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Research Paper

A Comparative Study on Surgical Outcome of Conventional Adenoidectomy and Endoscopic Adenoidectomy in Children with Adenoid Hypertrophy

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Abstract

Background and Objective: *Advances in endoscopy and powered instruments have revolutionized the field of otorhinolaryngology . With the advent of endoscopes we could remove adenoids under vision. Aim of the study was to compare the surgical outcome of endoscopic adenoidectomy and conventional adenoidectomy.*

Methods: *A descriptive longitudinal study which spanned a period of 18 months. Consecutive cases were posted for Endoscopic Assisted Adenoidectomy (Group I) and Conventional Adenoidectomy (Group II), each group comprising 32 patients. Postoperative pain score was assessed and compared between two groups undergoing adenoidectomy alone. Patients were called for follow up at 12th week to assess subjective improvement of symptoms, DNE done to assess remnant adenoid tissue and scarring of surrounding structures, and tympanogram done to assess middle ear compliance and finally surgical outcome was compared between both groups.*

Results: *Mouth breathing and snoring were common presenting complaints. Preoperative endoscopic assessment showed Grade III adenoid hypertrophy in majority of patients (78.1% in group I and 81.3% in group II). Postoperative pain was less in endoscopic assisted adenoidectomy group and the difference was statistically significant (p value<0.01).Postoperatively in Group I , only6.2% patients had remnant adenoid tissue (20-50%) whereas in Group II, 51.3% had remnant adenoids between 20-50% and 6.3% patients had more than 50% remnant adenoids. Postoperatively none of the patients in Group I had bilateral type C curves whereas in Group II, 21.9% patients had bilateral type C curve. The difference was statistically significant (p value<0.01). 81.3% patients in Group I had good surgical outcome whereas in group II it was only 31.3% and the difference was statistically significant (p value <0.01).*

Conclusion: *Endoscopic assisted adenoidectomy is a safe and effective alternative to conventional curettage method. It ensures reliable restoration of nasopharyngeal patency, better achievement of haemostasis, less postoperative pain, faster recovery.*

Keywords: *Curettage adenoidectomy; Endoscopic adenoidectomy; Microdebrider; Surgical outcome.*

Introduction

Adenoid hypertrophy causing recurrent upper respiratory tract infection, secretory otitis media, snoring and OSA arecommon complaints encountered by ENT surgeons. Lack of good sleep leads to poor concentration and poor school performance. 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.

Adenoidectomy is done for such patients either alone or in combination with tonsillectomy or myringotomy. Widely used method for removing adenoids is conventional curettage method which is a blind method where completion of the procedure is always a debate[1,2]. Because of increased incidence of residual tissue postoperatively newer endoscopic techniques have evolved to help remove adenoids under vision. Canon et al popularized endoscopic adenoidectomy and described it as "natural progression of endoscopic technology to allow more complete adenoidectomy"[1].

This study aims to compare the outcome of endoscopic assisted adenoidectomy and conventional curettage adenoidectomy and assess which is a better surgical modality.

Aim

- To compare the surgical outcome of adenoidectomy after conventional method and endoscopically assisted method.

Materials and Methods

Study Design

- Descriptive longitudinal Study

Study Setting

- ENT department, Government Medical College, Thiruvananthapuram.

Study Population

- Children between 3-14 years with adenoid hypertrophy presenting to ENT department, Government Medical College, Thiruvananthapuram.

Study Period

- February 2017- July 2018 (18 months)

Study Subjects

Inclusion Criteria

- Patients having symptoms suggestive of adenoid hypertrophy evaluated by clinical features, X-ray nasopharynx lateral view, Diagnostic nasal endoscopy, Tympanometry.

Exclusion Criteria

- Children <3 years and >14 years.
- Children with craniofacial deformities, cleft palate, deranged coagulation profile.
- Children with significant deviated nasal septum, allergic rhinitis and those undergoing associated myringotomy.

Sample Size

- 30 patients in Endoscopic adenoidectomy group (Group I)and 30 patients in Conventional Adenoidectomy group(Group II).Sample size calculated using **$(Z1-\alpha/2+Z1-\beta)^2$**
- **$(P1Q1+P2Q2) / (P1-P2)^2$.**

Data Collection Tool

1) Proforma
2) X ray nasopharynx lateral view
3) Diagnostic Nasal Endoscopy
4) Tympanometry
5) Pain score

Method

Patients between 3-14 years who presented to ENT OPD with symptoms suggestive of adenoid hypertrophy and posted for adenoidectomy, were assessed preoperatively with X- ray nasopharynx lateral view, Tympanometry, DNE and endoscopic grading using Clemens and Mcmurray scale of adenoid enlargement.[3]

Grade I	Adenoid tissue filling 1:3 vertical height of the choana
Grade II	Adenoid tissue filling 2:3 vertical height of the choana
Grade III	Adenoid tissue filling from 2:3 to nearly all but not complete filling of choana
Grade IV	Complete choanal obstruction.

