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Original Research Article

Comparison between endoscope assisted powered and conventional adenoidectomy

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ABSTRACT

Background: Adenoidectomy is one of the commonest operations done on children. It is conventionally performed using the curettage method. This present study was done to compare the results of endoscopic powered adenoidectomy and conventional adenoidectomy.
Methods: The present prospective randomized study was conducted among 50 patients between 4-16 years of age requiring adenoidectomy with or without tonsillectomy in department of ENT in Government Medical College and Rajindra Hospital, Patiala. All the 50 patients were divided into two groups (group A and group B) by systematic random sampling. Group A consisted of 25 patients who underwent conventional curettage adenoidectomy and group B consisted of 25 patients who underwent Microdebrider-Assisted Adenoidectomy.
Results: In group A and B, mean±SD intraoperative blood loss (in ml) was 20.60±7.96 and 30.60±7.96 respectively. Mean±SD operative time (in minutes) was 28.60±4.71 in group A, while in group B it was 39.60±4.71 with statistically significant difference. Complete adenoid removal was found in 52% of the subjects in group A while it was found in 96% of the subjects in group B with statistically significant difference. In group A, mean±SD recovery time (in hrs) observed was 33.52±10.58 while in group B, recovery time (in hours) observed was 36.22±11.31.
Conclusions: Based on the results of this study, it can be concluded that the new method of microdebrider assisted powered adenoidectomy was found to be safer and more useful tool for adenoidectomy than conventional method.

Keywords: Adenoiditis, Adenoid hypertrophy, Adenoidectomy, Endoscope, Microdebrider-assisted adenoidectomy

INTRODUCTION

Adenoidectomy is the surgical procedure which requires removal of hypertrophied lymphatic tissue (Lushka's pharyngeal tonsil) which blocks the nasopharynx. Adenoid is a nidus of contaminated tissue that may secondarily act as a source of infection for the middle ear. Hence adenoidectomy removes the anatomic obstruction of eustachian tube.[1] Obstructive sleep apnea, nasal obstruction, persistent otitis media, adenoidal hypertrophy, and chronic adenoiditis are common indicators for adenoidectomy. Surgery often is performed between the ages of 2 to 5 years old.[2]

There are various surgical approaches for the removal of the adenoids, but we are discussing two of them i.e. Conventional adenoidectomy and Microdebrider-Assisted Adenoidectomy (Endoscopic assisted adenoidectomy). Conventional curettage adenoidectomy is a widely used technique in ENT practice, which was first described in 1885.[3] However, the conventional curettage adenoidectomy for removing adenoids is a relatively

'blind' technique which can cause injury to nasopharynx and incomplete adenoid removal.[4]

Microdebrider assisted adenoidectomy is a recent method that decreases the risk of adenoid recurrence. It is also considered an effective procedure for revision surgery as it provides complete removal of adenoid tissue. Endoscope also reduces the risk of collateral injury to the neighbouring nasopharyngeal structures and pharyngeal muscles.[5-7] Hence the present study was planned to compare the outcome of Microdebrider-Assisted Adenoidectomy and conventional adenoidectomy to know which about a better technique.

METHODS

The present prospective randomized study was conducted in department of ENT in Government Medical College and Rajindra Hospital, Patiala from December 2017 to November 2019 to compare the outcome of Microdebrider - Assisted Adenoidectomy and Conventional Adenoidectomy. The study was done on 50 patients between 4-16 years of age requiring adenoidectomy with or without tonsillectomy. The study protocol for all procedures was approved by the Institutional Review Board for Ethical Clearance of Govt. Medical College and Rajindra Hospital and it was performed in accordance with the Code of Ethics of the World Medical Association according to the Declaration of Helsinki of 1975, as revised in 2000. Written consent was obtained and patients were selected according to the following inclusion and exclusion criteria.

Inclusion criteria

Age between 4 to 16 years, subjects having grade 3 and grade 4 adenoid hypertrophy, symptoms consistent with adenoidal hypertrophy lasting more than 3 months, no previous adenoidectomy were included in the study.

Exclusion criteria

Subjects having age >16 years, metabolic diseases, nasal polyps, bleeding disorders, genetic syndromes with craniofacial abnormalities, upper respiratory tract infections, history of previous surgery for adenoidectomy and cleft palate were not included in this study.

