same surgeon. The study sample consisted of 41 male and 40 female patients. The mean age of the patients was 66.5 months (range 2-12 years). An informed consent was obtained from the parents of each child. The protocol of this study was approved by the institutional review board of the Hospital.

Patients were intubated with a transoral endotracheal tube. After the intubation, the patient was put supine in Rose's position with the head extended. The mouth was opened with a Crowe-Davis mouth gag. Disinfection (with Polivinilpirolidoniyot) of the face and oral cavity was performed to avoid unnecessary contamination. The patient's nasal cavities were packed with 1:1000 epinephrine soaked pledgets. The patient was evaluated for a bifid uvula or submucosal cleft palate, as a contraindication to proceed with adenoidectomy. All patients underwent nasal endoscopy with a 2.7 or 4 mm 0 degree rigid endoscope prior to adenoidectomy. In some patients nasal endoscopy could not be performed. In this case, adenoid tissue was visualized through oral endoscopy and the findings were recorded (Figure 1). During conventional adenoidectomy (CA), while the soft palate was retracted using a Hurd tonsil retractor, adenoid curette was applied to the nasopharynx transorally and the adenoid tissue was removed, avoiding damage to the Eustachian tube orifices laterally on either side. After the achievement of hemostasis first, laryngeal mirror was used to detect if any residual tissue was left. The presence of residual adenoid tissue (RAT) and location was noted. Subsequently, a 4 mm or 2.7 mm 0 degree endoscope was inserted transnasally into the nasopharynx. If the endoscope could not be passed through to the nasopharynx due to the septal deviation, a 4 mm 70 degree endoscope was inserted transorally to visualize the nasopharynx, and locations of the RAT were recorded (Figure 2, 3). Mirror and endoscopic view of nasopharynx was compared for the presence of any residual tissue. If there was any RAT in the nasopharynx, it was removed under

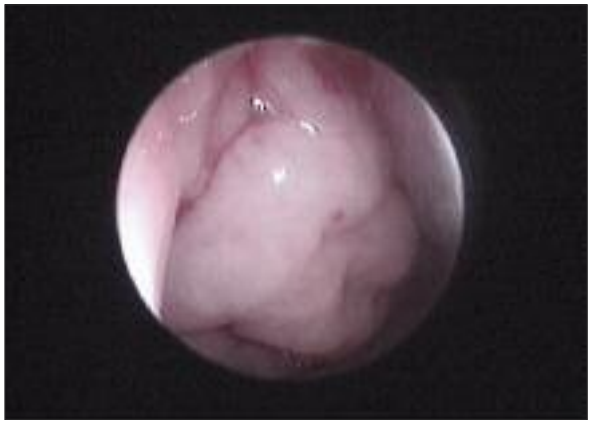

FIGURE 1: The view of adenoid tissue transnasally with 2.7 mm 0 degree endoscope.

FIGURE 2: The view of adenoid tissue transorally with 70 degree endoscope.

FIGURE 3: The view of residual adenoid tissue transorally after conventional adenoidectomy, with 70 degree endoscope.

direct visualization with the endoscope with straight or up-biting Blakesly forceps. During endoscopic complementary adenoidectomy (ECA) the patients' Eustachian tube orifices were visualized and damage to this area was avoided. Hemostasis was then obtained transorally or transnasally. The blood loss and time during the different portions of the procedure were independently measured in the operating theatre. Blood loss was measured by calculating the amount of blood in the suction bottle and with the pledgets. Seven days after the operation, endoscopic nasal examination was performed.

Intraoperative visualization of residual adenoid tissue by mirror and endoscopy were compared. Mc-Nemar test and Kappa statistic was used to perform the statistical analysis. Blood loss and operative time for CA and ECA was measured. NCSS 2007 &PASS 2008 statistical software (Utah, USA) as used to perform the statistical analysis.

RESULTS

The findings on endoscopy prior to surgery are shown in Table 1. The adenoid tissue was totally obstructive in 53 patients, and partially obstructive in 28. Forty five patients had other abnormalities on endoscopy, including six gross septal deviations preventing endoscopic examination and 11 cases of gross rhinitis with hypertrophic turbinate.

