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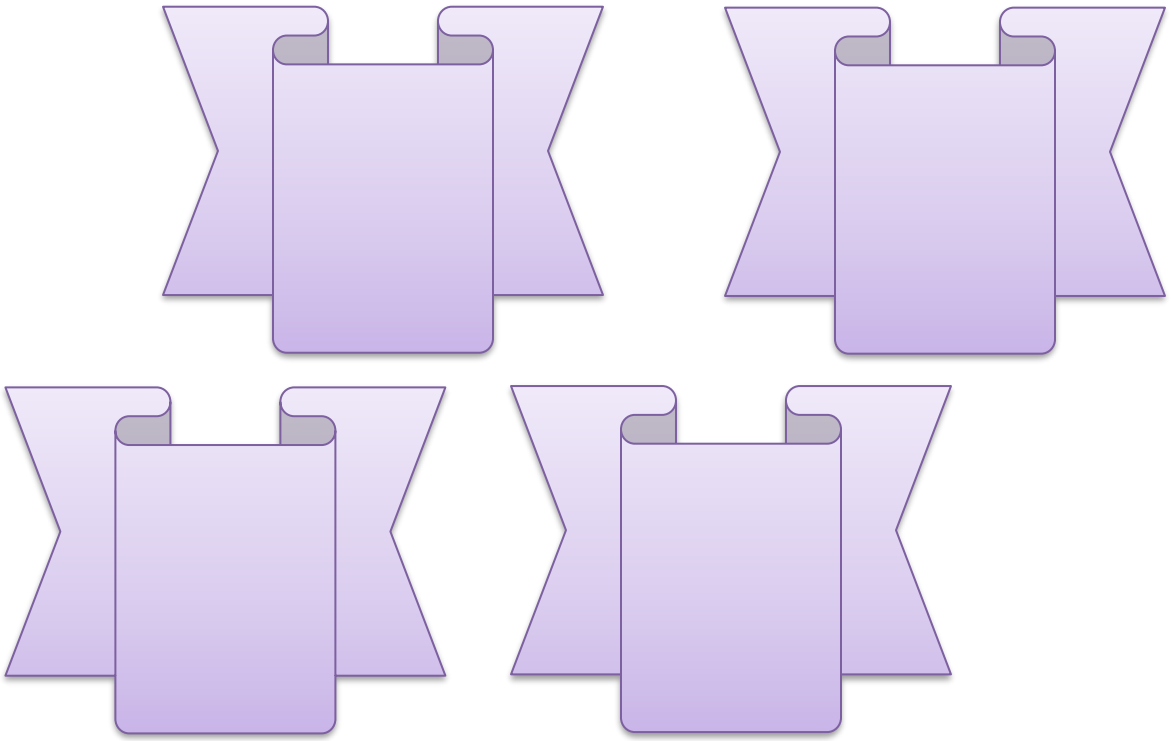

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Original Article

Comparative Study between Different Techniques of Adenoidectomy

Ali Mohamed Abo-Elnaga *[1], Wael Hassan Abo-Elwafa [2], Mohamed Ahmed El-sharkawy [2]

[1] Department of Otorhinolaryngology, El-Menshawy General Hospital, Ministry of Health, El-Gharbia, Egypt
[2] Department of Otorhinolaryngology, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

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*Corresponding author

Email: aliaboelnaga2008@gmail.com

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ABSTRACT

Background: Adenoid Hypertrophy [AH] is the most frequent cause of upper airway obstruction in the pediatric age groups, while Adenoidectomy is the standard surgical procedure for complicated AH. Multiple surgical practices have been illustrated for performing adenoidectomy.

Aim of the work: To compare between three different methods of adenoidectomy [coblation, suction diathermy and conventional method] according to pain, bleeding, time, blood loss, and post-operative adenoid remnants.

Patients and Methods: Ninety patients were randomly assigned to one of three groups [30 patients in each] were included in this study; Group A was managed by coblation, Group B was managed by suction coagulation, and Group C was performed via the conventional approach. Collected operative data included operative time and the amount of intraoperative bleeding. Post-operative data included pain scale, duration till resolution, duration of hospitalization, total financial cost, and the incidence of complications.

