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Comparing endoscopic microdebrider assisted adenoidectomy with curettage procedure

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ABSTRACT

Background: Adenoid is a mass of lymphatic tissue situated posterior to the nasal cavity, in the roof of the nasopharynx, forming a part of the Waldeyer's ring, was initially described in 1868 by Meyer. Adenoidectomy is one of the commonest operations done on children. It is done alone or along with tonsillectomy or with ventilation tube insertion for otitis media with effusion. Objective of the study was to compare the results of endoscopic microdebrider assisted adenoidectomy with that of conventional curettage adenoidectomy.
Methods: A prospective randomized study of 60 patients with clinical features of adenoid hypertrophy. These patients were randomly divided into two groups, 30 each using the table of random numbers. Group I, underwent endoscopic microdebrider assisted adenoidectomy and group II underwent adenoidectomy by curettage. All the patients were followed up for a period of 3 months. Parameters such as operating time, blood loss, intra-operative/post-operative complications and residual adenoid tissue were assessed.
Results: In this study mean age of patients in group I (EAA) was 9±0.50 years (range 6–15 years) and group II (CA) was 9.86 ± 2.31 years (range 6-15 years). The mean operating time was 20.79 minutes for the group I (range: 12 to 35 minutes) and 14.42 minutes for group II (range: 10 to 22 minutes, p=0.001). Blood loss was around 31.06 ml (range: 21 to 46 ml) in group I and 22.26 ml (range: 10 to 60 ml) in group II. Adenoidectomy by curette group showed more residual nasopharyngeal adenoid tissue (43.33%) than by endoscopic microdebrider assisted adenoidectomy (20%).
Conclusions: Endoscopic microdebrider assisted adenoidectomy is a safe and more effective compared to curettage method, with very minimal chances of injury to the surrounding structures during the procedure.

Keywords: Adenoidectomy, Endoscopic adenoidectomy, Microdebrider assisted adenoidectomy

INTRODUCTION

Nasopharyngeal tonsil becomes evident by six months to one year of life, increases rapidly in size during the first 6 to 8 years of life & generally atrophies by adolescence.[1]Adenotonsillectomy is one of the most frequent procedures done in otorhinolaryngology. In the past decades it was not unusual to therapeutically remove enlarged adenoids & tonsils. But, it is now recognized that lymphoid hyperplasia is not itself an indication for adenoidectomy. To determine the necessity for adenotonsillectomy the physician typically relies on physical examination & history. However physical examination provides little information about size of adenoid, although enlarged tonsils may be proved easily. Several radiological techniques have been proposed to favour the decision for adenoidectomy.

During the last 20 years, we have observed higher prevalence of sleep disordered breathing in children. Adenotonsillar enlargement leading to partial or complete obstruction of nasopharynx/oropharynx account for

majority of these cases. Consequently adenoidectomy performed in children has increased significantly. Adenoidectomy can be performed as an isolated procedure or along with tonsillectomy. Adenoidectomy is conventionally performed using the curettage method with an adenoid curette. This is blind procedure and is described since 1885.[2] Canon et al popularized endoscopic assisted adenoidectomy (EAA) calling it natural progression of endoscopic technology to allow a more complete adenoidectomy.[3]

The classical surgical technique with adenoid curette has now evolved into a safer and more controlled removal of adenoids by introduction of endoscope and microdebrider.

In this study we assessed the effectiveness of Endoscopic microdebrider assisted Adenoidectomy compared to Conventional adenoidectomy using curette.

METHODS

This study was conducted on 60 patients who were enrolled from patients visiting Sri Venkateshwara ENT institute, Department of Otolaryngology, Bangalore Medical College and Research Institute India, from November 2015 to May 2017. Patients satisfying the following criteria were included in the study

Patients with symptomatic adenoid hypertrophy who were willing to give consent were included, and patients with following conditions like cleft palate, sub mucous cleft, significant septal deviations, revision cases and those with history of co- morbidities like neuromuscular disorders, diabetes mellitus, and renal disease were excluded from the study.

A total of 60 patients diagnosed with adenoid hypertrophy were divided into two groups of 30 participants in each using a table of random numbers. Group I underwent endoscopic microdebrider assisted adenoidectomy and Group II, adenoidectomy by curettage method.

