Conventional Versus Endoscopic Powered Adenoidectomy: A Comparative Study

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Abstract

Background: Adenoidectomy is a commonly performed ENT surgery. It is conventionally performed using the curettage method. This present article aims to evaluate endoscopic powered adenoidectomy as an alternative.

Methods: Sixty consecutive cases requiring adenoidectomy were randomized into two groups of thirty each. Group A underwent conventional adenoidectomy using the curettage method and Group B underwent endoscopic assisted micro-debrider adenoidectomy. The parameters studied were intra-operative time, intra-operative bleeding and completeness of resection, collateral damage, post operative pain and recovery time.

Result: Sixty cases of adenoidectomy were done using conventional surgery and powered endoscopic adenoidectomy in the study period from Aug 04 to Dec 05. The time taken in Group A (conventional surgery) varied from 22-39 minutes (95% Confidence Interval (CI) -27.7 - 30.9) and in Group B (powered endoscopic surgery) from 27 - 55 minutes (95% CI 36.6 - 41.9) ($p < 0.05$). The average blood loss in Group A was 21 ml (range 10 - 50) as compared to 31.67 ml (range 10-60) in Group B ($p < 0.05$). The resection was invariably complete in Group B whereas seven (23%) cases had more than 50% residual adenoid tissue in Group A. Three cases in group A had collateral damage whereas in Group B, there were no added injuries. Post operative pain was studied only in cases undergoing adenoidectomy alone. Group A ($n=8$) demonstrated a pain score of 1.64-2.63-3.63 (95% CI) whereas Group B ($n=11$) demonstrated a pain score of 1.19-2.13-3.06 (95% CI). This difference was not statistically significant. In group A, the mean recovery period was 3.5 days and 2.93 days in Group B ($p < 0.05$).

Conclusion: Endoscopic powered adenoidectomy was found to be a safe and effective tool for adenoidectomy. The study parameters where endoscopic powered adenoidectomy fared better were completeness of resection, accurate resection under vision, lesser collateral damage and faster recovery time. On the other hand, conventional adenoidectomy scored in matter of lesser operative time and intra-operative bleeding.

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Introduction

Adenoidectomy forms a valuable treatment option in management of sleep disordered breathing, middle ear pathologies, paediatric chronic rhino-sinusitis and recurrent adeno-tonsillitis. 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.

Canon et al [1] popularized Endoscopic Assisted Adenoidectomy (EAA) calling it “a natural progression of endoscopic technology to allow a more complete adenoidectomy”. They followed a conventional trans-oral adenoidectomy with endoscopic removal of residual adenoids. Microdebriders are powered instruments which provide an excellent, safe and thorough technique in

endoscopic nasal surgery. They provides atraumatic dissection with minimal bleeding which enables decreased surgical time and faster postoperative healing [2]. Koltai et al [3] have published the use of microdebrider for adenoidectomy using visualization by a laryngeal mirror. When both these methods are combined and endoscopic assisted powered adenoidectomy performed, advantages of both techniques should get pooled.

The present study was designed to compare the endoscopic powered adenoidectomy versus conventional adenoidectomy and collect morbidity data regarding the same.

Material and Methods

The present study was carried out in a tertiary care teaching hospital. To achieve the objectives of the study, a prospective randomized trial was designed. Sixty consecutive cases between the ages of 6-12 and requiring adenoidectomy

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for various indications were included in the study. Subjects with significant deviated nasal septum were excluded from the study. On enrolment, the subject underwent a baseline evaluation including nasal endoscopy. The grade of adenoid hypertrophy was assessed using the scale described by Clemens and McMurray where Grade I has adenoid tissue filling 1:3 the vertical height of the choana, Grade II up to 2:3, Grade III from 2:3 to nearly all but not complete filling of the choana and Grade IV with complete channel obstruction [4]. All the cases were randomized into two groups consecutively. Group A consisted of cases undergoing conventional adenoidectomy using curettage method and Group B undergoing endoscopic powered adenoidectomy.