Results: The mean amount of intra operative bleeding was 35.17, 12.67, and 58.5 ml in the same three study groups respectively, with a significant increase in Group C. Post-operative VAS score showed a significant decrease in Group A, as it had mean values of 2.67, 6.43, 4.6 in the three study groups respectively.

Conclusion: Coblation adenoidectomy has multiple advantages including less blood loss, decreased post-operative pain, and faster resolution after operation. Nonetheless, it is associated with longer operative duration along with increased financial healthcare costs.

Keywords: Adenoids; Adenoidectomy; Coblation; Suction coagulation.

INTRODUCTION

The adenoids, which are part of the upper respiratory tract- related lymphoid networks, are the primary line of immune defense, and regulate both mucosal and systemic adaptive immunity [1].

Adenoids are lymphatic tissue within the nasopharynx that making a component of the Waldeyer's ring [2]. Its enlargement can cause recurrent upper respiratory tract infections, such as otitis media and sinusitis, as well as sleep-disordered breathing, nasal blockade with oral breathing with subsequent speech problems, swallowing issues, and facial malformations [3].

Obstructive sleep apnea, nasal blockage, recurrent middle ear infection, adenoid hypertrophy, and chronic adenoiditis are among the conditions that frequently call for an adenoidectomy [4].

Children between the ages of 2 and 5 frequently get surgery [adenoidectomy]. Being a popular procedure in the field of pediatric otolaryngology, numerous studies were done to enhance its quality and reduce its side effects and difficulties. The best adenoidectomy technique should remove the adenoids securely with the least amount of bleeding, postoperative morbidity, and/or recurrence. The adenoid-ectomy procedure has been documented using a variety of surgical procedures. Over the past few decades, there has been a shift away from cold treatments and towards electrosurgical techniques like electrocautery [5].

First reported in 1885, the standard cold curette adenoidectomy is still in use today. Due to reported bleeding, insufficient removal, and eustachian tube and/or nasopharyngeal stenosis, the curettage operation was not well received. This prompted the creation of technologies to enhance surgical adenoid removal methods in order to achieve the most effective procedures [6].

Initially, suction electrocautery was utilized to assist in adenoidectomy hemostasis. The whole adenoidectomy was then carried out using suction electrocautery. Under direct vision, electrical current is administered from the suction cautery to the adenoid pad to liquefy and ablate it with a rigid endoscope either by a 70° endoscope trans oral or a trans nasal 0° endoscope. The benefit of this method is enhanced visualization [7].

The coblation adenoidectomy surgical procedure is based on the exclusion of the adenoid tissue using an ablation and coagulation of coblation, then hemostasis and removal of any adenoid remnants [8].

The aim of this study is to compare between three different methods of adenoidectomy [coblation, suction diathermy and conventional method] according to Pain, bleeding, time, amount of blood loss and post-operative remnants of adenoid.

PATIENTS AND METHODS

A randomized prospective study included 90 patients of both genders [35 males and 55 females]. All patients had hypertrophied adenoid tissue, which was diagnosed radiologically by a plain x-ray film lateral view to the nasopharynx and clinically by mouth breathing, snoring, bilateral nasal blockage, and/or discharge. All cases presented to Al-Azhar University Hospitals [Al-Hussein and Sayed Galal] during the period from August 2021 to December 2021.

After completing the pre-operative assessment & investigation, the study subjects were randomly classified into 3 groups:

Group A: 30 patients will undergo endoscopic adenoidectomy using coblation

Group B: 30 patients will undergo adenoidectomy using suction diathermy

Group C: 30 patients will undergo adenoidectomy by conventional technique [cold and steel].

Operative techniques

Initial steps common in all surgical techniques

The procedures were done under general anesthesia with oro-tracheal tube, and then the child was covered with sterile drapes. A Davis - Bowel mouth gag will be used to open the mouth. The palate was palpated to exclude submucous clefting. The recording of the operative time started when the coblation, suction diathermy or the curette first touched the adenoidal tissues and stopped when the homeostasis was announced to be completed by the surgeon. The length of the procedures was recorded in minutes & seconds.

