

A Comparative Study between Coblation Adenoidectomy and Conventional Adenoidectomy

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Abstract:

Back ground: the classic surgical technique performed with an adenoid curette or an adenotome has recently developed by the introduction of the endoscopic sinus surgery

Objectives: to compare the safety and efficacy of coblation adenoidectomy versus conventional curettage adenoidectomy.

Patients and methods: This study was conducted on 50 patients who came to outpatient clinics in the Otolaryngology department, of age group between 4-14 years with adenoids hypertrophy from February 2019 to February 2020.

Results: results revealed that the mean time of operation, it was 11.1 ± 1.5 min in group A, but was 14.2 ± 1.8 min in group B, with statistical significance relationship $P=000$. Regarding the mean of Intra operative blood loss, it was 32.4 ± 3.2 ml in group A, but was 2.5 ± 1.2 ml in group B, with statistical significance relationship $P=000$.

Conclusion: The advent of endoscopes made a significant impact in adenoidectomy. Endoscopic assisted adenoidectomy is a natural progression of this technology to allow a more complete adenoidectomy. From this we concluded that the overall advantages of coblation adenoidectomy, compared with cold curettage, are the decrease in intra and post-operative bleeding, better safety, precision of adenoid removal and less injury to adjacent tissues.

Key words: Coblation, Conventional, Adenoidectomy, Curettage, Endoscopic.

Introduction

The adenoids, or nasopharyngeal tonsil, are a lymphoepithelial organ located in a critical anatomical position in the roof of the nasopharynx, and it plays an important role in disease of the upper respiratory tract (**van Cauwenbergeet al., 1995**).

Techniques and instruments have considerably changed over the years. The classic surgical technique performed with an adenoid curette or an adenotome has recently developed by the introduction of the

endoscopic sinus surgery instrumentation, with an improved patients' outcome and a better satisfaction of the surgeon (**Koltaiet al., 2002**).

The conventional adenoidectomy using curette was first described in 1885¹ This procedure is performed blindly by most surgeons without visualizing the nasopharynx; which leads to uncommon complications such as inadequate adenoid tissue removal, eustachian tube scarring,

bleeding and nasopharyngeal stenosis (Koltai et al., 1997).

Subsequently, the use of an angled mirror or an endoscope during the adenoidectomy provides adequate visualization of the field, and these techniques are currently preferred (Cannon et al., 1999)

In the last years, several surgical techniques have been submitted to ensure a finer and more assured removal of the adenoids mass, as well as to attain a better control of intra operative bleeding. Suction diathermy was initially introduced for hemorrhage control following conventional curettage (Kwok et al., 1987). Subsequently, the whole procedure was performed with this technique, always along a laryngeal/dental mirror or endoscopic control (Skilbeck et al., 2007).

Patients and methods

This was a prospective study performed at Otolaryngology department in Qena University Hospital, South Valley University, Qena, Egypt, from February 2019 to February 2020.

Participant's parents should write a consent before enrolling him/her in the study which was approved by the ethical committee of the Faculty of Medicine, South Valley University.

Inclusion criteria: This study included 50 patients who came to Qena University Hospital outpatient clinic of age group between 4-14 years with adenoids hypertrophy and radiologically evident adenoids causing any of the following: Patients aged 4-14 years old, Patient with adenoid hypertrophy grade III and grade IV, Patients with recurrent adenoiditis with persistent anterior and post

nasal discharge, Patients with symptoms of adenoid hypertrophy like snoring, mouth breathing, obstructive sleep apnoea, with features of adenoid facies, Patients with features of otitis media with effusion, chronic suppurative otitis media –mucosal disease, atelactatic ear, recurrent sinusitis and Patients also underwent myringotomy with grommet insertion in addition, if required.

The exclusion criteria were:

- 1- Age more than 18 years.
- 2- Past history of cleft palate repair, cases with submucous cleft palate and cases with palatal paralysis.
- 3- Craniofacial abnormalities, cervical spine abnormalities.
- 4- Patients having Down syndrome,
- 5- Cases with bleeding or coagulation defects
- 6- Patients with deviated nasal septum that hinders intra and postoperative endoscopy
- 7- Patients with active rhinitis or active rhinosinusitis were postponed till infection subsided.