Parents of children willing to undergo study were given a proforma listing personal details. Consecutive cases were posted for endoscopic assisted adenoidectomy and conventional adenoidectomy. All cases were done under GA with orotrachaeal intubation and patient in Rose's position. Boyle-Davies' mouth gag with tongue blade applied in the oral cavity supported by Draffin's bipod in Magauraun's plate. In patients undergoing conventional adenoidectomy, adenoids were palpated with index finger. A St.Clair Thomson adenoid curette was then inserted into the nasopharynx, gently positioned against the posterior border of nasal septum and swept downwards. The nasopharynx is palpated again and any further remnants were curetted out. Then a pack was placed in nasopharynx and waited for double the clotting time. If the patient had associated chronic tonsillitis tonsillectomy also was done along with this. Intransoral debrider assisted endoscopic adenoidectomy, patient positioned under GA with orotracheal intubation in Rose's position. This has the added advantage that intraoperative change in position is not necessary if there is an associated tonsillectomy and also avoids the difficulty encountered in simultaneous passage of endoscope and debrider blade through the nasal cavity especially when it is narrow. Soft palate was retracted using two paediatric suction catheters passed through bilateral nasal cavities and tying it on either side. Using a 70 degree rigid telescope (4mm) with video attachment nasopharynx was assessed. Microdebrider with special adenoid blade was used. Special adenoid blade has a window on convex side for use transorally to adapt to roof of nasopharynx. Both the 70 degree endoscope and angled microdebrider blade passed through oral cavity.

The suction was then turned on which draws the adenoid tissue in and the rotating blade at a speed of 3000rpm shaves it under constant endoscopic vision. The adenoidectomy was started high in the nasopharynx from upper limit of adenoid tissue, which often cannot be reached by conventional curette. Resection was continued in a side to side fashion on an even level until the inferior edge of adenoid pad was reached. The cutting and aspirating action of the shaver and simultaneous irrigation removes both the adenoid tissue and blood providing a clear view. Better control of depth of removal of adenoid is achieved thus avoiding damage to the surrounding structures.

A nasopharyngeal pack was kept for double the clotting time and then removed. If hemostasis is not achieved by this method selective bipolar cauterization is used. Boyle davies mouth gag and Draffins bipod are removed and patient is handed over to the anaesthetist. Postoperatively patients were assessed for pain 6 hrs after procedure. Patients were monitored for any post operative complications during hospital stay.

Patients were followed up at 1st week and 12th week. During 1st week only symptomatic improvement is assessed. At 12th week patients were subjected to Tympanometry to assess middle ear compliance and diagnostic nasal endoscopy done to assess any remnant adenoid tissue. Pain was graded according to Wong Baker's ten point faces scale[4]

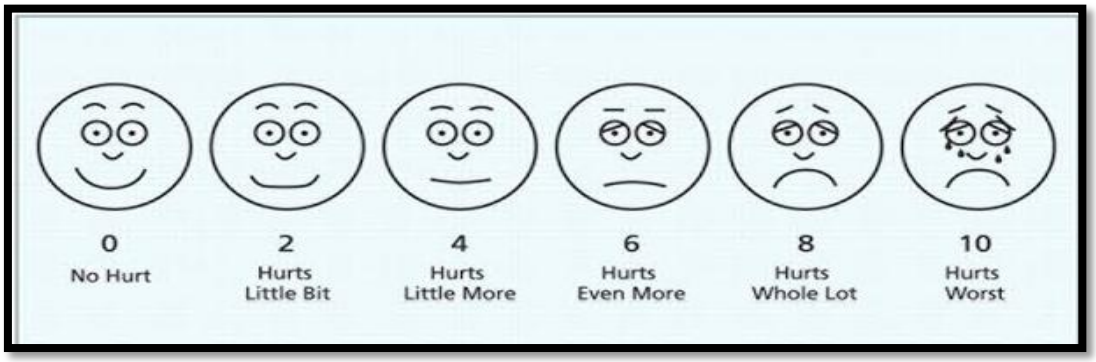

Fig 1: Visual analog pain scale

Diagnostic nasal endoscopy was done at 12 weeks to asses remnant adenoids and to detect damage to surrounding structures (torus tubarius, Eustachian tube orifice, posterior end of nasal septum)

- <20% remnant adenoid- complete removal
- 20-50% remnant adenoid- partial removal
- >50 remnant adenoid- suboptimal removal[5]

Based on the parameters assessed at postoperative follow up surgical outcomes were defined. The surgical outcomes were graded as Good, Fair and Poor.