A. Coblation technique

The child was placed in Rose's position. To retract the soft palate and increase nasopharyngeal exposure, the distal and proximal ends of two soft rubber catheters were inserted into the patient's mouth and crossed externally with a clamp. The coblator Evac 70 Xtra device [ArthroCare, Sunnyvale, California] on power setting of nine for coblation and five coagulation was used. Under general anesthesia coblation was performed using oral endoscopy [4 mm, 70 degrees endoscope]. After completion of the procedure, hemostasis was secured [in conventional techniques] by packing the operative bed with gauze soaked with 0.05% oxymetazoline. In group of conventional technique, after control of bleeding and pack removal, an endoscope "rigid type; 0-degree 2.7 mm and/or 4.0 mm introduced trans-nasally or 70-degree 2.7 mm and/or 4.0 mm introduced trans-orally" was utilized to check for any remaining adenoid tissue in the adenoid bed, both choanae, and both orifices of the Eustachian tube. The remaining adenoid tissue was cut out using lucs or adenoid curette.

B. Suction diathermy technique

Two small-bore suction catheters are inserted into the child's nostrils, brought out of the mouth, and their ends are clamped under tension to retract the soft palate and open the nasopharynx. This procedure is known as the Rose's position. The adenoid pad and adjacent structures are visualized directly through oral endoscopy [4 mm, 70 degrees endoscope]. The oropharynx Diathermy ablation of the adenoid pad is accomplished by using a disposable, malleable size 10 or 12 [according to adenoid size] hand- switching suction coagulator [ValleyLab,]. A current [38 W] is applied while the tip is in contact with the adenoidal tissue, and suction is started at the tip's most superior aspect. The bulk of the tissue can be precisely removed by continuing to move slowly over the adenoids while applying suction and diathermy at the same time. When the posterior choanae are clearly visible and the nasopharynx has a smooth shape, the surgery is finished. Extreme caution should be used to prevent thermal injury to the corner of the mouth during the process when the suction diathermy is in touch with the skin. This can be prevented by periodically chilling it with cold saline suction. Additionally, by doing this, the burned tissue that frequently obstructs the suction is removed.

C. Conventional technique [cold and steel]

Because the Rose's position [position for tonsillectomy] emphasizes the curvature of the cervical spine, it is likely more challenging to perform a full adenoidectomy. It may be better to have the neck in a more neutral position, neither stretched nor flexed. Many people who aim for total removal of all upper pharyngeal tissue favor curettage of the tissue in the Rosenmuller fossa, while others do not out of concern for tissue development and rigidity, which may contribute to a patulous Eustachian tube and reflux. In either scenario, caution must be exercised to prevent direct trauma to the torus tubarius that could cause stenosis. So, the nasopharynx is palpated with identification of the adenoids, auditory tube cushions and back of the nasal septum. Finger displacement of adenoid tissue in the fossa of Rosenmuller towards the midline by gentle scraping action. Adenoid curette of suitable size is passed strictly in midline behind the soft palate into contact with back of septum. The curette is firmly pressed against the hard roof of nasopharynx**.** The adenoids are shaved away in a firm sweeping movement of the wrist, and the curette is moved sharply away from the posterior pharyngeal wall to break the adenoid mass free from mucosae. Palpation of lateral fossae. Removal of remnants using the finger to scrape these areas clean or exploring with a curette which may injury superior constrictor muscle with bleeding and scarring or damage to the Eustachian entrance.

Intraoperative or immediate post-operative complication [hemorrhage, laryngeal spasm, injury to palate, torus or posterior part of septum] if present were recorded. Then, hemostasis was achieved by dealing with any bleeding point by the bipolar forceps under direct endoscopic visualization. All patients were followed up once weakly for one month for endoscopic assessment of any adenoid remnants bleeding or pain.

Statistical analysis: Data was summarized using mean, standard deviation and P- Value for quantitative variables and frequency and percentage for qualitative ones. Descriptive statistics: Mean, standard deviation, median, range and percentage were calculated. For continuous variables, ANOVA test analysis was carried out to compare the means of dichotomous data. Data is expressed as mean and standard deviation or as percentage and frequency. P is significant when < 0.05.