All surgeries were performed by the principal author and co-authors themselves. General anaesthesia was used using oro-tracheal tube and a laryngeal pack. In the conventional technique, adenoidectomy was done using the adenoid curette. In the endoscopic technique, the endoscope was used along with a micro-debrider (Stryker: Hummer model) in the oscillating mode with saline irrigation using speeds up to 2400 rpm to curette and shave off the adenoid tissue using adenoidectomy blades.

Bipolar cautery was used to stop bleeding from the raw surface of the adenoid bed. The procedure was visualized using 2.7mm and 4mm nasal endoscopes using the contra-lateral nostril as the conduit. When it was not possible to introduce the scope from the opposite side, an angled 45-70 degree scope was introduced through the oral cavity and working end of the instruments seen.

The intra-operative parameters studied were operative time, primary bleeding, completeness of removal of adenoid and collateral damage. Post-operative parameters included assessment of post-operative pain and recovery time.

Intra operative time was defined as the time taken for completion of the procedure from the time patient was handed over by the anaesthetist and included setting up of instruments, operative steps, packing and securing the bleeding. The measurement ended when the patient was handed back to the anaesthetist. In cases where tonsillectomy was also combined, the time taken for tonsillectomy and haemostasis was deducted.

The amount of primary bleeding was assessed by a rough though time tested guide. For the conventional adenoidectomy group, the number of three square inch gauze pieces used for packing the nasopharynx were counted and each gauze was assumed to a corresponding blood loss of 10 ml. In the endoscopic method, the blood loss was assessed by whatever came into the suction minus the irrigation solution. The completeness of adenoid removal was assessed by nasal endoscopy at the end of the procedure in both groups. A less than 20% residual adenoid was regarded as complete removal, 20-50% as partial and more than 50% residual as sub-optimal removal.

Post operatively, the patient was assessed for post operative pain using a six point faces scale (where 0= no pain and 5= intolerable pain). The recovery time was defined as the number of days taken to return to normal activity as gauged by the patient / parents during the routine post operative follow-up visit at seven days.

The data so obtained was compared in each group and the mean in two groups statistically analysed using the paired t test for significance. All subjects including their parents were counselled about the nature of the study and informed consent taken.

Results

The mean age of the patients was 8.14 years in Group A and 9.2 years in Group B. The type of surgical procedure (adenoidectomy / adeno-tonsillectomy) done is shown in Fig.1. Sleep disordered breathing was the predominant indication for which adenoidectomy was done (Fig. 2). The pre-operative grading of the adenoid size was done and most of the patients had Grade III – IV adenoid hyperplasia in equal proportions in both groups.

The time taken in Group A subjects varied from 22 to 39 minutes with a mean of 29.3 minutes (95% CI -27.7 to 30.9). In contrast in Group B (powered endoscopic surgery) 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 ($p < 0.05$).

The average blood loss in Group A was 21 ml (range 10 –

Fig. 1 : Surgery performed in the two groups

Fig. 2 : Indications of surgery in the two groups

Fig. 3 : Comparison of operative time

50ml) compared to an average blood loss of 31.67 ml (range 10-60ml) in Group B. This difference in intra-operative blood loss was statistically significant ($p < 0.05$) (Fig. 4).

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 Group A, more than 50% adenoid tissue was left behind and in additional nine cases (30%) between 20-50% of adenoid tissue was left.

The post operative endoscopy was also used to look for inadvertent trauma / collateral damage after the procedure. There were three cases in group A where the adenoid curette had abraded the normal healthy mucosa from the post sepal wall / vault region. Also in two cases the mucosa over the torus tubaris was injured. In Group B, there were no other injuries / damage in the nasopharynx. However five cases had mild trauma to the nasal mucosa over the septum and one case had epistaxis.