The data collected was analysed. All patients were assessed endoscopically and graded according to Clemens and McMurray Scale.

Table 1: Clemens and McMurray scale for adenoid hypertrophy grading.

Gradings	Feature
Grade I	Adenoid tissue filling 1:3 of the choana
Grade II	Up to 2:3
Grade III	2:3 to nearly all but not complete
Grade IV	Complete choanal obstruction

Endoscopic microdbrider assisted adenoidectomy

Patients were given general anaesthesia with orotracheal intubation. The theatre set up and positioning was as for a standard functional endoscopic sinus surgery. The nasal cavities were decongested by using pledgets soaked in 4% lignocaine with 1:100,000 adrenaline. The posterior choanae and nasopharynx was assessed with a 0° and 2.7 mm rigid telescope (4 mm for older children). Sinuscope and debrider were passed through the same nostril or, the sinuscope through one nostril and debrider through the other. Micro-debrider was used in oscillating mode with saline irrigation to shave off the adenoid tissue using adenoidectomy blades. The procedure was visualized using 2.7 mm and 4 mm nasal endoscopes. When it was not possible to introduce the scope from opposite side, an angled 45 or 70 degree scope was introduced through the oral cavity after applying self retaining mouth gag and working ends of the instruments were visualised. Visualization was improved by frequent irrigation and suctioning. Post nasal pressure pack kept to achieve haemostasis and was removed after 5-6 min.

Intra operative parameters recorded were adenoid size, operating time, blood loss, completeness and depth of removal and complications.

Operating time in minutes and seconds was recorded using a stop watch, 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 achieving haemostasis. The measurement ended when the patient was handed back to the anaesthetist.

During adenoidectomy, in-line irrigation system of the microdebrider was used. So the exact amount of irrigating fluid from saline bottle was noted. At end of procedure the material collected from suction canister was filtered to remove tissue and the remaining fluid comprising of blood and sucked irrigating fluid measured. The blood loss in milliliters was calculated as the difference between this amount and the earlier amount of saline used for irrigation. The blood soiling the nasopharyngeal pack after surgery was measured and blood loss was noted by the difference in the weight of the pack before and after the surgery.

The completeness of the adenoid resection was recorded as fair, good or excellent.

Excellent: When adenoid tissue was completely resected superiorly up to roof of nasopharynx, poster laterally till the eustachian tube orifices and anteriorly from the choanae.

Good: When only a few adenoid tags were left behind inadvertently and

Fair: When substantial adenoid remnants were found post operatively.

Intra operative complications such as injury to surrounding structures were assessed in the theatre itself.

Residual adenoid tissue in the nasopharynx after adenoidectomy was divided into two grades for the purpose of comparision.[4]

a) Grade I (minimal): Residual adenoid tissue was found above the level of Eustachian tube.
b) Grade II: Residual adenoid tissue was found between the superior border of Eustachian tube and a line extrapolated posteriorly from the nasal floor. This grade was further divided into
   i) Grade IIa (moderate): Residual adenoid tissue obstructing the Eustachian tube lumen but not blocking choana.
   ii) Grade IIb (severe): Residual adenoid tissue obstructing the Eustachian tube lumen and choana.

Data analysis

Results were analyzed using SPSS version 20. P<0.05 was considered statistically significant.

RESULTS

Total of 60 patients participated in our study, aging between 6 years to 15 years Mean age of patients in group I (EAA) was 9±0.50 years (range 6–15 years) and group II (CA) was 9.86±2.31 years (range 6-15 years). There was male preponderance in both groups, group 1 (53.3%) and group II (53.33%).

Table 2: Shows distribution of symptoms among the groups.

No	Symptoms	Group I		Group II		Total No (%)
		No of patients (n)	Percentage (%)	No of patients (n)	Percentage (%)	
1	C/o Mouth breathing	22	73.3	26	86.7	48 (80.0)
2	H/O Nasal obstruction	20	66.7	24	80.0	44 (73.3)
3	H/o Snoring	14	46.7	19	63.3	33 (55.0)
4	H/o Nasal discharge	14	46.7	15	50.0	29 (48.3)
5	H/o Sleep disturbance	15	50.0	15	50.0	30 (50.0)
6	H/o Recurrent throat pain	16	53.33	12	40.0	28 (46.66)

Table 3: Grading of adenoid hypertrophy by nasal endoscopy (Clemens &McMurray grading).