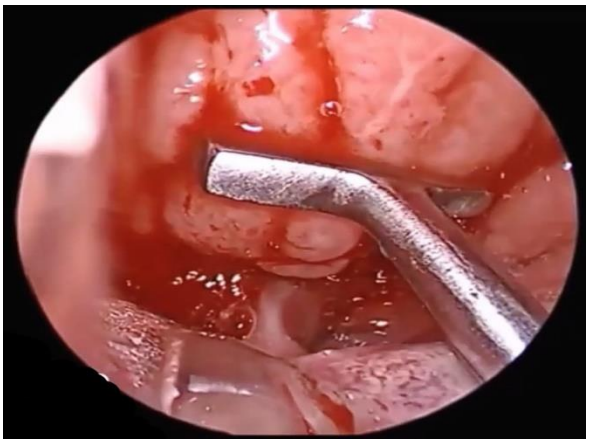

Figure [1]: Method of conventional adenoidectomy

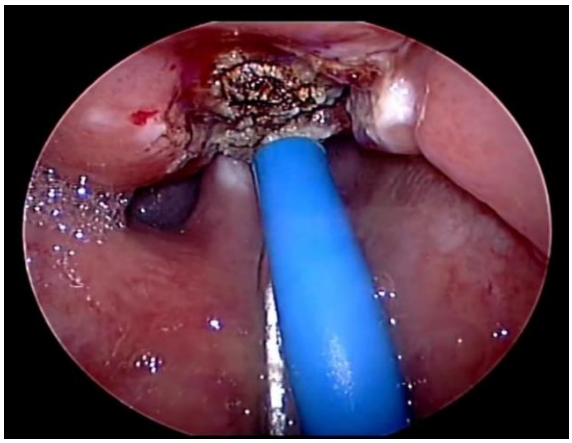

Figure [2]: Surgical field of suction diathermy

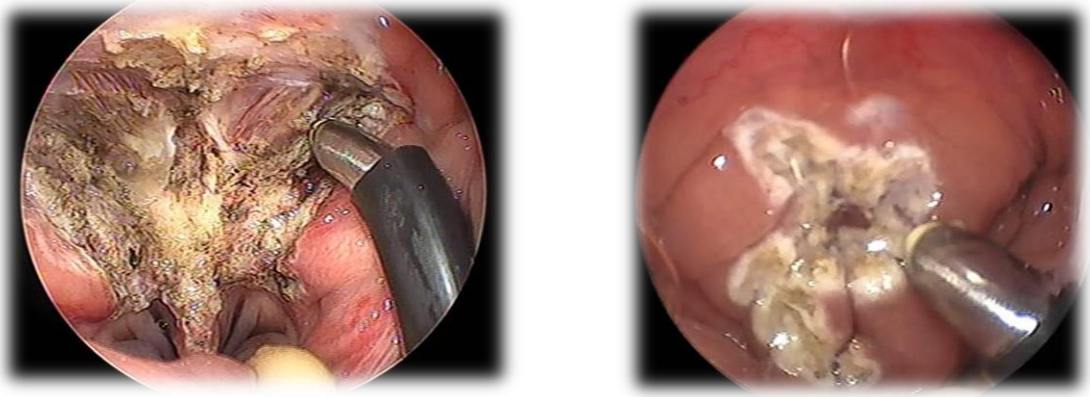

Figure [3]: Surgical field of coblation

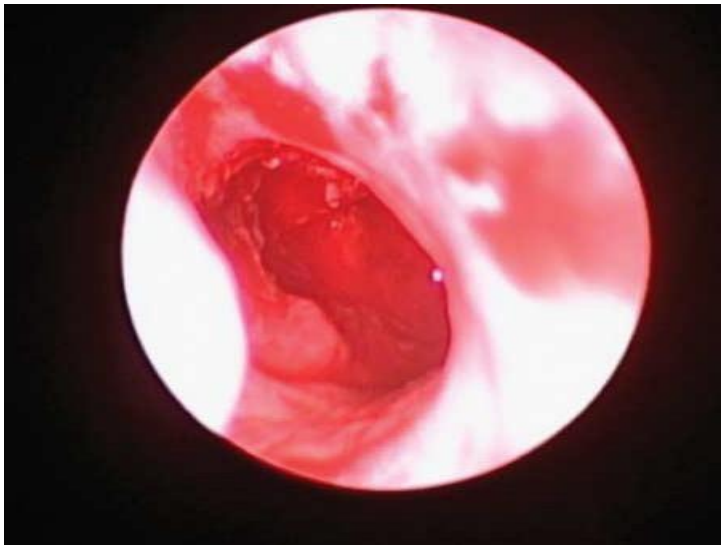

Figure [4]: Endoscopic examination of nasopharynx after removal of adenoid tissue by 4.0 mm, 0° rigid endoscope

RESULTS

Starting with demographics, the mean age of the included cases was 4.51, 5.23, and 4.97 years in groups A, B, and C respectively. Regarding gender, boys represented 46.7%, 43.3%, and 26.7% of patients in the three groups respectively, whereas the remaining patients were girls. Both age and gender showed no significant difference between the three groups [p = 0.539 and 0.235 respectively] [table 1].

Operative time had mean values of 20.40, 15.73 and 11.27 minutes in groups A, B and respectively, with significant difference between the three groups [p < 0.001]. Operative time was significantly decreased in group C in comparison with the other two groups. However, group C showed a significant increase in intra operative blood loss [58.5 ml] compared to groups A and B [35.17 and 12.67 ml respectively] [p < 0.001] [table 2].

Post-operative VAS score showed a significant decrease in Group A [p < 0.001], as it had mean values of 2.67, 6.43, 4.6 in groups A, B, and C respectively. The duration of hospitalization was statistically comparable between the three groups [p=0.638], as it had mean values of 5.97, 5.72, and 5.7 hours in the same three groups respectively. Contrarily, the duration of resolution showed a significant difference between the three groups [p<0.001], as it had mean values of 2.7,5.03, and 4.57 days in the same groups. Group A was associated with a significant decrease in resolution days [table 3].

