

COMPARISON OF OUTCOMES OF ADENOIDECTOMY BY ENDOSCOPIC MICRODEBRIDER AND CONVENTIONAL METHOD: AN OBSERVATIONAL STUDY

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ABSTRACT

Background: Adenoidectomy is a common pediatric procedure for treating adenoid hypertrophy, which can cause nasal obstruction, sleep disorders, and recurrent infections. Conventional curettage is blind and risks incomplete removal, while endoscopic microdebrider techniques offer improved precision and outcomes. **Objectives:** This study aimed to compare the efficacy, safety, and postoperative outcomes of endoscopic microdebrider-assisted adenoidectomy versus conventional curettage in children. **Methodology:** A prospective comparative study was conducted on 50 patients (aged 3–14 years) divided into two groups: conventional adenoidectomy (n=25) and endoscopic microdebrider-assisted adenoidectomy (n=25). Parameters assessed included operative time, blood loss, completeness of tissue removal, postoperative pain (VAS score), and recovery time. Statistical analysis was performed using SPSS version 28. **Results:** The endoscopic group demonstrated significantly lower blood loss (10.8 ± 2.8 ml vs. 31.0 ± 5.6 ml, $p < 0.001$), more complete tissue removal (80% vs. 6%, $p < 0.001$), and reduced postoperative pain (VAS score 3.1 ± 0.3 vs. 3.9 ± 0.4 , $p < 0.001$). However, operative time was longer in the endoscopic group (14.7 ± 2.5 min vs. 10.5 ± 3.3 min, $p < 0.001$). Recovery time was shorter in the endoscopic group (2.6 ± 0.6 days vs. 3.2 ± 0.6 days, $p < 0.001$). **Conclusion:** Endoscopic microdebrider-assisted adenoidectomy offers superior outcomes, including reduced blood loss, better tissue removal, and faster recovery, despite longer operative times. It is a safe and effective alternative to conventional methods.

KEYWORDS

Adenoidectomy, Endoscopic microdebrider, Conventional curettage, Pediatric ENT surgery, Postoperative outcomes.

INTRODUCTION:

Adenoidectomy forms a valuable treatment in middle ear pathologies, sleep disorders, paediatric chronic rhino-sinusitis and recurrent adenotonsillitis. It is conventionally performed using the curettage method which is not only crude but also blind. Damage to eustachian tube opening is known and the completeness of the procedure difficult to assess. The advent of endoscopes has made this area more accessible and more procedures are presently performed using nasal endoscopes⁽¹⁾.

Children presenting with complaints such as nasal obstruction, sleeping with the mouth open, snoring and earache arouse the suspicion of adenoid enlargement. Though adenoid enlargement is physiologically normal in this age group, the resulting airway obstruction is troublesome and the children can present with distressing symptoms. Adenoid hypertrophy can cause eustachian tube dysfunction leading to otitis media with effusion which if not treated adequately may lead to a chronic discharging ear. Chronic adenoiditis can act as a septic focus with the child falling ill often with repeated respiratory infections⁽²⁾.

This remains one of the common causes for a poor appetite leading to a poor nutritional status. This creates an alarming state for parents who rush for medical consultation. Studies have revealed that adenoid hypertrophy causing chronic airway obstruction can even lead to cor pulmonale. Though a physiological hypertrophy, adenoid enlargement when causing airway compromise or interfering with the development of the facial skeleton needs to be addressed. Surgical removal of the adenoid tissue is the solution and is being practised for years. A simple curettage adenoidectomy offers a solution⁽³⁾.

Recently, one such advancement is the development of newer surgical techniques for adenoidectomy. These techniques that have been proposed seem to have a significant effect on the morbidity and the incidence of complications following the procedure. The advent of endoscopes has made ENT surgeries more attractive, with a reduction in the list of indications for conventional techniques. The use of endoscopes combined with the newer surgical techniques has gained popularity in the recent days⁽⁴⁾.

One such combination is the endoscopic assisted micro-debrider technique⁽⁵⁾. This has considerable influence on the duration of surgery, the blood lost intraoperatively, pain in the postoperative period, the time taken for recovery in the postoperative period and the complete removal of adenoid tissue. The present study was carried out to compare and observe adenoidectomy by endoscopic microdebrider

and conventional method.