Good Surgical Outcome

1. Subjective improvement of symptoms.
2. Type A tympanogram on follow up.
3. No postoperative sequelae like scarring of Eustachian tube orifice, posterior end of nasalseptum.
4. Less than 20% remnant adenoid tissue.

Fair Surgical Outcome

1. Subjective improvement of symptoms.
2. No postoperative sequelae like scarring of Eustachian tube orifice, nasal septum.
3. Less than 50%remnant adenoids.
4. Type C tympanogram.

Poor surgical outcome

If any one of the following is present

1. Persistence of symptoms
2. Postoperative sequelae like scarring of Eustachian tube and posterior end of nasal septum.
3. >50% adenoid.
4. Type B tympanogram.

Data obtained was analysed using paired t test for significance. Institutional research committee clearance was obtained prior to the study.

Results

Our study consisted 64 patients. In Group I,32 children underwent endoscopic assisted adenoidectomy and Group II, 32 children underwent conventional adenoidectomy.

Mouth breathing was the most common presenting complaint. Majority of the patients were in 7-10 year age group in both the study groups. Majority patients had Grade III adenoids in both the study groups. In Group I, 78.1% had Grade III adenoid enlargement whereas in Group II, it was 81.3%. In Group I, 14 cases (43.7%) had undergone adenoidectomy alone and 18 cases (56.3%) had undergone adenoidectomy with tonsillectomy. In Group II, 15 cases (46.9%) underwent adenoidectomy alone and 17 cases (53.1%) underwent adenotonsillectomy.

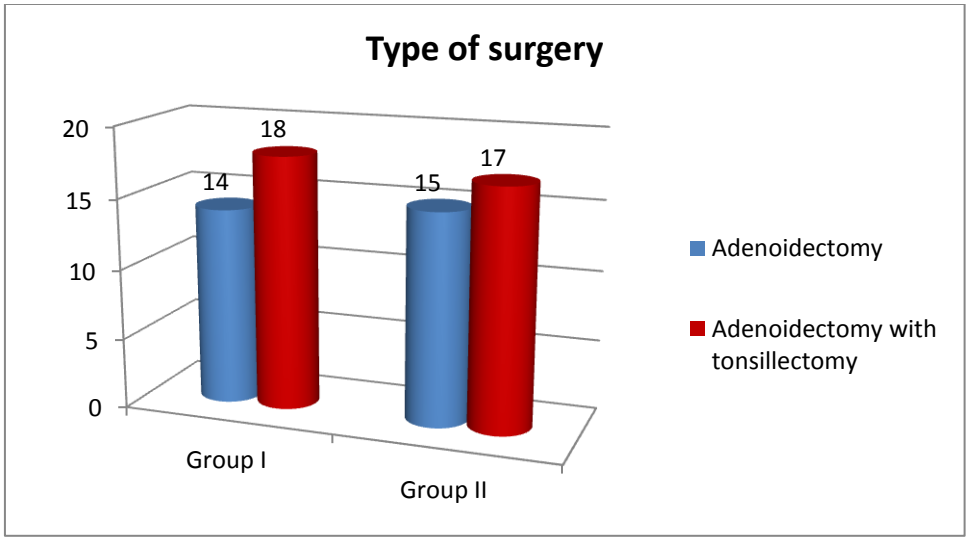

Fig 2: Type of surgery

Post operative pain score was assessed in cases undergoing adenoidectomy alone. It was found that 57.1% of patients in Group I had postoperative pain score in the range 3-4. None of the cases in Group I had postoperative pain score more than 7 on visual analog scale. Whereas in

Group II, 46.7% patients had postoperative pain score of 7-8. This was followed by pain score in the range 5-6(6.3%). This was statistically significant. Out of the 64 cases, 19 cases had remnant adenoid tissue between 25 - 50 %. Among them 17 cases underwent conventional adenoidectomy. 2 cases among conventional adenoidectomy had more than 50% remnant adenoid. It was found to be statistically significant. Postoperative sequelae like scarring of Eustachian tube orifice, posterior end of septum were not found in any of the cases in our study population.