The cost of surgery showed a significant increase in Group A in comparison with the two groups [p < 0.001]. It had mean values of 4190, 1436, and 38 LE in Groups A, B, and C respectively [table 4].

The incidence of complications was statistically comparable between the three groups [p > 0.05], apart from residual tissue which showed significant difference between the three groups [p = 0.001]. It was detected in 3.3%, 3.3%, and 30% of patients in Groups A, B, and C respectively. Regarding other complications, bleeding was encountered in 3.3%, 3.3% and 6.7% of patients, while VPI was noted in 0%, 3.3% and 3.3% of patients in the same three groups respectively. Nasopharyngeal stenosis was encountered in 0%, 3.3%, and 3.3% of cases in the same three groups, whereas ET injury was discovered in only one case in group C [3.3%]. In addition, neck pain was experienced in 3.3%, 6.7%, and 3.3% of cases in the same three groups respectively [table 5].

Table [1]: Demographic characteristics of the studied groups

		Group A [n= 30]	Group B [n= 30]	Group C [n= 30]	P	P1	P2	P3
Age [years]		4.51 ± 2.530	5.23 ± 2.559	4.97 ± 2.474	0.539	0.822	1	**1**
Gender	Male	46.7% [14]	43.3% [13]	26.7% [8]	0.235	> 0.05	> 0.05	> 0.05
	Female	53.3% [16]	56.7% [17]	73.3% [22]				

P1: Group A vs Group B. P2: Group A vs Group C. P13: Group B vs Group C.

Table [2]: Operative duration and intra-operative blood loss in the current study

	Group A [n= 30]	Group B [n= 30]	Group C [n= 30]	P	P1	P2	P3
Operative duration [minutes]	20.40±2.44	15.73±2.24	11.27±1.91	**<0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Bleeding volume [ml]	35.17±5.33	12.67±2.85	58.5±11.61	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**

P1: Group A vs Group B. P2: Group A vs Group C. P13: Group B vs Group C.