All the 50 patients were divided into two groups (group A and group B) by systematic random sampling. Group A consisted of 25 patients who underwent conventional curettage adenoidectomy and group B consisted of 25 patients who underwent Microdebrider-Assisted Adenoidectomy.

Diagnostic nasal endoscopy was done preoperatively for grading the adenoid size. The grading was according to the scale given by Clemens andMcMurray.[8]

Statistical analysis

Data collected was tabulated in an excel sheet. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Difference between two groups was determined using student t-test as well as chi square test and the level of significance was set at $p < 0.05$.

RESULTS

In group A, males and females comprised of 64% and 36% of the study population respectively. 60% and 40% of the population in group B were males and females respectively (Figure 1). In group A, mean±SD age was 9.80±2.90 years with minimum and maximum age of 5 and 15 years respectively. In group B, mean±SD age was 9.72±2.95 years with minimum and maximum age of 5 and 15 years respectively.

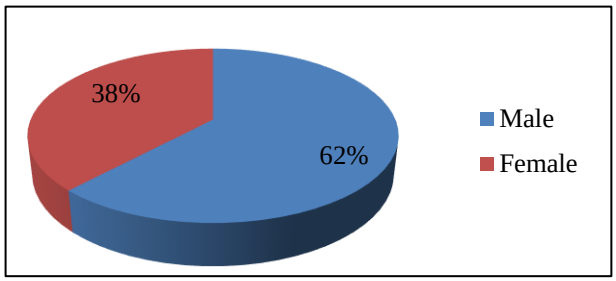

Figure 1: Gender distribution among the study groups.

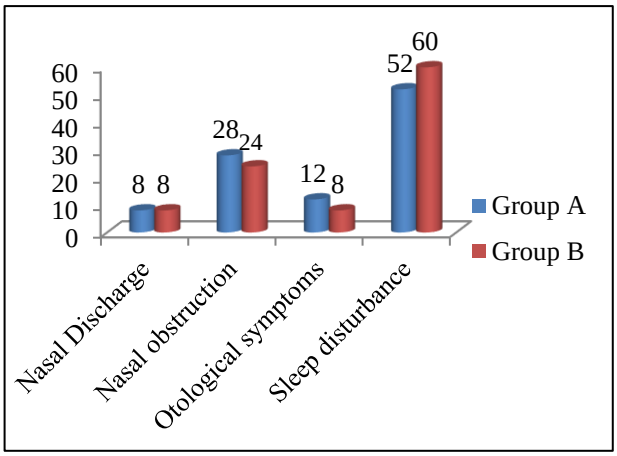

Figure 2: Symptoms among the study groups.

Sleep disturbance was the most common symptom in both group A (52%) and B (60%) followed by nasal obstruction (28% in group A, 24% in group B) (Figure 2). In group A, mean±SD intraoperative blood loss (in ml) was 20.60±7.96 with minimum and maximum intraoperative blood loss (in ml) of 10 and 41 respectively. In group B, mean±SD intraoperative blood loss (in ml) was 30.60±7.96 with minimum and

maximum of 20 and 51ml respectively (Table 1). When mean intraoperative blood loss (in ml) was compared among group A and B, it was found to be statistically significant (p<0.01).

Table 1: Comparison of intraoperative blood loss (in ml) among the groups.

Intraoperative blood loss	Group A (conventional curettage adenoidectomy)	Group B (microdebrider-assisted adenoidectomy)
Minimum	10	20
Maximum	41	51
Mean	20.60	30.60
SD	7.96	7.96
t test	14.31	
p value	<0.01*	

*statistically significant

In group A, mean±SD operative time (in minutes)was 28.60±4.71 with minimum and maximum of 22 and 38 respectively as compared to group B, in which mean±SD operative time (in minutes)was 39.60±4.7 with minimum and maximum of 33 and 49 respectively (Table 2). The difference in operative time between the two groups was found to be highly significant (p<0.01).

Table 2: Comparison of operative time (in minutes) among the groups.

Operative Time	Group A (Conventional Curettage Adenoidectomy)	Group B (Microdebrider-Assisted Adenoidectomy)
Minimum	22	33
Maximum	38	49
Mean	28.60	39.60
SD	4.71	4.71
t test	18.68	
p value	<0.01*	

*statistically significant

Table 3: Comparison of postoperative pain among the groups.