- Clinical assessment of these patients includes:

1- **General examination** in the form of **Vital signs** (Blood pressure, Temperature, Heart rate, Respiratory rate), **Signs of** (Pallor, Cyanosis, Jaundice, and Lymph node enlargement).

2- **Full ENT examination including:** Oropharyngeal examination, Nasal examination was done using a 0°, 2.7 mm rigid endoscope or a 4-mm scope in older children (Karl Storz_Endoscope, Germany), Ear examination searching for otitis media with effusion and adhesive otitis media and

Neck examination with assessment of cervical lymph nodes.

Pre-operative investigations included:

1- Laboratory investigations in the form of Complete Blood Count (CBC) and bleeding profile which includes prothrombin concentration (PC), prothrombin time (PT) and activated partial thromboplastin time (APTT). **2- Radiological investigations** in the form of plain X-Ray soft tissue lateral view to nasopharynx. **3- Pre-operative pediatric assessment (Fitness)** which includes general, cardiovascular, neurological and chest examination. Patients enrolled in this study were divided randomly into two groups. Group A (25) twenty five patients underwent conventional adenoidectomy by curettage, while Group B (25) Other twenty five patients underwent nasal endoscopy assisted coblation adenoidectomy

1- The size of adenoids was assessed and graded according to the clinical grading Girdany B R(1979):

Grade I: Adenoids tissue filling one-third of air column .**Grade II:** Adenoids tissue occupying up to two-thirds of the choanae. **Grade III:** From two-thirds to nearly complete obstruction of the choanae.

Grade IV: entire choanal obstruction.

Postoperative Care: The patient stay at hospital few hours postoperative for monitoring and observation of postoperative bleeding .patient charged in the same day. All patients received the same dosage of analgesics for one week after surgery (Paracetamol 15 mg per kg three times daily). In addition, all patients received postoperative antibiotics for seven days (Amoxicillin clavulanic acid 30 mg per kg per day).



Fig.1. The coblator device

Assessment Parameters: To compare between conventional adenoidectomy and coblation adenoidectomy several operative postoperative parameters were assessed.

Intra-operative time, a mount of bleeding, Completeness of removal, any injury to nearby structures and early post-operative pain and recovery time were recorded for each patient in the two groups.

Operative Assessment Data:

- 1- **Operative time:** operative duration in minutes was recorded.
- 2- **Estimated blood loss:** Intraoperative bleeding was recorded by measuring the amount of blood in milliliters collected in the suction machine.
- 3- **Completeness of removal** was detected using a suitable endoscope postoperatively. Any adenoids remnant can be detected.
- 4- **Injury to the nearby structures** was recorded (Eustachian tube, pharyngeal muscles, uvula, nasal turbinates and nasal septum).

Postoperative Assessment Data:

1- **Post-operative pain:** Early post-operative pain which was measured 6 hours post-operative, assessed by a visual analogue scale (VAS). **2-Recovery time** was defined as the number of days taken to return to normal activity as judged by patient/parents during the routine post-operative follow-up at 7 days.

Follow up: Endoscopic follow up was done for all cases, three months postoperative using vasoconstrictor for adenoids remnants.

Statistical analysis: Data were verified, coded by the researcher and analyzed using

IBM-SPSS 21.0 (IBM-SPSS Inc., Chicago, IL, USA) *. A significant p-value was considered when it is equal or less than 0.05.

Results

Comparative analysis between group A and group B regarding age , sex was summarized in table 1,where mean age± stander deviation was 8 ± 2.9 years in group A but was 9 ± 3 years in group B ,and this was statistically in significant ($p = 0.2$).Rgarding the sex, male to female ratio was 16/9 in group A but was 14/11 in group B. This association was statistically in significant ($pv = 0.7$).

Table1. Age and sex distribution between the studied groups:

VARIABLE		Conventional adenoidectomy(25 cases) Group A	Coblation adenoidectomy (25 cases) Group B	P value
Age		8 ± 2.9	9 ± 3	.2
Sex	Males	16(64%)	14(56%)	.7
	Females	9(36%)	11(44%)	

*Independent t-test test was used to compare the mean difference between groups

**Chi-square test was used to compare proportions between groups

Table 2, showed that regarding the mean time of operation, it was 11.1 ± 1.5 min in group A, but was 14.2 ± 1.8 min in group B, with statistical significance relationship $Pv=0.000$. Regarding the mean of Intra operative blood

loss, it was 32.4 ± 3.2 ml in group A, but was 2.5 ± 1.2 ml in group B, with statistical significance relationship $Pv=0.000$.