Table [3]: Post-operative recovery profile in the current study

	Group A [n= 30]	Group B [n= 30]	Group C [n= 30]	P	P1	P2	P3
Postoperative VAS score	2.67±1.184	6.43 ± 0.858	4.60 ± 1.248	**< 0.001**	**< 0.001**	**< 0.001**	**< 0.001**
Resolution after surgery [days]	2.70±1.21	5.03±1.497	4.57 ± 1.832	**< 0.001**	**< 0.001**	**< 0.001**	**0.725**
Period of hospital stay [hours]	5.97±1.231	5.72±1.27	5.70 ± 1.149	0.638	1	1	**1**

P1: Group A vs Group B. P2: Group A vs Group C. P13: Group B vs Group C.

Table [4]: Operative cost in the current study

	Group A [n= 30]	Group B [n= 30]	Group C [n= 30]	P	P1	P2	P3
Cost [EGP]	4190 ± 141.0	1436 ± 143.2	38 ± 31.3	< 0.001	< 0.001	< 0.001	**< 0.001**

P1: Group A vs Group B. P2: Group A vs Group C. P13: Group B vs Group C.

Table [5]: Post-operative complications and presence of residual tissue in the studied groups

	Group A [n= 30]	Group B [n= 30]	Group C [n= 30]	P	P1	P2	P3
Bleeding	3.3% [1]	3.3% [1]	6.7% [2]	0.77	> 0.05	> 0.05	**> 0.05**
VPI	0.0% [0]	3.3% [1]	3.3% [1]	0.60	> 0.05	> 0.05	**> 0.05**
ET Injury	0.0% [0]	0.0% [0]	3.3% [1]	0.36	> 0.05	> 0.05	**> 0.05**
Neck pain	3.3% [1]	6.7% [2]	3.3% [1]	0.77	> 0.05	> 0.05	**> 0.05**
Residual tissue	3.3% [1]	3.3% [1]	23.3% [7]	0.01	> 0.05	< 0.05	**< 0.05**

P1: Group A vs Group B. P2: Group A vs Group C. P13: Group B vs Group C

DISCUSSION

There are numerous adenoidectomy techniques, however few studies have compared over two different tool types in a single assay. There is a lack of information to compare the financial burden, operating time, and post-operative results of suction diathermy, traditional, and coblation procedures.

First of all, one should notice no significant difference between the three adenoidectomy methods regarding the duration of hospitalization. Adenoidectomy is now routinely performed as a day-care operation in several nations [9], and in the context of our hospital, this is a standard procedure. Despite worries, a lot of reports have shown that daycare adenoidectomy for children are safe [10-12].

Operative time had mean values of 20.40, 15.73 and 11.27 minutes in Groups A, B and C respectively, with significant difference between the three groups [p < 0.001]. Operative time was significantly decreased in Group C in comparison with the other two groups. In line with our findings, **Aref *et al.*** [13] reported a substantial increase in operating time associated with coblation versus the standard method [p < 0.001]. It had mean values of 14.2 and 11.1 minutes in the coblation and conventional groups respectively. Moreover, **Hapalia *et al.*** [14] reported a significant increase in the same parameter in the coblation group which had a mean value of 15.55 minutes versus 10.3 in the conventional technique.

In this study, Group C showed a significant increase in intra operative blood loss [58.5 ml] compared to groups A and B [35.17 and 12.67 ml respectively] [p < 0.001]. In the same context, another study reported a significant decline in intraoperative blood loss when the coblation device was used [2.5±1.2 vs. 32.4±3.2 in the conventional group – p < 0.001] [13]. Furthermore, **Hapalia *et al.*** [14] reported that the mean values of blood loss were 28.5 and 19 ml in the conventional and coblation groups respectively. Other previous two studies confirmed the previous findings [15, 16].

In the current study, post-operative VAS score showed a significant decrease in Group A [p < 0.001], as it had mean values of 2.67, 6.43, 4.6 in Groups A, B, and C respectively. **Businco *et al.*** [15] agreed with our findings regarding the decreased post-operative pain scores in the coblation versus the conventional group [3.85 vs. 7.15 respectively – p < 0.05].