Postoperative pain	Group A (Conventional Curettage Adenoidectomy)	Group B (Microdebrider-Assisted Adenoidectomy)
Minimum	3	2
Maximum	8	8
Mean	4.80	3.80
SD	1.53	1.50
t test	6.89	
p value	0.03*	

*statistically significant

For both groups, post-operative pain score was assessed using visual analog scale. In group A, mean±SD post-operative pain was 4.80±1.53 with minimum and maximum of 3 and 8 respectively. In group B, mean±SD post-operative pain was 3.80±1.50with minimum and maximum of 2 and 8 respectively (Table 3). Statistically significant difference was observed in the two groups (p value 0.03). Complete adenoid removal was found in 52% of the subjects in group A whereas it was 96% in group B which was statistically significant (p value 0.04).

Table 4: Comparison of completeness of removal among the study groups (n=25).

Completeness of removal	Group A (Conventional Curettage Adenoidectomy)		Group B (Microdebrider-Assisted Adenoidectomy)	
	N	**%**	**N**	**%**
Yes	13	52	24	96
Grade 2	7	28	1	4
Grade 3	5	20	0	0
Chi Square	5.94			
p value	0.04*			

*statistically significant

Table 5: Comparison of post-operative complications among the study groups (n=25).

Complications	Group A (conventional curettage adenoidectomy)		Group B (microdebrider-assisted adenoidectomy)	
	N	**%**	**N**	**%**
Injury to ET (Eustachian Tube)	3	12	0	0
Injury to Torus Tubaris	4	16	1	4
Nasal /mucosal Injury	1	4	2	8
No	17	68	22	88
Chi square	8.32			
P value	0.02*			

Table 6: Comparison of recovery time between the two groups.

Recovery Time (in hrs)	Group A (Conventional Curettage Adenoidectomy)	Group B (Microdebrider-Assisted Adenoidectomy)
Mean	33.52	36.22
SD	10.58	11.31
t test	2.21	
p value	0.12	

Post-operative complications such as injury to ET (Eustachian Tube), injury to Torus Tubaris and nasal

/mucosal injury were reported in 12%, 16%, 4%respectively in group A whereas in group B it was 0%, 4%, 8% respectively which was statistically significant (p value 0.02). In group A, mean±SD recovery time (in hours) observed was 33.52±10.58 whereas in group B, recovery Time (in hours) observed was 36.22±11.31 (Table 6). This difference was found to be statistically insignificant (p value 0.12).

DISCUSSION

Adenoidectomy is one of the most commonly performed procedures in children. Various surgical modalities have been employed for adenoidectomy. Each has its own advantages and disadvantages. Suction diathermy ablation of adenoid has been a popular alternative. It is reported to be safe with minimal blood loss.[9,10] However it may not address choanal adenoid tissue, is slow and has the risk of cicatrisation and burns the surrounding tissue. Similar problems are observed with CO_2 laser.[11] Nasopharyngeal stenosis has been reported following adenoidectomy using a KTP laser.[12] However, conventional adenoidectomy with currete and microdebrider assisted adenoidectomy are still the most commonly performed procedures.

Although many studies have compared endoscopic assisted adenoidectomy with conventional curettage adenoidectomy, but still there is lack of consensus in literature regarding the superiority of each technique over the other. Hence, this study was conducted to compare the outcome of Microdebrider-Assisted Adenoidectomy and Conventional Adenoidectomy for complete removal of adenoids and their postoperative complications.

The present study showed male dominance. Similar male dominance was reported by Somani et al in their study. They reported 27 males (61.36%) and 17 females (38.64%) in their study. Singh et al in their study showed that 73% and 83% subjects were males in conventional and endoscopic technique respectively.[13,14]

In group A, sleep disturbance was the most common symptom (52%) and in group B too (60%) followed by nasal obstruction (28% in group A, 24% in group B). This might be due to fact that large adenoids may completely block the nasal passages and make breathing through the nose difficult. Similar results were reported by Ravishakar et al in their study.[15] They found that sleep disordered breathing was common symptom in both groups. Other indications were snoring, recurrent adenotonsillitis and rhinosinusitis. Datta et al also found that sleep disordered breathing was the predominant indication for which adenoidectomy was done.[16]

