Changing Trends in Adenoidectomy

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Abstract Adenoid hypertrophy treatment is must to alleviate chronic nasal obstruction, mouth breathing, rhinosinusitis and eustachian tube dysfunction. For proper management of this clinical entity a thorough clinical examination along with radiological and endoscopic evaluation is mandatory. Although, few children having adenoid hypertrophy respond to medical treatment, surgery remains the mainstay. An adenoidectomy can be performed by variety of techniques. Conventional adenoidectomy is by the curettage method, still practiced in many institutions, though, a recent technique of endoscopic assisted adenoidectomy by microdebrider is also getting popularized. Both the techniques have their own merits and demerits. However, which of the two surgical techniques is better, is still a matter of preference and experience of the surgeon with the technique. In the present study we will compare the conventional curettage adenoidectomy with endoscopically assisted adenoidectomy done with microdebrider in 40 pediatric patients of adenoid hypertrophy.

Keywords Adenoidectomy · Microdebrider · Endoscopically · Compare

Introduction

Adenoidectomy is the second most common surgical procedure performed in pediatric otolaryngological practice even today [1, 2]. However, there is an increasing trend worldwide to perform adenoidectomy in isolation rather

than combine it with adenotonsillectomy [3]. Powered instrumentation has established itself as an important tool for sinus surgeons. A step ahead in this development is power assisted adenoidectomy. The type of surgical technique used can have considerable influence on the duration of surgery, intra operative bleeding, post operative pain, recovery time and completeness of removal of the adenoid tissue.

The microdebrider is a powered shaving device that precisely resects tissue, minimizing inadvertent mucosal trauma and stripping thereby minimizing bleeding and post-operative scarring. The term ‘powered instrumentation’ refers to motor driven instruments that deliver continuous suction to the surgical site while providing cutting action [4]. Microdebrider is being successfully used with endoscopes for adenoidectomy. It gives a complete clearance of obstructive adenoids under vision thus providing reliable restoration of nasopharyngeal patency. The main advantage of microdebrider adenoidectomy resides in its precision. However, specialized equipment is required. Also the surgeon should be well-versed in the use of the endoscope and microdebrider before attempting the procedure.

In the present study, comparison of conventional curettage adenoidectomy with endoscopically assisted adenoidectomy using microdebrider has been done.

Materials and Methods

The present prospective study was conducted in a tertiary care medical college. The study included 40 pediatric cases of age group 3–14 years, having symptoms suggestive of adenoid hypertrophy. Following were the inclusion and exclusion criteria:

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Inclusion criteria

- Age group 3–14 years
- The patients presenting with following symptoms were included:
 1. Nasal obstruction, nasal discharge, post nasal discharge, voice change
 2. Ear ache, decrease hearing, delayed and defective speech
 3. Sleep apnea, snoring, hyponasal speech

Exclusion criteria

- Age less than 3 years and more than 14 years
- Past history of cleft palate repair and cases with submucous cleft palate
- Cases with bleeding or coagulation defects
- Craniofacial abnormalities
- Patients having down syndrome

The following examinations were done on the selected patients:

1. Presence/absence of adenoid facies (an elongated dull expressionless face, prominent mouth, crowded upper teeth, hitched up upper lip, high arched palate and pinched in nose).
2. Nasal examination by anterior and posterior rhinoscopy.
3. Aural examination.
4. Oral cavity examination
5. Eustachian tube function tests (Valsalva technique, if possible)
6. X-ray nasopharynx (Lateral view)—the grading of adenoid hypertrophy was done as per the grading system given by Fujioka et al. [5]

Per-operatively nasal endoscopy was done. The grading of adenoid hypertrophy was according to scale given by Clemens and McMurray [6] which is: 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 choanal obstruction.

All patients were randomized into two groups: group A consisting of 20 cases undergoing conventional curettage adenoidectomy and group B consisting of 20 cases undergoing endoscopically assisted adenoidectomy with microdebrider. All surgeries were performed by a single person to avoid surgeon to surgeon discrepancies.