MATERIAL AND METHODS:

The present perspective comparative study was conducted at department of ENT, CPR Hospital, Kolhapur, between January 2023 to June 2024 on 50 patients with indications for tonsillectomy. Study was started after getting permission from Institutional Ethics Committee. Patients of age between 3 to 14 years with history of mouth breathing, snoring, drooling of saliva, adenoid facies, sleep apnoea syndrome or speech abnormalities and who were indicated tonsillectomy, were included. Cases with other causes of nasal obstruction or cleft palate including submucous cleft palate, cases with bleeding disorders, cases with immuno-compromised status, or those are unwilling for surgery were excluded.

Informed written consent for inclusion into the study as well as for adenoidectomy was obtained from the parents of the patients. Counseling of the patients and their parents were done. All the 50 patients were divided into two groups - 25 patients in Group A - conventional adenoidectomy, and 25 patients in group B - Microdebrider-assisted Adenoidectomy with the use of the endoscope. Clinico-demographic data like presenting complaints, duration of symptoms, associated comorbidities were noted in a pre-designed questionnaire. Basic investigations like blood routine- HB, TC, DC, ESR, BT, CT, RBS, Urea, Creatinine etc. were done. Special investigations-HIV, HBsAg, imaging like X RAY soft tissue nasopharynx lateral view, X ray chest, X ray PNS (waters view), CT-PNS when required. Baseline diagnostic nasal endoscopy was also done.

The grade of adenoid hypertrophy was assessed using the scale described by Clemens and McMurray⁽⁶⁾. Grade I: Adenoid tissue filling 1:3 the vertical height of the choana; Grade II: Adenoid tissue filling up to 2:3 the vertical height of the choana; Grade III: Adenoid tissue filling from 2:3 to nearly all but not complete filling of the choana; Grade IV: Adenoid tissue filling complete choanal obstruction.

Intra-operative observational parameters like operative time, blood loss, and adenoid removal completeness and damage to collaterals as intraoperative indicators were collected for both of the groups. Post-operative parameters were assessed including post-operative pain scoring and recovery time for both groups.

Data was analysed using SPSS version 28 (IBM SPSS Statistics, Somers NY, USA). Categorical data was represented in the form of Frequencies and proportions. Chi square test, Fisher Exact tests were

used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. Unpaired t test was used to identify the mean difference between two quantitative variables for comparison. p value (Probability that the result is true) of 0.05 was considered as statistically significant.

RESULTS:

Table 1. Comparison Of Demographic Variables Of The Patients Between 2 Groups:

Demographic Variables		Techniques		Total	Chi-Square & p-value
		Conventional	Endoscopic		
Age (Years)	≤10	12(48%)	11(44%)	23(46%)	2.129 0.345
	11 to 15	8(32%)	12(48%)	20(40%)	
	>15	5(20%)	2(8%)	7(14%)	
Sex	Male	19(76%)	16(64%)	35(70%)	0.857 0.355
	Female	6(24%)	9(36%)	15(30%)	
Pre-Operative Grade	1	0(0%)	4(16%)	4(8%)	4.354, 0.113
	2	20(80%)	17(68%)	37(72%)	
	3	5(20%)	4(16%)	9(18%)	
Total		25(100%)	25(100%)	50(100%)	

In the present study, majority of the patients were from age group ≤10 years (48% from conventional group and 44% from Endoscopic group). Mean age of the patients from Conventional adenoidectomy group is 11.3±3.8 years and for patients from Endoscopic micro-debrider adenoidectomy group was 10.9±3.2 years. Majority of the patients were male both groups (76% from conventional group and 64% from Endoscopic group). Age and gender distribution of the patients from both groups also was similar and both groups were comparable (both p values >0.05).

The preoperative grade of adenoid hypertrophy of the patient from conventional group was grade 2 in 80% patients and 20% had grade 3. For endoscopic group, preoperative grade of the patient was grade 1 in 16% patients, 68% had grade 2 and 16% patients had grade 3. No difference in grade was observed between two groups (p value 0.113).