- **Follow up endoscopy after endoscopic adenoidectomy at 12 weeks**

Fig 3(a)

Fig3(b)

Fig3(c)

Follow upendoscopy after conventional adenoidectomyat 12 weeks

Fig 4(a)

Fig4(b)

Fig 4(C)

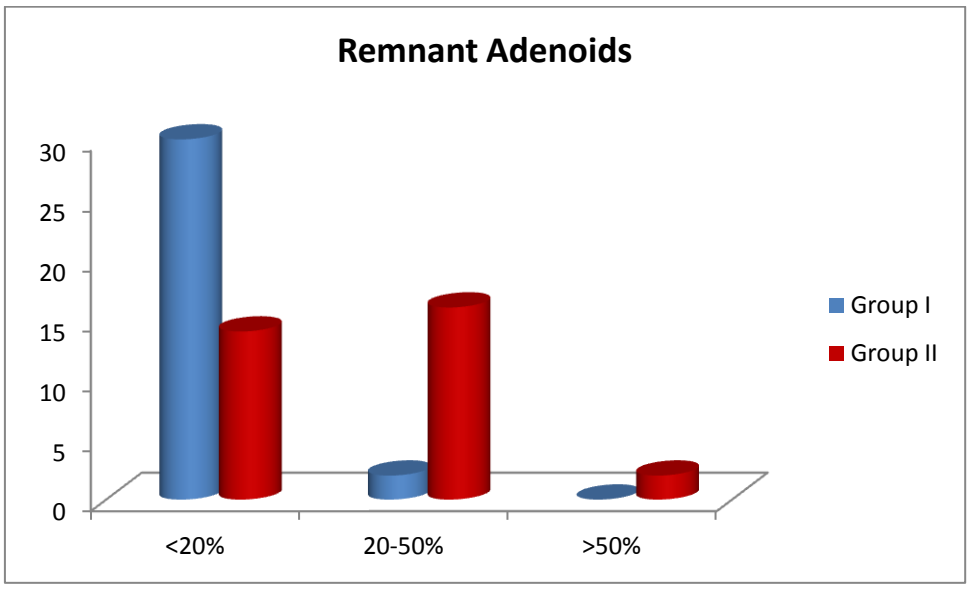

Fig 5: Remnant adenoids

Postoperatively at 12 weeks, tympanogram was repeated and in Group I, 29 patients (90.6%) had bilateral A curve. In Group II, 21 cases (65.6%) had bilateral A curve. In Group I none of the cases had bilateral C curve or B curve. Unilateral C curve was seen in 3 cases (9.4%). In Group II, 7 patients (21.9%) had bilateral C curves. None of the cases had type B tympanogram. 4 cases (12.5%) had unilateral C curves. The difference between two groups was statistically significant.

In Group I, 26 patients (81.3%) had a good surgical outcome. 5 cases had fair surgical outcome and one case had poor surgical outcome. Whereas in group II 56.2% cases had fair surgical outcome and only 10 cases (31.3%) had good surgical outcome. Four cases had poor surgical outcome.

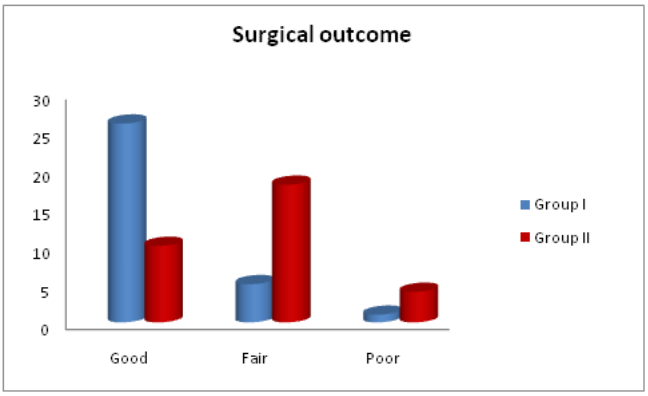

Fig 6: Surgical outcome

Discussion

Adenoidectomy remains one of the commonest procedures done by ENT surgeons. The main advantage of performing an adenoidectomy is that it decreases bacterial reservoir thereby preventing recurrent upper respiratory tract infection and airway obstruction. The role of adenotonsillectomy in children with sleep disordered breathing is established and is a common indication for surgery[6].