Comparison of Conventional Curettage Adenoidectomy with Endoscopic Assisted Adenoidectomy by Microdebrider was done on basis of:

Intra-operative time

It was taken as the time required for the completion of procedure beginning from the time the patient was

intubated and after the consent of anaesthesiologist to start the procedure. Time taken for setting up of instrumentation was not included and so all the preparation was done side by side by the assistant during the time the patient was being intubated. As in endoscopic method, increased set up time for instrumentation is required. So exact comparison of time taken for these two surgical techniques will become a biased assessment. The procedure was considered as complete when the patient was handed back to the anaesthesiologist for extubation.

Primary bleeding

Number of 3 square inch gauze pieces used for packing the nasopharynx were counted and each gauze was assumed to correspond to blood loss of 10 ml and to it was added, the amount of fluid collected in suction subtracting the volume of irrigation solution utilized.

Completeness of removal

It was seen by nasal endoscopy at end of procedure in both groups, to see for any remnant adenoid tissue. Residual adenoid tissue was assessed as done by Datta et al. in his study [7].

A less than 20 % residual adenoid was regarded as complete removal.

20–50 % residual adenoid as partial removal.

More than 50 % residual adenoid as sub-optimal removal.

Post-operative pain and recovery

For post-operative pain, Objective pain scale of Hanallah et al. [8] was employed.

The following parameters were used:

(1) Systolic blood pressure, (2) Crying, (3) Movement, (4) Agitation (confused excited), (5) Posture, (6) Complaint of pain (may not be possible in younger children)

Total Score = sum(points for all scorable parameters)

- Minimum score: 0
- Maximum score: 12
- The higher the score the greater the degree of pain.

Score 0 = no pain, Score 1–4 = mild pain, Score 5–8 = moderate pain,

Score 9–12 = Severe pain

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.

Results

In our study, 70 % of the cases were males and 30 % of the cases were females. The mean age of presentation in group A was 8.68 years and in group B was 7.70 years.

Nasal obstruction was the most common complaint in our study, having 100 % incidence, followed by nasal

discharge found in 75 %, post-nasal discharge in 70 % and snoring in 50 % cases. Ear ache and decrease hearing had an incidence of 32.5 % each. Delayed defective speech and sleep apnoea showed an incidence of 2.5 % each (Fig. 1).

Adenoid facies was the most consistent and constant feature on general examination in our study accounting for 75 % incidence. Oral cavity examination revealed 92.5 % cases with open mouth and had high arched palate.

Eustachian tube functions showed, 50 % of the cases with patent eustachian tube while rest 50 % had non patent eustachian tube. Otitis media with effusion was the most common finding on ear examination; found in 40 % cases and retracted tympanic membrane was seen in 27.5 % cases.

Radiological evaluation of nasopharynx showed that grade III adenoid hypertrophy was the most common radiological diagnostic finding in our study, found in 57.5 % cases. On nasal endoscopy, grade III adenoid hypertrophy was the most common (Fig. 2) followed by grade II and grade IV accounting for 62.5, 20 and 17.5 % respectively.

Fig. 1 Clinical features

Fig. 2 Grade III adenoid hypertrophy

In group A, mean intra-operative time was 16 min and 20 s and in group B it was 12 min and 10 s (Fig. 3). This data is statistically significant with p value of 0.015 which indicates that group B is a faster surgical modality as compared to group A.

Mean value of primary bleeding in group A was 40 ml and in group B was 35 ml with p value of 0.016 which is statistically significant indicating that group B is a better surgical procedure in lieu of bleeding (Fig. 4).

In group B, complete removal of adenoids was seen in 100 % cases (Fig. 6) while in group A, 75 % cases had complete removal and rest 25 % had partial removal (Fig. 7). Hence group B was statistically better group as compared to group A (p value of 0.017) in terms of completeness of removal (Fig. 5).

According to Objective pain scale of Hanallah et al. majority of cases of group B i.e. 70 % had pain score of 4 and rest 25 and 5 % had pain score of 5 and 3 respectively. In group A, 45 % cases had pain score of 5. The remaining 35 and 20 % had pain score of 4 and 6 respectively. Thus group B was better statistically (p value of 0.037) as compared to group A (Fig. 8).

In group A, 70 % cases had recovery within 4 days and 30 % had within 5 days while in group B, 85 % had

Fig. 3 Comparison of intra-operative time

Fig. 4 Comparison of primary bleeding

Fig. 5 Comparison of completeness of removal on nasal endoscopy

recovery within 4 days and rest 15 % recovered within 3 days. Mean recovery period in group A was 4.3 days and in group B was 3.8 days. Thus, group B had statistically (p value of 0.010) better recovery rates when compared to group A (Fig. 9).

