

Endoscopic Adenoidectomy with Microdebrider Versus Conventional Adenoidectomy

Sanjoy Das^{1*} Pranay Kumar Dutta² Tuli Sen³

Abstract

Background : Adenoidectomy is one of the most common surgical procedures performed in children in Bangladesh. Though conventional curettage is highly popular as it has the advantage of being cost effective and continues to be a commonly used method especially in developing countries but Microdebrider has opened the new horizon in this arena. To compare conventional curettage adenoidectomy and endoscopic-assisted powered adenoidectomy using a microdebrider.

Materials and methods: This is randomized single blinded comparative study, which was performed in the Medical Center Hospital, Chattogram from August 2019 to July 2020. A total of 60 patients were randomly divided into two groups. Group I underwent conventional curettage adenoidectomy while Group II underwent endoscopic- assisted powered adenoidectomy. Duration of surgery, amount of intra-operative bleeding, adequateness of removal and damage to the adjacent structures were assessed and compared between two groups. All patients were followed for 12 months. Statistical analysis was done using statistical software package SPSS v 22.0. Data were represented as mean \pm SD. Continuous variables were compared using the t test while nonparametric data were compared using Mann-Whitney U test. The χ^2 test was used to compare the nominal data. A p value <0.05 was considered statistically significant. Ethical directives from the Managing Body of Medical Centre Hospital, Chattogram for this study was obtained.

Results : in our study , we observed approximately almost three times more mean blood loss and total operating time in the endoscopic-assisted powered procedure compared to the conventional technique (149 and 56 ml, respectively, 63 and 27 min, respectively). 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 24-48 hour with a mean of 33.6 hour in group I and 36 hour for group II. 23 patients (77%) in group I presented with residual disease in the 3 months follow up period, where number of patients with the exact instance in group II was 0.

Conclusion : Endoscopic assisted adenoidectomy may appear more handy over conventional curettage. But precise peri-operative care and awareness are required to attain the successful outcomes.

Key words : Adenoidectomy; Conventional adenoidectomy; Endoscopic assisted powered adenoidectomy.

Introduction

Wilhelm Meyer, in 1885 first described conventional adenoidectomy and since then it has been one of the most frequently performed surgical procedure in the pediatric age group.^{1,2} Indication for adenoidectomy include adenoid hypertrophy causing nasopharyngeal obstruction with subsequent sleep disordered breathing, otitis media with effusion, chronic rhino-sinusitis, recurrent acute otitis media, obstructive sleep apnoea, chronic discharging ear in CSOM (TT variety).³⁻⁶ Over time, adenoidectomy has been performed using many new techniques which include an electronic molecular resonance, suction diathermy, a microdebrider, endoscopy, coblation and laser.⁷⁻¹¹ Each method has got advantages and disadvantages in terms of outcome. Complications, operative time and cost.

However, despite improvements in the techniques, complications related to the procedure are often inevitable. Major complications include fever, soreness, neck stiffness and post-operative pain, velo-pharyngeal insufficiency, nasopharyngeal stenosis etc.

Currently, with the increasing trend towards day care surgery, it is essential for the surgeon to use the most optimal technique with the least post-operative morbidity. The classical surgical technique with adenoid curette has now evolved into a safer and more controlled removal of adenoids with the introduction of the endoscope and powered instruments such as microdebrider.

1. Junior Consultant of ENT
Boalkhali Upazila Health Complex, Chattogram.
2. Associate Professor of Anaesthesia
Chittagong Medical College, Chattogram.
3. Lecturer of Pharmacology
Marine City Medical College, Chattogram.

***Correspondence:** Dr. Sanjoy Das
Cell : 01716 62 10 35
E-mail: dr.sanjoydas1984@gmail.com

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Over the years, since its introduction in the late 1990s, endoscopic-assisted powered adenoidectomy has been described widely in the literature. However, considering it as a choice over the conventional curettage technique has been widely debated. To this objective, we compared the two techniques with respect of duration of surgery, amount of intra-operative bleeding, recovery time, adequateness of removal, damage to the adjacent structures and post operative pain.

Materials and methods

This randomized, single-blinded comparative study was performed in the Medical Center Hospital Chattogram from August 2019 to July 2020. The study comprised 60 patients of either sex aged 6-12 years who were planned for adenoidectomy. The subjects were randomly divided into two groups. Randomization was performed using a table of random numbers for 30 subjects each. Group I included numbers 1-30 while group II includes number 31-60. Each group has randomly distributed 15 even and 15 odd numbers. The study subjects were then allocated numbers according to the randomization. Those allocated with even numbers (Group I) underwent conventional curettage adenoidectomy while those in Group II (Odd numbers) underwent endoscopic assisted powered adenoidectomy. Patients with significant deviated nasal septum and patients with cleft palate were excluded from the study.