Table 2. Data about the operation time and intra operative blood loss.

VARIABLE	Conventional adenoidectomy(25 cases)	Coblation adenoidectomy(25 cases)	P value
Operative time	11.1 ± 1.5	14.2 ± 1.8	.000*
Intra operative blood loss	32.4 ± 3.2	2.5 ± 1.2	.000*

*Independent t-test test was used to compare the mean difference between groups

Regarding recurrence table 3, showed that In group A it occurred in 16(64%) cases but in group B it occurred in 5(20%)of cases with statistical significance relationship $P= .002$

Table 3. Recovery and Recurrence

VARIABLE		Conventional adenoidectomy(25 cases)	Coblation adenoidectomy(25 cases)	P value
Recurrence	Yes	16(64%)	5(20%)	.002*
	No	9(36%)	20(80%)	
Recovery (days)		4.7±.8	2.6±.7	.000

*Independent t-test test was used to compare the mean difference between groups

Table 4, showed that Post-operative bleeding occurred in 2(8%) of cases in group A but not occur in group B. with statistical insignificance relationship Pv=0.1. Regarding Presence of residual lymphoid tissue it was

present in 10 (40%) of group A cases, but was present in only 2(8%) of group B cases. with statistical significance relationship Pv=0.008

Table 4. post-operative complications:

VARIABLE		Conventional adenoidectomy (25 cases)	Coblation adenoidectomy (25 cases)	P value
Post-operative bleeding	Yes	2(8%)	0(0%)	.1
	No	23(92%)	25(100%)	
Presence of residual lymphoid tissue	Yes	10(40%)	2(8%)	.008*
	No	15(60%)	23(92%)	

**Chi-square test was used to compare proportions between groups

Discussion

In up to one-third of children with clinically significant adenoid hypertrophy, conventional curettage adenoidectomy does not achieve an adequate removal of obstructive adenoid tissue, especially when there is an intranasal extension, or a bulky mass of adenoids superiorly in the nasopharynx and in the peritubal region (**Kozcu et al., 2019**).

The mean age ± stander deviation was 8 ± 2.9 year in group A but was 9 ± 3 year in group B, and this was statistically in significant (p v=0.2) Regarding the sex, male to female ratio was 16/9 in group A but was 14/11 in group B. This association was statistically in significant (p =0.7).

Our results were in agreement with study of **Businco et al., (2012)** as they

reported that there was no statistically significant difference among both studied groups as regard age and sex. The mean of age among group A & B were 8.4 ± 3.42 & 7.4 ± 3.39 years respectively.

Similarly, **Selvan et al., (2018)** found that there was no statistically significant difference among their studied groups as regard age and sex. The study included patients aged 4-14 years old. The majority of them were males.

The present study showed that regarding the mean time of operation, it was 11.1 ± 1.5 minute in group A, but was 14.2 ± 1.8 minute in group B, with statistically significance relationship P=0.000. Regarding the mean of Intra operative blood loss, it was 32.4±3.2ml in group A, but was

2.5±1.2 ml in group B, with statistically significance relationship P=000.

Our results were supported by study of **Kim et al., (2015)** as they revealed that there was significant difference between the studied groups regarding the mean operation time. There was a significant difference between the proportions of less and more amount of intraoperative bleeding across the studied groups (P < 0.001).

Furthermore **Veronica, (2018)** reported that the mean operative time in group A was 10.4 ± 3.23 minute and 14.6 ± 2.33minute in group B with a p value of 0.0001. There was statistically significant difference among both groups as regard intraoperative blood loss.

The operation time was lower in the curettage group compared with the coblation group. In spite of longer operation durations because of endoscopic control of the nasopharynx, more accurate removal of hypertrophied adenoid tissue under direct vision was performed with coblation adenoidectomy.

According to **Abd El Rahman et al., (2018)** the operation times for patients in group A varied from 5 to 30 min, with a mean of 10.22 min, whereas in group B, it ranged from 13 to 35 min, with a mean of 22.4 min. The mean intraoperative blood loss was 61.5 ml (range, 20–370 ml) in group A, whereas in group B, it ranged from 5 to 20 ml, with a mean of 8.8ml. The difference in intraoperative blood loss was found to be statistically significant.