Post operatively, the patient was assessed for post operative pain where isolated adenoidectomy was done. Cases where tonsillectomy was combined were excluded as tonsillectomy would cause pain post-operatively which might not be differentiated from post adenoidectomy pain. This left 8 subjects in Group A and 11 subjects in Group B.

The two groups were compared and statistical analysis showed a pain score of 1.64-2.64-3.63 (95% CI) and Group B demonstrated a pain score of 1.19-2.13-3.06 (95% CI) ($p > 0.05$) (Fig. 5). In Group A, the mean recovery period was 3.5 days and in Group B, it was 2.93 days ($p < 0.05$).

Discussion

The present study attempts to compare the conventional curettage method with a newer endoscopic powered technique. Randomisation was done in the present study to enable a more thorough comparison. The groups were also evenly matched in age, type of surgery done and the indications. In any study where dissimilar techniques are involved, the scope of randomization is limited as blinding is not possible, resulting in possibility of biased interpretation.

There is an increasing trend however worldwide to perform adenoidectomy in isolation rather than combine

Fig. 4 : Comparison of intra-operative blood loss

Fig. 5 : Comparative post operative pain in the two procedures (n=19)

it with adeno-tonsillectomy [6]. This trend was somewhat seen in our series where 31% of the cases were operated for adenoids alone. This is in contrast to conventional teaching of combining adenoidectomy with tonsillectomy in most cases. Perhaps with greater awareness and evolution of clear cut indications, the two surgeries would be considered as having separate indications in their own right.

The indications of surgery were varied and both groups had a mixture of indications. The role of adeno-tonsillectomy for sleep disordered breathing in children has been established and often is a common indication for surgery [7]. In the present series sleep disordered breathing formed the predominant indication in both our groups (in 22 cases – 36%) thus depicting the increasing trend to diagnose and surgically treat this condition.

Though the precise steps of the adenoidectomy would only take 4-5 minutes, we felt that a true assessment of the operative time should include all steps including preparing and setting up of instruments, packing and securing the bleeding and checking for haemostasis. As a result, the time taken in the present series may seem longer than other studies. Also the overall operative times may be on the higher side as endoscopy was performed

pre-operatively and post-procedure for the purpose of the study. The increase in the operative time in the newer technique 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 ten minutes to the surgery. This by itself is a small difference and may not be an independent factor in influencing the decision to operate using endoscopes. Our findings are in contrast to those by Stanislaw et al [8] who have reported powered adenoidectomy to be 20% faster than curette adenoidectomy. In their study they have used a 45 degree angled shaver blade through the oropharynx and not the nose. The visualization was with a laryngeal mirror and not using endoscopes. In our opinion, the micro-debrider is potentially a dangerous instrument which should be used under direct and close vision as that provided through an endoscope. The time taken for setting up the instrumentation is also reduced in their study accordingly. Since the parameters used to define operative time differ, the operative times are not comparable. In the present study however, we feel that the endoscopic powered adenoidectomy consumes more time.

Similarly, intra-operative blood loss was higher in Group B patients. Though statistically significant, the difference is small (10ml). As the endoscopic surgery is a bit by bit approach the raw bleeding surface is exposed for a longer time. An increased operative time would also lead to increased bleeding per se. Bipolar cautery is effective in stopping the bleeding from the adenoid bed but tends to stick to the coagulated tissue. When withdrawn, the cautery tip often tears the tissue afresh leading to bleeding from the raw surface. The blood loss in the series by Feng et al [9] was more in the conventional adenoidectomy group though it was not statistically significant. Stanislaw et al [8] however reported a significant reduction in blood loss following endoscopic adenoidectomy.

It has often been noted by authors that the extent of resection following conventional adenoidectomy has been incomplete [10]. 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. The results show that resection was invariably complete by the endoscopic method in contrast to curettage method where in seven (23%) cases more than 50% tissue was remaining and an additional 30% where between 20-50% of adenoid tissue was left. This is comparable to 39% cases reported as residual obstructive adenoids by Havas et al [10]. In endoscopic assisted adenoidectomies, the

nasopharynx can be seen properly and remnant bits of adenoid tissue removed accurately under vision. This makes endoscopic powered adenoidectomy more complete.