Twelve (14.8%) of the 81 patients, who had CA, had no RAT at the end of the procedure. These patients did not require revision. Thus, CA was found effective in 14.8% of cases. In 69 patients, ECA was done. The mean time required to complete the CA was 10.47 ± 4.31 minutes; and to complete the ECA was 18.84 ± 7.61 minutes. The mean blood loss for the CA was 27.06 ± 11.41 ml and for the ECA was 39.78 ± 15.69 ml. ECA prolonged the operation time for a mean of 8.37 minutes. The mean blood loss was increased by 12.72 ml (Table 2).

RAT was seen in 49 patients by using mirror and endoscopy. Among these patients, residual tissue was seen at the same location by mirror and endoscopy. Residual tissue was seen in the posteriosuperior part of nasopharynx in 32 patients, medial part of nasopharynx in six patients and in peritubal area in 11 patients. In 12 patients, no residual tissue was seen with either by mirror or by endoscopy. In 20 patients, residual tissue was not seen with mirror, but seen by endoscopy. In this study, we com-

TABLE 1: Nasal endoscopic findings.

Endoscopic findings	Number of children (n: 81)
Occlusive adenoid vegetation	53
Partially obstructive adenoid tissue	28
Major deviation of nasal septum	9
Minor deviation of nasal septum	12
Hypertrophic inferior turbinate	6
Hypertrophic middle turbinate	7
Rhinitis	11

TABLE 2: Comparison of conventional adenoidectomy and endoscopic complementary adenoidectomy.

	Conventional adenoidectomy	Endoscopic complementary adenoidectomy
Operative time (min)	10.47 ± 4.31	18.84 ± 7.61
Blood loss (ml)	27.06 ± 11.42	39.87 ± 15.69

TABLE 3: The comparison of endoscopy and mirror examination to detect RAT.

		Endoscopic examination		
		RAT +	RAT -	Total
Mirror examination	RAT +	49 (60.5%)	0	49 (60.5%)
	RAT -	20 (24.7%)	12 (14.8%)	32 (39.5%)
	Total	69 (85.2%)	12 (14.8%)	81 (100%)

Mc-Nemar test= 0.001 p< 0.01.
+: number of patients that' residual tissue was seen.
-: number of patients that' residual tissue was not seen.
RAT: Residual adenoid tissue

pared mirror examination with endoscopy (Table 3). According to Mc-Nemar test there was a statistically significant difference between two methods (p< 0.01). With regard to endoscopic control, the sensitivity of mirror examination was 71%, the specificity was 100%, positive predictive value was 100%, and negative predictive value was 37.5%.

There were no postoperative complications. All of the patients were discharged the day after the operation.

The patients underwent nasal and nasopharyngeal endoscopy 7 to 10 days after the initial procedure. There was no evidence of RAT in any of the patients.

DISCUSSION

Different amounts of residual adenoid tissue was seen in patients who underwent conventional adenoidectomy. The efficiency of the conventional adenoidectomy was found different by different authors. Cannon et al found only 12 (5.1%) out of the 236 patients had no RAT after CA. In this study, RAT was seen in 94.9% of the patients.[4] Bross-Soriano et al found RAT in 107 (43%) out of the 250 patients after CA.[3] Pagella et al stated that after conventional adenoidectomy, a significant mass of residual adenoid tissue was observed in approximately 50% of the cases.[5] In our study, after CA, RAT was seen in 69 (85.2%) of the 81 cases. This rate was consistent with the literature.

Therefore, after adenoidectomy, nasopharynx must be visualized. Pearl and Manoukian removed the choanal adenoids under indirect visualization using a laryngeal mirror.[6] Elluru et al. and Heras and Koltai used a laryngeal mirror for indirect visualization and powered instrumentation.[1,7] Although, was used in these studies laryngeal mirror, they did not compare visualization by endoscopy. In this study, we compared indirect visualization of nasopharynx by mirror and direct visualization of nasopharynx by endoscopy. In our study, while the endoscopic examination detected the RAT in additional 20 cases (24.7%) and allowed a better visualization; this difference did not prove to be statistically significant. Both laryngeal mirror and endoscope were found similarly effective to detect the RAT. Indirect visualization using a laryngeal mirror is useful to view the nasopharynx but endoscope provides a direct and clear view. While mirror provides indirect visualization, endoscope additionally provides better removal of the residual adenoid tissue and control of hemorrhage under direct visualization. Endoscopic examination was more specific and sensitive than mirror examination.