Gülşen&Çikrikçi., (2020) demonstrated that the mean time of operation was significantly higher in coblation group

compared to the conventional group (Pv< 0.001).

One of the most extremely performed operations in children is adenoidectomy. Though not considered a critical surgery, some complications can occur. The most common of these complications is bleeding,

Selection of the surgical technique reflects on intra-operative bleeding, postoperative pain and recovery time. Nasopharyngeal and Eustachian tube stenosis one of the rare complication, but once occur difficult to treat.(**Tarantino et al., 2004**).

Coblation technology is quixotic for most ENT procedures such as adenoidectomy, tonsillectomy, nasal turbinectomy, laryngeal polypectomy, and sleep apnea surgery because it is less invasive, low thermal technology for tissue removal.

Veronica, (2018), reported that postoperative adenoid tissue filling < 20% of the vertical height of the choana was considered as complete removal. 3 patients in group A showed complete removal of adenoids following the procedure with <20% of residual adenoid tissue detected in the postoperative period. The remaining 17 patients in group A showed partial removal of adenoids in the postoperative endoscopic evaluation with either grade 2 or grade 3 adenoids. Conversely in group B, 15 patients showed complete removal of adenoids demonstrating adenoid tissue occupying less than 20 percent of the vertical height of choana.

Respiratory outcomes after endoscopic coblator adenoidectomy, as it has previously observed after long term follow-up 10, are within the normal range and stable, with no

risk of recurrence (according to our histological results) or persistence of adenoid tissue. Data from the NDT indicate the persistence of adenoid tissue as the main reason for high nasal resistance values in the cold curettage group of patients (**Ungkanont et al., 2004**).

In the study in our hands, post-operative bleeding occurred in 2(8%) of cases in group A but don't occurred in group B. with statistical insignificance relationship $P_v=0.1$. Regarding Presence of residual lymphoid tissue, it was present in 10(40%) of group A cases, but was present in only 2(8%) of group Bcases. with statistical significance relationship $P=0.008$.

Our results were in line with study of **Kim et al., 2015**as they reported that there was a significant difference in delayed postoperative bleeding among the studied groups ($P = 0.016$).

Similarly, **Gülseven & Çikrikçi, 2020** revealed that eight (22.2%) out of 36 patients who underwent CCA had a residual adenoid tissue postoperatively, while there was no residual adenoid tissue in any patients who operated via the EACA technique. Mean pain score on postoperative day 1 and 2 and blood loss were significantly less in the EACA group than the CCA group.

Businco et al., 2012demonstrated that rhinomanometric values before and after DNT (Decongestant Nasal Test) demonstrated higher resistances in group A even after DNT. This was consistent with adenoidal tissue persistence after cold curettage, which can cause air flow obstruction even after turbinate decongestion.

Also, as reported by others, **Timms et al. 2005**, coblation adenoidectomy is associated with less postoperative neck pain than curette/cautery adenoidectomy. Respiratory outcomes after endoscopic coblator adenoidectomy, as they have observed previously after long-term follow-up, are within the normal range and stable, with no risk of recurrence or persistence of adenoid tissue.

Assessment of completeness of adenoid removal was done by using nasal endoscopy at the end of the operation in both groups. There is a statistically significant difference between the two groups in the incidence of post operative remnants. Noteworthy that the extent of resection with cold curettage is often incomplete, leading to recurrence (**Havas et al., 2002**).

Bidaye et al., 2019 reported that there is no residual tissue in the second group ($p_v < 0.0001$).

Regarding, **Singh et al., 2019** nine (30%) cases in group I had more than 50% residual adenoid tissue while 20–50% of residual adenoid tissue was documented among 7 patients (23%). Postoperative pain was found to be significantly higher in group I compared to group II. In both groups, recovery time ranged from 24 to 48 h with a mean of 33.6 h for group I and 36 h for group II; 23 patients (77%) in group II presented with residual disease in the 3-month follow-up period.

However, **Ferreira et al., 2018** found that no postoperative complications were noted, for any patient.

Conclusion

The advent of endoscopes made a significant impact in adenoidectomy. Endoscopic assisted adenoidectomy is a natural progression of this technology to allow a more complete adenoidectomy. From this we conclude that the overall advantages of coblation adenoidectomy, compared with cold curettage, are the decrease in intra and post-operative bleeding, better safety, accuracy of adenoid removal and less injury to adjacent tissues.

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