Collateral damage following adenoidectomy is uncommon. However there is always a fear of trauma to the eustachian tube opening leading to subsequent scarring and eustachian tube dysfunction. The torus tubaris region was partially injured in two cases of curettage adenoidectomy. In Group B, however there was an increased incidence of nasal mucosal injuries. To summarise, though both techniques have their own peculiar problems, they are usually self resolving and minor.

Adenoidectomy is a well tolerated procedure. The simple six point faces pain scale which has shown it to be a simple and reliable pain scale was used [11]. The post-operative pain in the powered adenoidectomy group was lesser than the conventional method though this was not statistically significant. A study on the post operative pain in tonsillectomy using an intracapsular debrider technique and electro-cautery technique demonstrated significant lesser post-operative pain in the debrider group [12]. The present study does not show such a significant reduction in post-operative pain, probably due to small number of cases and the fact that adenoidectomy done in isolation causes lesser post-operative pain per se.

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. The question was asked about "return to normal activity" following the surgery in the post operative follow up. The recovery period in the debrider assisted adenoidectomy was shorter than conventional adenoidectomy and this difference was statistically significant. The use of debrider resulted in faster recovery by an average of 0.57 days, which may not merit an adaptation of current practices to the newer technique.

To summarise, the advantages and drawbacks of the newer procedure as determined by the present study are presented in Table 1. The newer method of endoscopic powered adenoidectomy was found to be a safe and useful tool for adenoidectomy. It scored on completeness of resection, accurate removal, less collateral damage, lesser post operative pain and faster recovery. However the technique suffered from certain drawbacks, like increased time taken for surgery, increased though controllable bleeding and risk of damage of collateral structures by cautery.

The role of such a procedure on selected cases where

Table 1**Tabular comparison of two methods**

Parameter	Conventional adenoidectomy by curettage	Endoscopic powered adenoidectomy	Remarks
Operative time	29.30	39.30	p<0.05
Intraoperative blood loss (ml)	21.00	31.67	p<0.05
Collateral damage	++	+	Minor
Complete removal	46%	93%	
Accuracy	+	+++	
Post operative pain (score)	2.64	2.13	Not significant
Recovery time (days)	3.5	2.93	p<0.05

accurate removal of adenoids is of consequence may however be important. Cases of submucous cleft palate and other cranio-facial anomalies may require adenoidectomy. However for fear of causing velopharyngeal insufficiency, adenoidectomy is avoided. An accurate removal using endoscope and debriider may enable the surgeon to carefully excise part of the adenoid and leave the velopharyngeal sphincter untouched as suggested by some authors [13]. The newer procedure still has some contra-indications and should not be used for biopsy purposes and in cases where tissue diagnosis is in doubt.

The Indian scenario presents a situation where availability of the equipment is also a factor in choosing the method of surgery. Though nasal endoscopes are fast becoming basic tools, powered instrumentation like micro-debriders are not common.

To conclude, endoscope assisted powered adenoidectomy needs to be acknowledged as a safe alternate to conventional adenoidectomy. However, in light of certain drawbacks, its routine use cannot be recommended. It also fails to demonstrate any significant benefit over conventional adenoidectomy. The need for special equipment and cost of procedure has to be kept in mind. The use of powered adenoidectomy is technically demanding in the paediatric age group due to relative difficulty in passing both the scope and debriider blade through the nose.

Nevertheless, adenoid removal with the endoscopic method is more complete, accurate has less post operative pain and has faster recovery. However, it was not found to be a faster procedure contrary to some

reports in literature. The setup time required for the instrumentation may be a factor towards this aberration.

Conflicts of Interest

This study has been financed by research grants from the O/o DGAFMS, New Delhi.

Intellectual Contribution of Authors

Study Concept : Lt Col R Datta, Col VP Singh

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