Grade	Group I		Group II	
	No of patients	Percentage (%)	No of patients	Percentage (%)
I	1	3.33	2	6.66
II	6	20	7	23.33
III	10	33.33	11	36.66
IV	13	43.33	10	33.33
Total	30	100	30	100

Table 4: Shows operating time and blood loss.

Variants	Groups	No	Mean	Std. Deviation	Std. Error mean	P value	Significance
Operating time	Group I	30	20.7977	5.92806	1.08231	0.001	Significant
	Group II	30	14.4233	3.04435	0.55582		
Blood loss	Group I	30	31.0667	6.01683	1.09852	0.002	Significant
	Group II	30	22.2667	9.82233	1.79330		

Table 5: Visual analogue score in both groups.

Variant	Groups	No	Mean	Std. Deviation	P value	Significance
VAS	Group I	8	4.75	1.03	0.40	Not Significant
	Group II	11	5.27	1.48		

Nasal obstruction and mouth breathing was found in majority of the patients. Most patients have more than one complaint.

Sleep disordered breathing was common indication in both groups. Other indications were snoring, recurrent adenotonsillitis and rhinosinusitis.

Subjective assessment was done for pain in patients who underwent adenoidectomy alone using visual analogue scale (VAS). Adenotonsillectomy patients were excluded as tonsillectomy would cause pain post-operatively which might not be differentiated from post adenoidectomy pain. VAS was ranging from 0 (no pain at all) to 10 (severe pain).

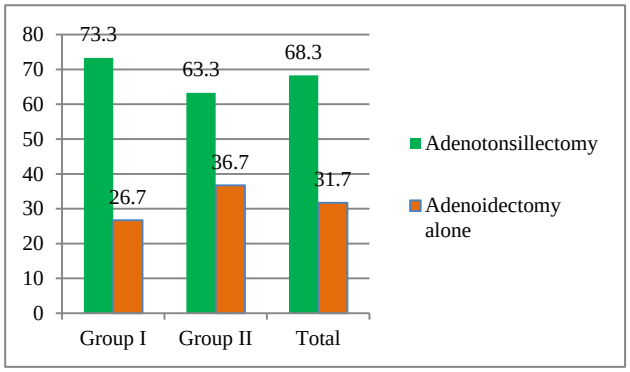

Figure 1: Shows operative procedure in both groups.

Velopharyngeal dysfunction causing hyper nasal speech without nasal regurgitation developed in 4 cases (13.33%) of Group I and 6 cases (20%) of Group II, which was temporary, and resolved spontaneously within a week. Symptoms resolved in all patients of Group I whereas three patients in Group II (10%) continued to have symptoms at 3rd month visit.

Nasopharyngeal endoscopic examination done during the follow-up showed; residual adenoid tissue in the nasopharynx 13 in Group II, and 6 in Group I. None of the Group I patients had severe grading of residual adenoid tissue, which was statistically significant ($p<0.05$). One case in group II showed minimal scarring over the tubal elevation at 3 months postoperative evaluation but patency of eustachian tube was not affected.

DISCUSSION

Adenoidectomy is one of the commonest procedures performed by otorhinolaryngologists worldwide.[5] In the present series, sleep disordered breathing formed the predominant indication in both groups which is similar to previous studies.[6] Thus depicting the increasing trend to diagnose and surgically treat this condition.