Table 2. Comparison Of Intra-operative Details Between Two Techniques:

Intra-operative details		Technique		Total	Chi-Square & p-value
		Conventional	Endoscopic		
Blood Loss (ml)	1 to 20	1(4%)	25(100%)	26(52%)	42.4, <0.001
	21 to 40	24(96%)	0(0%)	24(48%)	
Mean Blood Loss (ml)		31.0±5.6	10.8±2.8	P value <0.001	
Duration of Surgery	≤5	1(4%)	0(0%)	1(2%)	19.4 <0.001
	5 to 10	15(60%)	2(8%)	17(34%)	
	11 to 15	9(36%)	17(68%)	26(52%)	
	15 to 20	0(0%)	6(24%)	6(12%)	
Mean time of Surgery		10.5±3.3	14.7±2.5	<0.001	

Majority of the patients (96%) from conventional group had blood loss 21 to 40 ml. In endoscopic group, all of the patients had blood loss 1 to 20 ml. Mean blood Loss (ml), was significantly less in Endoscopic group (10.8±2.8 ml) (<0.05). Duration of patients from conventional group surgery was 5 to 10 mins in majority of the patients (60%) followed by 11 to 15 mins in 36% patients. In endoscopic group, duration of surgery was 11 to 15 mins in majority of the patients (68%) followed by 15 to 20 mins in 24% patients. Statistically lower duration of surgery was seen in conventional group (p value <0.001). Mean time of Surgery (min), was significantly more in Endoscopic group (14.7±2.5 ml) compared to Conventional group (10.5±3.3 ml) (p value <0.001).

Comparison Of Post-operative Details Of The Patients Between Two Techniques:

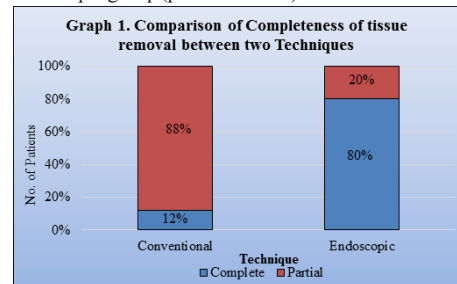
Post-operative grade of adenoid hypertrophy of the patient from conventional group was grade 1 in 88% patients. For endoscopic group, it was grade 0 in 80% patients. Lower grade was significantly more in endoscopic group (p value <0.001). Post-operative pain score (VAS) of the patient from conventional group was grade 4 in 84% patients and 12% had grade 3. For endoscopic group, pain score (VAS) of the patient was grade 3 in 88% patients and 12% had grade 4. VAS score was significantly lower in endoscopic group (p value <0.001). Mean pain Score (VAS), was significantly less in Endoscopic group (3.1±0.3 ml) compared to Conventional group (3.9±0.4 ml) (p value <0.001).

Table 3. Comparison Of Post-operative Details Of The Patients Between Two Techniques:

Post-Operative variables		Technique		Total	Chi-Square & p-value
		Conventional	Endoscopic		
Post-Operative Grade of Adenoidectomy	0	3(12%)	20(80%)	23(46%)	23.269 <0.001
	1	22(88%)	5(20%)	27(54%)	
Pain Score (VAS)	3	3(12%)	22(88%)	25(50%)	28.940, <0.001
	4	21(84%)	3(12%)	24(48%)	
	5	1(4%)	0(0%)	1(2%)	
Mean Pain Score (VAS)		3.9±0.4	3.1±0.3	P value <0.001	

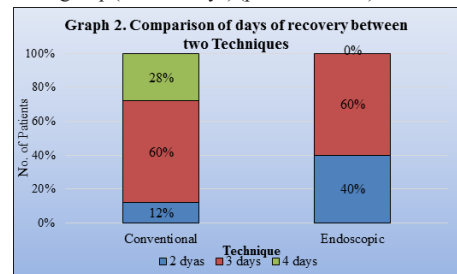
Comparison Of Completeness Of Tissue Removal Between Two Techniques:

Tissue removal in the patient from conventional group was complete in only 6% patients. For endoscopic group, tissue removal was complete in 80% patients. Completeness of tissue removal was significantly more in endoscopic group (p value <0.001).