On enrollment, all patients underwent baseline evaluation which included a diagnostic nasal endoscopy. The grade of adenoid hypertrophy was assessed using the scale described by Clemens et al.¹² Both surgical techniques were performed by the principal author and observations were documented by the Co-author. St. Clair Thompson adenoid curette was used in Group I, while endoscope along with microdebrider used in Group II. The procedure in group II was visualized using 4 and 2.7 mm rigid telescope.

The intra-operative parameters included total operative time, amount of bleeding, completeness of removal of adenoid tissue and collateral damage to the adjacent structures. Post operative recovery time was assessed in all patient. The time period between the initial introduction and the final removal of the mouth gag was considered as total operative time.

For the conventional adenoidectomy group, each 3-inch² soaked gauze was assumed to correspond to blood loss of 10 ml. However, in the endoscopic method, the blood loss was assessed by whatever came into the suction canister minus the irrigation solution.

The completeness of adenoid removal was assessed by nasal endoscopy at the end of the procedure in both groups; 20% or less residual adenoid was regarded as complete removal, 20-50% was regarded as partial, while more than 50% residual was considered as suboptimal removal. Recovery time was defined as the total number of hours taken to return to normal activity as gauged by the patient/ guardian during the routine post-operative follow-up visit on the 7th day.

Statistical analysis was done using statistical software package SPSS v 22.0. Data are represented as mean±SD. Continuous variables were compared using the t test while nonparametric data were compared using the Mann-Whitney U test. The χ^2 test was used to compare the nominal data. A p value <0.05 was considered statistically significant.

Results

Table I Age and Gender distribution of the study

a. Age distribution of all subjects (n=60)

Age, years	
Mean± SD	8.7±2.3
Range	6 – 12
Median	8.5

b. Group –wise age distribution of subjects

Techniques	n	Mean age (Years)
Conventional	30	9.30±2.200
Endoscopic	30	8.23±2.373

c. Gender distribution of the subjects

Gender	Techniques		Total
	Conventional	Endoscopic	
Female	8(27%)	5(17%)	13
Male	22(73%)	25(83%)	47
Total, n	30	30	60

Table II Comparison of bleeding volume (Mean±SD) between the two groups

Technique	n	Bleeding volume (ml)
Conventional	30	56.67±18.952
Endoscopic	30	149.33±20.833

Table III Comparison of total operative times in two groups

Techniques	n	Operative time	p value
Conventional	30	26.83±5.796	<0.001
Endoscopic	30	62.67±6.915	

Table IV Comparison of post-operative pain in two groups

Techniques	n	VAS pain score
Conventional	30	4±.44
Endoscopic	30	3±.36

Table V Comparison recovery time and residual disease in two groups

Variables	Techniques	n	findings	p value
a. Recovery time (Hours)	Conventional	30	33.60±11.959	0.445
	Endoscopic	30	36.00±12.205	
b. Residual disease (Numbers)	Conventional	30	23 (77%)	
	Endoscopic	30	0 (0%)	

The mean age of all 60 patients aged 6–12 years was 8.7 ± 2.3 years. Group I comprised 8 males (26%) and 22 females (73.3%) while group II comprised 5 males (17%) and 25 females (83%). The mean age of patients was 9.3 years in group I and 8.2 years in group II. There was no statistical difference between the two groups with respect to age and gender distribution between the two groups ($p = 0.076$ and 0.347 , respectively) (Table Ia–c).

The majority of the two groups showed grade III–IV adenoid hypertrophy (77% in group I and 87% in group II). Mann-Whitney U analysis was used to compare the mean rank of adenoid grades between the two groups.

There was no significant statistical difference between the two groups ($p = 0.449$). In group I, blood loss ranged from 30 to 100 mL with mean blood loss of 56.6 mL. However, in group II, bleeding ranged from 100 to 180 mL with mean blood loss of 149.3 mL. This difference was statistically significant ($p < 0.05$) (Table II).

Total operative times in groups I and II were 26.8 min (range 15–40 min) and 62.6 min (range 50–80 min), respectively. The difference in total operating time between the two groups was statistically significant ($p < 0.05$) (Table III).

Post-procedural endoscopy done to look for residual adenoid tissue showed that resection was invariably complete by the endoscopic-assisted powered technique. Contrary to this, 9 (30%) cases in group I had more than 50% residual adenoid tissue while 20–50% of residual adenoid tissue was noticed among 7 cases (23%). Statistical comparison showed better completeness of removal with the endoscopic technique compared to the conventional procedure ($p < 0.001$).