Discussion

This article consists of a comparative study of conventional versus endoscopic assisted microdebrider adenoidectomy. Though conventional adenoidectomy is a quick and a simple procedure but it is a crude and a blind procedure too. Besides known complications such as injury to eustachian tube orifice and pharyngeal musculature, Canon et al. [1, 9] and Havas et al. [10] have drawn attention to the high percentage of residual tissue remaining after this procedure. This residual tissue can lead to a combination of potential problems, including peritubaric obstruction, bacterial reservoirs and hyperplasia of the remnants with the persistence of obstructive symptoms; all these aspects highlight the importance of addressing a complete removal of the adenoid tissue. To overcome the drawbacks of the above mentioned procedure, the need for endoscopic assisted microdebrider adenoidectomy came into existence.

With reference to national and international studies, the mean age of presentation in both the groups of our study coincides well with other studies. Adenoid hypertrophy can present with varied symptoms ranging from nasal obstruction, nasal discharge, post nasal discharge, snoring, ear ache, decrease hearing, sleep apnoea to delayed defective speech [11, 12]. Hypertrophied adenoid tissue causing habitual mouth breathing may result in dento-skeletal malocclusions. These dentofacial changes are termed as “adenoid facies” by CV Tomes in 1872 with the belief that enlarged adenoids were the principal cause of airway obstruction leading to noticeable dentofacial changes [13]. In our study also, adenoid facies is one of the most consistent and constant feature. Eustachian tube orifices are in close proximity to adenoidal pad. Eustachian tube dysfunction and chronic rhinoadenoiditis represent

two related pathologies, regarding the fact that the obstruction and the inflammation that appear secondary to adenoid hypertrophy can lead to auditory tube dysfunction. Within the pediatric population, the rhinopharynx lymphoid tissue hypertrophy is the primary cause of eustachian tube dysfunction and its complications [14]. Eustachian tube evaluation in our study also supported this fact as 50 % of the cases revealed a non-patent eustachian tube.

Many otolaryngologists and pediatricians maintain that the methods employed clinically for estimating the size of adenoids are in many ways unsatisfactory. The feeling that clinical assessment alone can be misleading when a decision for adenoidectomy has to be taken, stimulated the quest for a radiological means of confirming the diagnosis. Lateral cephalogram (X-ray naopharynx lateral view) revealed that grade III followed by grade II adenoid hypertrophy were the most common radiological finding followed by grade IV adenoid hypertrophy as quoted by Elwany [15] who showed grade III adenoid hypertrophy (with an AN ratio of 0.713) as the commonest radiological finding. A study by Saedi et al. [16] suggest significant relationship of sum of symptoms grading with the size of adenoid in X-ray nasopharynx lateral view.

The ability of nasal endoscopy to observe in three dimensions helps in determining the size of adenoids in relation to the posterior extremity of nasal septum and its lateral extension between the tubal ostiae. This makes nasal endoscopy indispensable to evaluate upper airway conditions in pediatric age group and hence is complimentary to the radiological investigations. In our study, grade III was the most common nasal endoscopic finding followed by grade II and grade IV respectively. Grades of adenoid hypertrophy as described by Clemens and McMurray [6]. The above mentioned fact is well supported with a study of 98 patients by Cassano et al. [17], which also shows similar findings.

The clinical manifestations of adenoiditis may be readily remedied with the removal of obstructive hypertrophied adenoid tissue to restore airway patency [10]. Surgical indication (adenoidectomy) is necessary each time the volume of adenoids obstructs the nasopharynx, producing respiratory, auditory or infectious complications, before any growth or developmental delays appear. In our study of 40 cases, mean operating time in group A was 16.20 ± 6.135 min and in group B was 12.10 ± 3.796 min (Fig. 3) while the mean blood loss in group A was 40 ± 6.489 ml and in group B was 35 ± 6.07 ml (Fig. 4) with no surgical complications in either of the groups. We found that in comparison with curettage adenoidectomy, PAA was statistically faster (p value of 0.015) and caused less blood loss (p value of 0.016). A similar study by Koltai et al. [18] has compared two aspects of surgery which were operating time and amount of blood loss having both