Our study attempts to compare the surgical outcome of conventional curettage method with that of endoscopic assisted method. The groups were evenly matched in age, type of surgery and indication. Majority of patients in both the study groups were between 7-10 years of age. This was comparable to a study conducted by Datta et al[5]

In our study the commonest presenting complaints were mouth breathing, snoring and nasal obstruction. This was comparable to a study conducted by Huang et al (1998) where patients' commonest complaints were nasal obstruction, mouth breathing and snoring[6]. Preoperative nasal endoscopy showed that Grade III adenoid enlargement was common in our study (71.8% in group I and 81.3% in group II) followed by Grade IV enlargement. This was also comparable to a study conducted by Sarin et al in 2016 where 65% patients in each group had Grade III adenoid enlargement. Visual analog scale was used to assess postoperative pain. Postoperative pain was assessed in children undergoing adenoidectomy alone. Cases where tonsillectomy was combined were excluded since tonsillectomy will inadvertently cause pain. In a study by Datta et al they found that post operative pain in endoscopic adenoidectomy group was less than that of conventional adenoidectomy but the difference was not statistically significant. But in our study we could find a statistically significant difference between pain score in patients who have undergone adenoidectomy alone. Pain was less in patients who had undergone endoscopic assisted adenoidectomy when compared to conventional adenoidectomy.

Mitchell V B, et al in 1997 in their study indicates average of 1.3 days of hospital stay for patients following conventional adenoidectomy and 1.16 days for endoscopic adenoidectomy[7]. In our study the average hospital stay was 2.03 days for conventional adenoidectomy and 1.94 days for endoscopic assisted adenoidectomy. The difference however was not statistically significant. In a study conducted by Sarin et al in 2016 on the audiological outcome of classical adenoidectomy versus endoscopically assisted adenoidectomy they found that there was reversal of type B and type C to type A curve in 55% of patients in conventional adenoidectomy group, while in endoscopic assisted adenoidectomy group

it was 90%[8]. In our study, on doing postoperative tympanometry 90.6% patients in endoscopic adenoidectomy group had bilateral type A curve while in conventional adenoidectomy group bilateral type A curve was seen in 43.7%. The results were comparable.

Conventional adenoidectomy with St. Clair Thompson adenoid curette is a blind procedure, which leads to residual tissue being found close to the nasal choana and adjacent torus tubarius. This has been confirmed by Havas and Koltai in their respective studies[9,10]. Our study also shows that there was residual tissue in the choana in children undergoing conventional adenoidectomy. In our study 16 cases in Group II had adenoid remnant between 25 and 50 %, 2 cases i.e.6.2% had more than 50% remnant adenoids. Whereas in Group I only 6.2% patients had remnant adenoid tissue. Hence remnant adenoid tissue was more in children undergoing conventional adenoidectomy. The results were comparable to a study conducted by Havas et al and Pagella et al. In a study conducted by Somani et al in 2009 on endoscopic adenoidectomy with microdebrider in 44 cases, they found out that the removal of adenoid was quick, precise, safe and also complete with direct visualization. This has further enhanced surgeon satisfaction[11].

Shin JJ (2003) studied 3 cases, where 10-15 minutes was taken for adenoidectomy portion of the procedure, including endoscopic equipment set up and photo documentation[12]. But in our study there is an increase in operating time taken for endoscopic adenoidectomy. The increase in time was due to the time taken for endoscopic equipment set up.

The advantages of endoscopic debrider assisted adenoidectomy include improved visualization of the surgical field, continuous suction of blood and thereby, enabling complete and precise removal of adenoid tissue from the choanal and tubaric regions. The high definition monitor display enables training residents and recording for documentation. There is also high degree of surgeon satisfaction due to improved plane of dissection. Availability of instruments is also a factor in choosing the method of surgery. Though endoscopes are becoming basic tools in the armamentarium of ENT surgeons, powered instruments like microdebriders are not common.

It should be acknowledged that endoscopic assisted powered adenoidectomy is a safe alternative to conventional adenoidectomy. The need for special equipment and cost of the procedure should be kept in mind. But there is complete removal of adenoid tissue with faster recovery, less postoperative pain, high rate of surgeon satisfaction and excellent surgical outcome.

Conclusion

The following conclusions were drawn from our study:

- Endoscopic assisted adenoidectomy is a safe and effective alternative to conventional curettage method. It ensures reliable restoration of nasopharyngeal patency, better achievement of haemostasis, less postoperative pain, faster.
- In addition to providing a magnified view the endoscope with camera aids in recording, teaching and training students and postgraduates.

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