Huang et al reported a series of 15 patients treated using combined method of conventional and endoscopic adenoidectomy.[2] They stated that by using this technique, the patency of the nasop-

harynx and the orifice of the Eustachian tube can be established by direct visualization without damage to other structures.

In another study, Connon et al used the combination of conventional and endoscopic approaches in a large series of 236 patients.[4] They showed that after conventional adenoidectomy. RAT was seen in 94.9% of the patients. They suggested the use of endoscope in any adenoidectomy. They stated that endoscopy-assisted adenoidectomy allowed more complete removal of the residual tissue without any significant increase in the operative time, blood loss or association with any postoperative complications. The amount of blood loss and time to complete the procedure tended to decrease as experience in the procedure increased. In their series none of patients had evidence of residual adenoid tissue after endoscopic technique and none had obstructive nasal symptoms or a need for further adenoid surgery.

In our study, when RAT was seen, ECA was performed to remove the RAT. The median time required to complete the conventional adenoidectomy and the ECA were longer than Connon et al reported.[4] This difference may be due to the surgeon's experience. In our study, to complete the ECA, an additional 8.37 minutes were needed. While performing the ECA, an additional 12.72 ml blood loss was seen.

Schaffer proposed the advantages of improved visualization with transoral endoscopic adenoidectomy as complete removal of adenoid tissue even from the change/nasal cavity; precise hemostasis under direct visualization: and avoidance of damage to normal structures; i.e., vomer and torus tubarius.[8] We agree with Schaffer that otolaryngologists will find transoral endoscopic adenoidectomy easily learned and clinically successful, with little chance of adenoid regrowth.

Bross-Soriano et al. questioned whether the use of endoscope in adenoidectomy was an abuse of technology or not.[3] They concluded that conventional technique for adenoidectomy was effective in less than 30% of the patients; therefore, it is imperative to use endoscopic revision in each case.

Ucar et al. reported similar results.[9] They stated that endoscopic adenoidectomy was a more satisfactory method compared to conventional adenoidectomy, because it allowed control of the amount of the adenoid tissue removed.

There are several advantages in the combined approach of conventional adenoidectomy and ECA. Conventional adenoidectomy can remove a huge adenoid tissue completely without prolonging the operative time. With the forceps and the other instruments this procedure takes longer than conventional adenoidectomy.[2]

Recently, Stern and Finkelstein showed that a horizontal partial adenoidectomy with endoscopic assistance is a safe and effective procedure for the treatment of nasal obstruction in children with submucosal cleft palate.[10,11] In addition, Nayak et al stated that endoscopic adenoidectomy was preferred over a conventional adenoidectomy in order to avoid complications associated with abnormal cervical vertebrae as Scheie syndrome (MPS IS).[12]

More recently, power-assisted adenoidectomy under endoscopic view was described. Heras and Koltai showed that power assisted adenoidectomy was as safe as the traditional technique of curette adenoidectomy.[7] While they have noted the safety of this new procedure, the issue of cost-effectiveness has not been addressed.

Pagella et al reported that the combined approach of conventional curette and endoscopic adenoidectomy with microdebrider assured a complete and accurate removal of the mass.[5]

These reports showed that the other techniques have no superiority on CA with endoscopic revision, if required. Increased medical costs and the learning curve are the disadvantages of other techniques. Medical cost is an important issue in countries like Turkey, where the health insurance companies pay lower fees.

CONCLUSION

There are several advantages of the combined approach of conventional adenoidectomy and endoscopic complementary adenoidectomy. Today, en-

doscopic equipments are available in most of the centers. Endoscopic equipments can be combined with the conventional surgical methods for adenoidectomy. After the conventional adenoidectomy, different amounts of residual tissue can be left behind. During conventional adenoidectomy use of the endoscope provides a clear view that allows the surgeon to remove the total amount of the adenoid tissue, to avoid damage of the Eustachian tubes, to view the hemorrhagic areas. We recommended the use of endoscopic assistance in adenoidectomy.

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