Earlier adenoidectomy was done with the help of adenoid curette. This method is a blind procedure and has its own demerits; the most important being bleeding (0.5–8% incidence).[7] It may damage the torus tubaris, mucosa and Eustachian tube orifices.[8] To prevent these complications, the newer surgical techniques evolved with advancement in endoscope. The use of rigid endoscope or sinuscope allows good visualization ensuring complete removal of adenoid tissue without damaging surrounding structures. When used transnasally there is no need to extend the neck especially in patients with instability of cervical spine.[9] The technique of endoscopic adenoidectomy has been described using rigid telescope for visualization and forceps for removal of adenoids.[10] Adenoidectomy with curette using a transnasal endoscopic approach has been described.[9,11] Others have used a mirror for visualization in the place of endoscope.[12]

Suction diathermy ablation of adenoid has been a popular alternative, reported to be safe with minimal blood loss. However, it is slow and has the risk of cicatrisation and causing thermal damage of surrounding tissue.[10,13] CO2 laser also have these disadvantages.[10] Nasopharyngeal stenosis has been reported following adenoidectomy using a KTP laser.[3] Other methods described are radiofrequency adenoidectomy, Coblator and use of electronic molecular resonance tool.[14,7] Power assisted adenoidectomy using a microdebrider is also recently described procedure. In this study we have compared the efficacy of endoscopic microdebrider assisted adenoidectomy with adenoidectomy using curette.

Table 6: Mean blood loss and operating time in other studies.

Study by	Year	Operating time		Blodd loss	
		CA (minutes)	EAA (minutes)	CA	EAA
Datta et al[15]	2009	29.30	39.30	21 ml	31.67 ml
Renuka et al[16]	2011	9	14	33 ml	38 ml
Prakash et al[17]	2013	9.06	14.44	20.9 ml	32.3 ml
Pandian et al[18]	2014	8	15	42 ml	50 ml

Though the precise steps of adenoidectomy would only take 4-5 minutes, we felt that a true assessment of the operating time should include all steps including preparing and setting up of instruments, packing and achieving haemostasis. As a result, the time taken in the present series may seem longer than other studies. In our study the mean operating time was 20.79 minutes in endoscopic microdebrider assisted adenoidectomy group

while in adenoidectomy using curette it was 14.2 minutes. Intra-operative blood loss was higher in Group I patients (31.07 ml) compared to adenoidectomy using curette (22.27 ml). Though statistically significant, the difference is small (11 ml). As the endoscopic surgery is a bit by bit approach, the raw bleeding surface is exposed for a longer time. An increased operating time would also lead to increased bleeding per se.

The increase in time in group I, though statistically significant, is a small difference and may not be an independent factor in influencing the decision to operate using endoscopes. However, we feel the extra time taken when we use endoscope is justified because of its safety and controlled excision of adenoids.

It has often been noted by authors that the extent of resection following conventional adenoidectomy has been incomplete.[9] This may lead to recurrence of the condition for which the surgery has been done or no improvement in clinical condition. It was therefore felt that an endoscopic assessment is necessary to determine the extent of residual tissue. The Group I results showed that resection was invariably complete in contrast to Group II wherein 4 (13.33%) cases had more than 50% residual adenoid tissue and nine cases (30%) between 20-50% of residual adenoid tissue. This is comparable to 39% cases reported as residual obstructive adenoids by Havas et al.[9] In endoscopic microdebrider assisted adenoidectomies, the nasopharynx can be seen properly and remnant bits of adenoid tissue removed accurately under vision. This makes endoscopic microdebrider assisted adenoidectomy more complete.

The overall complication rate in Group I was 13.33% whereas in Group II was 30.0%. There were no major complications in EAA group. Even though complications are rare, they can occur with conventional curettage method, and when they occur, are difficult to treat. The use of rigid nasal endoscope has its advantages. It allows good visualization ensuring complete removal of adenoid tissue situated even high up in nasopharynx and intranasally without damaging surrounding structures. The camera attachment allows for better magnified view on the monitor, facilitating recording as well as trainee teaching.

Recently microdebriders are in common use. This new technique seems to be safe and effective. Use of microdebriders has a few disadvantages. It requires the use of expensive equipment including the cost of blades which require replacement. Also, this technique requires a good amount of time spent on training to achieve proficiency.

CONCLUSION

Endoscopic microebrider assisted adenoidectomy is a safe and effective alternative to curette adenoidectomy.It is more complete and accurate with very minimal chances of injury to the surrounding structures during the procedure. The endoscopic method is useful method for choanal adenoid extending into the nasal cavity, recurrent cases. It needs special equipment and experience and more operating time.

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