similar groups as in our study showing the mean operating time to be significantly less with power assisted adenoidectomy (11 min) compared to curettage adenoidectomy (19 min). In a prospective study of 140 children divided into similar groups by Nicole Murray [19], operative time was 59 % shorter for the microdebrider group (mean 3 min 22 s) as compared to the conventional group (mean 8 min 8 s; range) ($p < 0.001$). On an average, microdebrider saved 4 min 46 s which is highly significant while the amount of blood loss in both the groups was not of significant difference. A similar prospective study of 140 cases by Rodriguez et al. [20] has evaluated various parameters like intra-operative time and amount of bleeding showing significant reduction in the surgical time in group B as compared to group A. A prospective study by Somani et al. [12] (of 44 children) and a retrospective study by Costatini et al. [21] (of 201 children) reported an operating time (with microdebrider assisted adenoidectomy) as 12.5 min each and the average blood loss of 30 and 28 ml respectively. These two parameters match significantly with our group B cases in which the intra-operative time and bleeding was 12.10 min and 35 ml respectively. A study by Datta et al. [7] with similar groups reported an average blood loss in Group B higher as compared to group A. Though statistically significant, the difference was small (<10 ml). In a series by Feng et al. [22] and Stanislaw et al. [23] however there was a significant reduction in blood loss following endoscopic assisted microdebrider adenoidectomy as compared to conventional adenoidectomy.

Post-operative nasal endoscopy has significant role in assessing the completeness of removal of hypertrophied adenoid tissue especially in areas of eustachian tube orifices and intranasal protrusions and assessing the intra-operative trauma caused by the operative technique [12]. The completeness of adenoid removal in both the groups of our study was assessed by nasal endoscopy at the end of procedure, revealing 100 % complete removal in group B as compared to only 75 % complete removal in group A, indicating a significant number of cases in group A showing residual adenoid tissue (p value 0.017) (Figs. 5, 6, 7). According to literature, regrowth of this residual lymphoid tissue left as a result of blind removal causes significant recurrence of symptoms [24]. The evidence of residual adenoid tissue post-operatively in group A (by classical curettage technique) is well supported by studies by Stansilaw et al. [23], Havas et al. [10], Datta et al. [7], Ezzat et al. [25] and Hussein and Al-Juboori [26] with an incidence of 39, 39, 30, 14.5 and 20 % respectively. All these studies strongly mention that presence of significant residual adenoid tissue especially along torus tubaris and intranasal protrusions lead to persistence of the initial symptoms and may necessitate a revision adenoidectomy

Fig. 6 Partial removal

Fig. 7 Complete adenoid removal

in future. Saxby et al. study by Somani et al. [12] reported an excellent completeness of removal of adenoid tissue following endoscopic power assisted adenoidectomy. Also Stansilaw et al. [23] reported a more complete removal of adenoids with microdebrider.

As the success of any surgical procedure lies in its completeness of removal and low incidence of co-morbidity, the two groups were compared and statistical analysis showed a pain score of 4–5–6 in group A and 3–4–5 in group B (p value 0.037) (Fig. 8). In group A, the mean recovery period was 4.3 days and in group B, it was 3.83 days (p value 0.010) (Fig. 9) and this difference was statistically significant. Power assisted adenoidectomy is associated with less morbidity and hence is a better treatment modality. This was supported by Datta et al. [7] who demonstrated a pain score of 1.64–2.63–3.63 (95 % CI) in group A whereas a pain score of 1.19–2.13–3.06 (95 % CI) in group B. The recovery period in the microdebrider assisted adenoidectomy group was shorter than in the conventional adenoidectomy group and this difference was

Fig. 8 Comparison of pain score in two groups

Fig. 9 Comparison of recovery in two groups

statistically significant. In group A, the mean recovery period was 3.5 and 2.93 days in group B ($p < 0.05$) [7]. Similarly, a study by Somani et al. [12], showed less morbidity after endoscopic power assisted adenoidectomy.

After the above discussions with reference to national and international studies, it is our impression that the adenoid tissue removed during endoscopic assisted microdebrider adenoidectomy is more acceptable as its use allows a more complete removal of the adenoid tissue and in a more precise manner compared with conventional methods.

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