Postoperative pain was found to be significantly higher in group I compared to group II (Table IV) most likely due to injury to adjacent structures. 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. There was no significant difference in recovery time following the two techniques ($p > 0.05$) (Table V).

At the 3-month follow-up, no residual disease was found in group II. However, in group I, 23 patients (77%) presented with residual disease causing nasopharyngeal symptoms and sleep-disordered breathing (Table V). It was hence observed that chances of residual disease were significantly higher with the conventional technique compared to the endoscopic procedure ($p < 0.001$).

Discussion

Although conventional curettage adenoidectomy is a quick and simple procedure, it has its own associated complications owing to the blind technique. Besides injury to the eustachian tube orifice and pharyngeal musculature, various studies have reported a high percentage of residual tissue following this technique.^{13,14} Residual tissue usually leads to a sequence of potential problems which include peritubal obstruction, hyperplasia of remnant tissue and a nidus for bacterial reservoirs. To overcome these drawbacks, the need for endoscopic-assisted microdebrider adenoidectomy came into existence.

In this regard, our study planned to compare the functional outcome of the two techniques considering certain specific parameters.

In all patients, we used the microdebridertransorally, since we felt it was suitable for children, especially those with narrow nasal passages. The safety and precision of the transoral curved microdebrider for adenoidectomy has been well documented in the literature.¹⁵⁻¹⁷

In our study, we observed approximately three times more mean blood loss and total operating time in the endoscopic-assisted powered procedure compared to the conventional technique (150 and 56 mL, respectively; 63 and 27 min, respectively). Our observation was in contrast to studies performed by Koltai et al.¹⁵ Murray et al. Rodriguez et al and Heras and Koltai who reported less total operative time and blood loss with the endoscopic-assisted powered technique.¹⁵⁻¹⁸

All patients belonging to group II had complete removal of the adenoid tissue by the endoscopic method. However, in group I, 9 (30%) cases had more than 50% residual tissue while 20–50% of adenoid tissue was left in 7 patients (23%). The evidence of residual adenoid tissue postoperatively in patients undergoing conventional adenoid curettage has been reported by Havas and Lowinger, Stanislaw et al. Datta et al Ezzat and Hussein, Al-Juboori and Cappaccio P et al with an incidence of 39, 39, 30, 14.5, and 20%, respectively.^{14,19-22,25}

Group I patients has more postoperative pain compared to those in group II. This was in agreement with the study performed by Lister et al and Costantini F et al who reported significant less postoperative pain in the debrider group.^{23,26}

The recovery period with the debrider-assisted adenoidectomy was shorter than that with conventional adenoidectomy and this difference was statistically significant. Similarly, a study by Somani et al and Elnashar I et al showed less.^{24,27}

Post-operative residual disease at 3 months follow up was 77% in group I and 0% in group II. The finding is quite similar with the finding of Duuta et al, Ezzat and Niemi p et al.^{20,21,28}

Limitation

- Surgeon skill was potentially confounding factor.
- Pain Assessment by VAS score may be judgemental.
- Assessment of blood loss by counting gauze may be cumbersome at times.

Conclusion

Although nasal endoscopes are fast becoming basic tools, powered instrumentation like microdebriders are not common. The need for special equipment and the cost of the procedure have to be borne in mind. The newer method of endoscopic-assisted powered adenoidectomy was found to be a safe and useful tool for adenoidectomy. The advantages of this technique include completeness of resection, accurate removal, less damage to adjacent structures, less postoperative pain, and faster recovery. However, in light of certain drawbacks such as increased total operative time, increased blood loss, need for special equipment, and cost of procedure limit its use. The use of powered adenoidectomy is technically demanding in the pediatric age group due to the relative difficulty in simultaneously passing both the scope and the debrider blade through the nose.

Recommendation

Though endoscopic adenoidectomy with microdebrider is still in its primitive era in a country like Bangladesh, it has got bright future if the procedure is followed country wide with diligence, precision and professionalism. Undue side effect of blind conventional adenoidectomy can easily be overcome by the endoscopic microdebrider adenoidectomy. And more such studies should be carried out to establish the supremacy of the endoscopic adenoidectomy procedure.

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Contribution of authors

SD-Conception, design, data collection, drafting & final approval.

PKD-Acquisition of data, data analysis, critical revision & final approval.

TS-Data analysis, interpretation of data, drafting & final approval.

Disclosure

All the authors declared no competing interest.

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