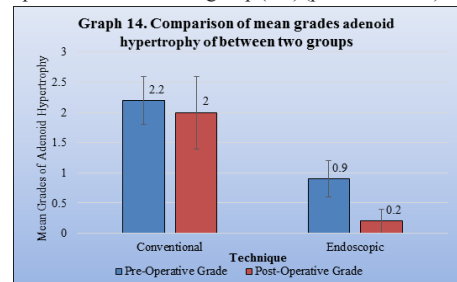
Comparison Of Days Of Recovery Between Two Techniques:

In conventional group, 60% patients recovered in 3 days and 28% recovered in 4 days. In endoscopic group, 60% patients recovered in 3 days and 40% recovered in 2 days. Duration of recovery lower in endoscopic group (p value 0.005). Mean time of recovery (days), was significantly less in Endoscopic group (2.6±0.6 days) compared to Conventional group (3.2±0.6 days) (p value <0.001).



Comparison Of Mean Grades Of Adenoid Hypertrophy Between Two Groups:

Mean pre-operative grade adenoid hypertrophy of was similar in both groups (2.2 in conventional and 2.0 in endoscopic) (p value 0.164). Mean post-operative grade was significantly less in Endoscopic group (0.2) compared to conventional group (0.9) (p value <0.001).



DISCUSSION:

Adenoidectomy is one of the commonly performed surgeries in children. The advent of endoscopes has made ENT surgeries more attractive, with a reduction in the list of indications for conventional techniques. The use of endoscopes combined with the newer surgical techniques has gained popularity in the recent days. One such combination is Micro-debrider-assisted Adenoidectomy with the use of the endoscope. The present study was carried out to compare and

observe micro-debrider-assisted Adenoidectomy with the use of the endoscope and conventional method.

Comparison Of Age Of The Patients Between Two Techniques: In the present study, majority of the patients were from age group ≤ 10 years (48% from conventional group and 44% from Endoscopic group). Mean age of the patients from Conventional adenoidectomy group is 11.3 ± 3.8 years and for patients from Endoscopic micro-debrider adenoidectomy group was 10.9 ± 3.2 years were comparable (p value 0.345). Comparable findings were observed in study by **Lt Col R Datta et al⁶**, the mean age of the patients was 8.14 years in conventional group and 9.2 years in Endoscopic group.

Amal T. Das et al⁷ found that the youngest child who underwent the procedure was 3 years while the oldest child was 16 years. The mean age of patients was 9 years. Similarly, **Jolene Alokkan⁸** found that the mean age of the patients in conventional was 7.8 years, while that of endoscopy Group was 7.5 years.

Comparison Of Sex Of The Patients Between Two Techniques: Gender distribution of the patients from Conventional adenoidectomy (76% males and 24% females) as well as Endoscopic micro-debrider adenoidectomy (64% males and 36% females) was similar and both groups were comparable (p value 0.355). Similar distribution was observed in study by **Saroo Singh et al⁹**, they had 27% females and 73% males in Conventional group and 17% females and 83% males in Endoscopic group. But in a study by **Amal T. Das et al⁷**, out of the 60 patients, 30(50%) were males and 30(50%) were females. This proportion was different from our study in which majority were males.

Comparison Of Pre-operative Grade Of Adenoid Hyperplasia The Patients Between Two Techniques: In the present study, preoperative grade of Adenoid Hyperplasia of the patient from conventional group was grade 2 in 80% patients and 20% had grade 3. For endoscopic group, preoperative grade of the patient was grade 1 in 16% patients, 68% had grade 2 and 16% patients had grade 3 (p value 0.113). Similar findings were observed in study by **Lt Col R Datta et al⁶**, the pre-operative grading of the adenoid size in most of the patients was Grade 3-4 adenoid hyperplasia in equal proportions in both groups.

Similarly, **Amal T. Das et al⁷**, observed that out of 60 participants, 43.3% children were grade 3, 56.7% were grade 4. **Jolene Alokkan¹⁰** also found that on doing nasal endoscopy pre-operatively, a Grade 3-4 adenoid hyperplasia was seen in both the groups.