In this study, the duration of resolution showed a significant difference between the three groups [p < 0.001], as it had mean values of 2.7, 5.03, and 4.57 days in groups A, B and C respectively. Group A was associated with a significant decrease in resolution days. **Aref *et al.*** [13] reported a significant decline in recovery days in association with the coblation technique compared to the conventional one [2.6 vs. 4.7 days in the two groups respectively – p < 0.001], which coincides with the findings of this study.

The findings of this study showed that the cost of surgery showed a significant increase in Group A in comparison with the two groups [p < 0.001]. It had mean values of 4190, 1436, and 38 LE in Groups A, B, and C respectively. **Ucar** [17] also noted that the coblation procedure was costly, in comparison to other methods used. Although the suction coagulation offers more economic approach for adenoidectomy compared to other devices like micro-debrider and coblator [18], the need for electrical device would increase the operative cost compared to the group who were managed conventionally. Another study reported that there was a statistically significant greater average direct cost associated with the coblator compared [$797] to the electrocautery [$597] [P < 0.0001] method [18].

In this study, the incidence of complications was statistically comparable between the three groups. In a previous similar study, one patient in the coblation group and five patients in the conventional developed reactionary post-operative hemorrhage; group B had a considerably reduced incidence of reactionary hemorrhage [P = 0.037]. No other complications developed in both groups [19]. Due to differences in sample size and surgical skill, the incidence of problems between various adenoid procedures may significantly vary between studies. Suction cautery, however, has the potential to possibly lower the frequency of some adenoidectomy problems. For instance, there is a risk of cervical osteomyelitis and postoperative nasal synechiae or stenosis with traditional curette adenoid-ectomy [20].

In the current study, residual tissue which showed significant difference between the three groups [p = 0.001]. It was detected in 3.3%, 3.3%, and 30% of patients in Groups A, B, and C respectively. According to a study, these regions miss a significant amount of adenoid tissue when using traditional curettage [21]. In a different trial that was identical to this one, residual lymphoid tissue was found in 8% and 40% of the coblation and conventional groups, respectively, with a considerable reduction in the coblation group [p = 0.008] [13].

Conclusion: Coblation adenoidectomy has multiple advantages including less blood loss, decreased post-operative pain, and faster resolution after operation. Nonetheless, it is associated with longer operative duration along with increased financial healthcare costs. Although the conventional method has the shortest operative time and the lowest financial costs, it was associated with a more significant blood loss, there was also an increased risk of adenoid residual when this approach was used.

Conflict of Interest and Financial Disclosure: None.

REFERENCES

1. Brandtzaeg P. Immunology of tonsils and adenoids: everything the ENT surgeon needs to know. Int J Pediatr Otorhinolaryngol. 2003 Dec;67 Suppl 1:S69-76. doi: 10.1016/j.ijporl.2003.08.018.

2. Arambula A, Brown JR, Neff L. Anatomy and physiology of the palatine tonsils, adenoids, and lingual tonsils. World J Otorhinolaryngol Head Neck Surg. 2021 Jun 27;7[3]:155-160. doi: 10.1016/j.wjorl.2021.04.003.

3. Poddębniak J, Zielnik-Jurkiewicz B. Impact of adenoid hypertrophy on the open bite in children. Otolaryngol Pol. 2019 Apr 5;73[4]:8-13. doi: 10.5604/01.3001.0013.1536.

4. Schupper AJ, Nation J, Pransky S. Adenoidectomy in Children: What Is the Evidence and What Is its Role? Curr Otorhinolaryngol Rep. 2018;6[1]:64-73. doi: 10.1007/s40136-018-0190-8.

5. Verma R, Verma RR, Verma RR. Tonsillectomy-Comparative Study of Various Techniques and Changing Trend. Indian J Otolaryngol Head Neck Surg. 2017 Dec;69[4]:549-558. doi: 10.1007/s12070-017-1190-6.

6. Yang L, Shan Y, Wang S, Cai C, Zhang H. Endoscopic assisted adenoidectomy versus conventional curettage adenoidectomy: a meta-analysis of randomized controlled trials. Springerplus. 2016 Apr 11;5:426. doi: 10.1186/s40064-016-2072-1.