Our study showed that mean intraoperative blood loss was more in group B (30.60±7.96) as compared to group A (20.60±7.96), as the endoscopic surgery is a bit-by-bit approach, the raw bleeding surface is exposed for a longer time (Table 3). An increased operating time would also lead to increased bleeding per se. Similar results were reported by Ravishakar et al in their study.[15] They showed that adenoidectomy using microdebrider had higher intra-operative blood loss (31.07 ml) compared to adenoidectomy using curette (22.27 ml). Though statistically significant, the difference is small (11 ml). Similar results were reported by Singh et al (56.6ml in group A and 149.3 in group B) in their study.[14] Datta et al showed similar results.[16] They found that the average blood loss in Group A was 21 ml (range 10 –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 ($p<0.05$). One retrospective review of complete adenoidectomy using microdebrider versus curettes showed that power assisted adenoidectomy had comparatively less blood loss (22 ml vs. 32 ml).[17]

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 the present study, group A, mean±SD operative time (in minutes) was 28.60±4.71 with minimum and maximum of 22 and 38 respectively. In group B, mean±SD operative time (in minutes) was 39.60±4.71with minimum and maximum of 33 and 49 respectively (Table 2). 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.

Similar results were reported by Ravishakar et al in their study. In their 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.[15] Datta et al showed similar results.[16] The time taken in Group A subjects varied from 22 to 39minutes 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).

Our study showed that in group A, mean ±SD post-operative pain was 4.80±1.53 with minimum and maximum of 3 and 8 respectively (Table 3). In group B, mean ±SD post-operative pain was 3.80±1.50 with minimum and maximum of 2 and 8 respectively. Significant difference was found in relation to post-operative pain which was higher in group A as compared to group B most likely due to injury to adjacent structures. Similar results were reported by Singh et al in their study.[14] Datta et al too showed similar results. Post operatively, the patient was assessed for post-operative pain where isolated adenoidectomy was done.[16]

Our study found that complete adenoid removal was found in 52% of the subjects in group A while it was found in 96% of the subjects in group B with statistically significant difference (Table 4). Similar results were reported by Stanislaw et al who found that the tissue dissection was more complete and to the appropriate depth with microdebrider, as opposed to being too shallow or too deep with a curette.[18] The surgeon satisfaction was also greater. A prospective study done by Havas et al involving endoscopic evaluation of cases operated by curette and microdebrider has shown that, following traditional curette adenoidectomy 39% of patients had residual obstructive tissue which was completely cleared by powered shaver adenoidectomy later.[11] Similar results were reported by Singh et al (53% and 5% remnants in group A and B respectively) and Datta et al (53% and 4% remnants in group A and B respectively) in their study.[12,14]

Our study found that in post-operative complications, injury to ET (Eustachian Tube), injury to Torus Tubaris and nasal /mucosal injury was reported in 12%, 16%, 4% of the subjects in group A while the same was reported in 0%, 4%, 8% of the subjects in group B respectively (Table 5). The overall complication rate in Group I (endoscopic microdebrider assisted adenoidectomy)was 13.33% whereas in Group II (adenoidectomy by curettage)was 30.0% as the use of nasal endoscope allows good visualization ensuring complete removal of adenoid tissue situated even high up in nasopharynx and intranasally without damaging surrounding structures. Datta et al too showed similar results.[16]

In group A, mean±SD recovery time (in hours) required was 33.52±10.58 while in group B, recovery Time (in hours) required was 36.22±11.31 (Table 6). Similar results were reported by Singh et al in their study.[14] Datta et al also showed recovery period of 3.5 days and 2.93 days in conventional and endoscopic powered adenoidectomy respectively.[16]

By performing an endoscopic power assisted adenoidectomy, we harvest the advantages of both the endoscope as well as the microdebrider. Use of microdebrider has a few disadvantages. It requires the use of expensive equipment including the cost of blades. Another shortcoming is that the resected tissue is not available for histopathological examination. Moreover, we found that this technique requires a good training to achieve proficiency.

CONCLUSION

Based on the results of this study, it can be concluded that the new method of microdebrider assisted powered adenoidectomy was found to be a safe and useful tool for adenoidectomy. Even though our intraoperative blood loss came out to be slightly high which was due to exposure of raw surface for longer time but microdebrider assisted powered adenoidectomy is very efficient in complete removal of adenoid tissue, thus preventing damage to adjacent surface with less post-operative pain and faster recovery. The present study has some limitations like small sample size and the comparatively higher cost involved in using expensive equipment like microdebrider.

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