Comparison Of Blood Loss Between Two Techniques: In endoscopic group, majority of the patients (68%) had blood loss 5 to 10 ml followed by 11 to 20 ml blood loss occurred in 24% patients. Mean blood Loss (ml), was significantly less in Endoscopic group (10.8 ± 2.8 ml) compared to Conventional group (31.0 ± 5.6 ml) (p value < 0.001). Similar findings shown in study by **Feng et al¹⁰**, blood loss was more in the conventional adenoidectomy group though it was not statistically significant. Also, **Amal T. Das et al⁷** also found that, there was no significant blood loss (15 ± 3 ml approximately) though initially there was more bleeding due to the increased raw area exposure after debinding adenoid tissue.

Contrast findings were observed in study by **Lt Col R Datta et al⁶**, observed that the average blood loss in Conventional Group was 21 ml (range 10–50ml) compared to an average blood loss of 31.67 ml (range 10–60ml) in Endoscopy Group. This difference in intra-operative blood loss was statistically significant (p < 0.05). Though statistically significant, the difference is small (10ml) because in their study, the raw bleeding surface was exposed for a longer time. **Stanislaw et al¹¹** also reported a significant reduction in blood loss following endoscopic adenoidectomy.

Comparison Of Duration Of Surgery Between Two Techniques: In endoscopic group, duration of surgery was 11 to 15 mins in majority of the patients (68%) followed by 15 to 20 mins in 24% patients. Mean time of Surgery (min), was significantly more in Endoscopic group (14.7 ± 2.5 ml) compared to Conventional group (10.5 ± 3.3 ml) (p value < 0.001).

Our findings are in accordance with the findings of study by **Lt Col R Datta et al⁶**, the time taken in Conventional Group subjects varied from 22 to 39 minutes with a mean of 29.3 minutes (95% CI -27.7 to 30.9). In contrast in Endoscopic Group, the time taken varied from 27

to 55 minutes with a mean of 39.3 minutes (95% CI -36.6 to 41.9 minutes) as depicted in Fig. 3. The difference in time taken in the two procedure was found to be significant (p < 0.05). Similar observations were seen in **Amal T. Das et al⁷** study, they found that, the duration of conventional adenoidectomy was significantly low (5 minutes 12 seconds) as compare to endoscopic micro-debrider-assisted adenoidectomy (14 minutes 45 seconds). **Jolene Alokkan et al⁸** observed that the operative time, in conventional group, was significant low (mean being 30.5 mins) compared to endoscopy group, (mean being 41.7 mins) (p value < 0.05).

In the present study, the overall operative time is higher in as endoscopic technique, this increase in the operative time is probably due to increased set-up time for instrumentation, endoscopic visualization, bit by bit removal of the adenoid tissue and time-consuming haemostasis. The increase in time though statistically significant, adds only approximately four minutes to the surgery.

Comparison Of Post-operative Grade Of Adenoid Hyperplasia Of The Patients Between Two Techniques: Post-operative grade of Adenoid Hyperplasia of the patient from conventional group was grade 1 in 88% patients. For endoscopic group, post-operative grade of the patient was grade 0 in 80% patients. Lower grade was significantly more in endoscopic group (p value < 0.001).

Post-operatively, **Amal T. Das et al⁷**, also observed that 3.3% participants had grade 1, 41.7% had grade 2, 46.7% had grade 3 and 8.3% patients had grade 4 after conventional adenoidectomy. But with the endoscopic micro-debrider assisted adenoidectomy, they were able to get complete clearance of adenoid tissue in all cases, along with better surgeon satisfaction

Comparison Of Completeness Of Tissue Removal Between Two Techniques: Tissue removal in the patient from conventional group was complete in only 6% patients. For endoscopic group, tissue removal was complete in 80% patients. Completeness of tissue removal was significantly more in endoscopic group (p value < 0.001). **Lt Col R Datta et al⁶** in their study revealed that post procedure endoscopy to look for residual adenoid tissue showed that resection was invariably complete by the endoscopic method. Contrary to this, in seven (23%) cases of conventional Group, more than 50% adenoid tissue was left behind and in additional nine cases (30%) between 20-50% of adenoid tissue was left.