7. Durr DG. Endoscopic electrosurgical adenoid-ectomy: technique and outcomes. J Otolaryngol. 2004 Apr;33[2]:82-7. doi: 10.2310/7070.2004.02119.

8. Gülşen S, Çikrikçi S. Comparison of Endoscope-Assisted Coblation Adenoidectomy to Conventional Curettage Adenoidectomy in Terms of Postoperative Eustachian Tube Function. J Craniofac Surg. 2020 Jun;31[4]:919-923. doi: 10.1097/SCS.0000000000006039.

9. Bidaye R, Vaid N, Desarda K. Comparative analysis of conventional cold curettage versus endoscopic assisted coblation adenoidectomy. J Laryngol Otol. 2019 Apr;133[4]:294-299. doi: 10.1017/S0022215119000227.

10. Sheppard IJ, Moir AA, Thomas RS, Narula AA. Organization of day-case adenoidectomy in the management of chronic otitis media with effusion--

preliminary results. J R Soc Med. 1993 Feb; 86[2]:76-8. PMID: 8433311.

11. Marshall JN, Sheppard I, Narula AA. A prospective study of day case adenoidectomy. Clin Otolaryngol Allied Sci. 1995 Apr;20[2]:164-6. doi: 10.1111/j.1365-2273.1995.tb00036.x.

12. Siddiqui N, Yung MW. Day-case adenoidectomy: how popular and safe in a rural environment? J Laryngol Otol. 1997 May;111[5]:444-6. doi: 10. 1017/s0022215100137594.

13. Aref ZF, Badawy BS, Abdelraheem AG, Mohamed EA, Tayee UK. A Comparative Study between Coblation Adenoidectomy and Conventional Adenoidectomy. SVU-Int J Med Sci. 2020 Nov 4; 5[1]:155-163.

14. Hapalia VB, Panchal AJ, Kumar R, Kapadia PB, Bhiryani MA, Verma RB, Parmar ND. Pediatric Adenoidectomy: A Comparative Study Between Cold Curettage and Coblation Technique. Indian J Otolaryngol Head Neck Surg. 2020 Oct 30:1-6. doi: 10.1007/s12070-020-02247-4.

15. Di Rienzo Businco L, Angelone AM, Mattei A, Ventura L, Lauriello M. Paediatric adenoidectomy: endoscopic coblation technique compared to cold curettage. Acta Otorhinolaryngol Ital. 2012 Apr;32[2]:124-9. PMID: 22767975.

16. Chauhan VM, Patel KB, Vishwakarma R. Plasma Dissection Versus Tissue Dissection in Adenoid Surgery. Indian J Otolaryngol Head Neck Surg. 2020 Jun;72[2]:156-159. doi: 10.1007/s12070-019-01721-y.

17. Uçar C. Endoskopik adenoidektomi [Endoscopic adenoidectomy]. Kulak Burun Bogaz Ihtis Derg. 2008 Mar-Apr;18[2]:66-8. Turkish. PMID: 18628638.

18. Sjogren PP, Thomas AJ, Hunter BN, Butterfield J, Gale C, Meier JD. Comparison of pediatric adenoidectomy techniques. Laryngoscope. 2018 Mar;128[3]:745-749. doi: 10.1002/lary.26904.

19. El Tahan AE, Elzayat S, Hegazy H. Adenoidectomy: comparison between the conventional curettage technique and the coblation technique in pediatric patients. Egy J Otolaryngol. 2016 Jul;32[3]:152-5.

20. Wynn R, Rosenfeld RM. Outcomes in suction coagulator adenoidectomy. Arch Otolaryngol Head Neck Surg. 2003 Feb;129[2]:182-5. doi: 10.1001/ archotol.129.2.182.

21. Elnashar I, El-Anwar MW, Basha WM, AlShawadfy M. Objective assessment of endoscopy assisted adenoidectomy. Int J Pediatr Otorhinolaryngol. 2014 Aug;78[8]:1239-42. doi: 10.1016/j.ijporl.2014.04.031.

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