This is also comparable to findings by **Havas T et al¹²**, in conventional group, 39% cases reported as residual obstructive adenoids. They noted that the extent of resection following conventional adenoidectomy has been incomplete. This may lead to recurrence of the condition for which the surgery has been done or no improvement in clinical condition. It was felt therefore that an endoscopic assessment be used to determine the extent of residual tissue. In the study by **Pagella et al¹³**, 48.9% of patients had significant obstructing adenoid tissue after conventional adenoidectomy.

The results show that resection was invariably complete by the endoscopic method in contrast to curettage method. In endoscopic method, nasopharynx can be seen properly and remnant bits of adenoid tissue removed accurately under vision. This makes endoscopic adenoidectomy more complete.

Comparison Of Post-operative Pain Score (VAS score) Between Two Techniques: In the present study, pain score (VAS) of the patient from conventional group was grade 4 in 84% patients and 12% had grade 3. For endoscopic group, pain score (VAS) of the patient was grade 3 in 88% patients and 12% had grade 4. Mean pain Score (VAS), was significantly less in Endoscopic group (3.1 ± 0.3 ml) compared to Conventional group (3.9 ± 0.4 ml) (p value < 0.001). Adenoidectomy is a well-tolerated procedure.

Findings were in accordance with the study by **Lt Col R Datta et al⁶**, the two groups were compared and statistical analysis showed a pain score of 1.64 in conventional group and endoscopic group demonstrated a pain score of 1.19. (p > 0.05). **Jolene Alokkan et al⁸** also mentioned similar observations, post-operative mean pain score in conventional group was 2.8, and in endoscopic group was 1.2.

Comparison Of Days Of Recovery Between Two Techniques: In conventional group, 60% patients recovered in 3 days and 28%

recovered in 4 days. In endoscopic group, 60% patients recovered in 3 days and 40% recovered in 2 days. Mean time of recovery (days), was significantly less in Endoscopic group (2.6 ± 0.6 days) compared to Conventional group (3.2 ± 0.6 days) (p value < 0.001). In **Lt Col R Datta et al⁽⁶⁾** study, conventional group shows mean recovery period of 3.5 days and endoscopic group shows 2.93 days ($p < 0.05$).

Jolene Alokkan et al⁽⁸⁾ revealed regarding recovery time that conventional group had slightly higher recovery time (mean of 3.8 days) compared to endoscopic group (mean of 3.3 days). The recovery time after any surgery is difficult to define as different parameters are used by different studies. We adopted a simple method and let the parent patient determine when he/she felt normal.

Comparison Of Mean Grades Of Adenoid Hyperplasia Of The Patients Between Two Groups: Mean pre-operative grade of Adenoid Hyperplasia was improved in Endoscopic group from 2.0 to 0.2 and in conventional group 2.2 to 0.9. **Amal T. Das et al⁽⁷⁾** in their study revealed that the mean pre-operative symptom score was 3.7, which improved to 0 after surgery by endoscopic micro-debrider-assisted adenoidectomy.

The advantages of endoscopic micro-debrider-assisted adenoidectomy include improved visualisation of the surgical field, continuous suction of blood and thereby, enabling complete and precise removal of adenoid tissue from the choanal and tubaric regions⁽¹³⁾. There is also no need to extend the neck during the endoscopic procedure. The high-definition monitor display enables training residents and recording for documentation. There was also high degree of surgeon satisfaction due to improved plane of dissection.

CONCLUSION:

We conclude that majority of the patients who need adenoidectomy has age ≤ 10 years and males. Using Micro-debrider-assisted Adenoidectomy method with use of the endoscope (endoscopic group) has advantages which include lower blood loss, lower post-operative grades of adenoid hypertrophy, completeness of tissue removal, better VAS score and shorter duration of recovery. Its only disadvantage is increased surgical time.

Micro-debrider-assisted adenoidectomy with the use of the endoscope needs to be acknowledged as a safe alternate to conventional adenoidectomy. But not all centres have the facility of using an endoscope and microdebrider. Also, the additional cost has to be borne. There is need for special equipment and cost of procedure has to be kept in mind.

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