Original Article

A Comparative Study on Conventional Adenoidectomy and Endoscopic Powered Adenoidectomy

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Abstract

Introduction: Adenoids are a type of nasopharyngeal lymphoid tissue that is a component of Waldeyer's ring. They are typically present from birth, reach their maximum size between the ages of 7 and 10 years, and then gradually decrease in size to become atrophied in adulthood. The objective of the current study is to compare conventional adenoidectomy using curette with power-assisted adenoidectomy. **Materials and Methods:** This randomized clinical trial was conducted at Teerthanker Mahaveer Medical College and Research Center from March 2023 to August 2023. A total of 40 patients were planned for adenoidectomy and randomly allocated under two groups. The conventional curettage adenoidectomy method was done on patients in Group A and patients in Group B who underwent power-assisted adenoidectomy using microdebrider. Both the groups were further compared in terms of surgical clearance of adenoids, operative time taken in procedure, injury to surrounding structures, and symptom score improvement on follow-up. **Results:** Surgical clearance was excellent in Group B with no adenoid tags left in all 20 (100%) patients, whereas few tags were left in 18 (90%) patients in Group A ($P < 0.0001$). The mean operative time (in minutes) for Group A was 22.4 ± 1.67, whereas Group B was 18.1 ± 1.76 ($P = 0.001$). Postoperative pain score in Group A was 3.7 ± 1.63, whereas for Group B was 2.8 ± 1.01 ($P < 0.043$). Recovery time in terms of number of days to return to normal diet and activities in Group A was 3.1 ± 0.3 days, whereas Group B was less 2.1 ± 0.2 days ($P < 001$). Postoperative nasal symptom score at 6 weeks in Group A was 1 in 1 patient and 2 in 4 patients with mean of 0.45 ± 83, whereas in Group B was 0 ($P = 0.043$). **Conclusion:** It was concluded from the study that power-assisted adenoidectomy was a better surgical procedure than conventional adenoidectomy. There was better improvement in nasal symptom score and surgical clearance by power-assisted adenoidectomy. Postoperative pain score and time taken for recovery after surgery were also less in power-assisted adenoidectomy.

Keywords: Adenoidectomy, microdebrider, nasal symptom score, surgical clearance

Introduction

Adenoid is a nasopharyngeal lymphoid tissue that is a part of Waldeyer's ring and was initially described in 1868 by Meyer.[1] Adenoid is present at birth, is at its largest size in 7–10 years of age, and thereafter gradually decreases in size to become rudimentary in adulthood.[2]

Adenoid hypertrophy can cause various symptoms such as nasal obstruction, mouth breathing, nasal discharge, snoring, sleep apnea, hyponasal speech, growth disturbance (orofacial), serous otitis media, recurrent otitis media, and rhinosinusitis. Patients presenting with these complaints are often indicators for adenoidectomy.[3]

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Adenoidectomy alone or along with tonsillectomy and/or grommet tube insertion is one of the most common surgical procedures performed in children. Most commonly, adenoidectomy is performed by the Curettage method which was described first in 1885.[1] This is the standard procedure of adenoidectomy. The main disadvantages of the traditional technique are less accurate removal because of lack of surgical field visualization, thereby likely less effective treatment, increased bleeding chances, risk of neck pain, and velopharyngeal insufficiency.[4] This method

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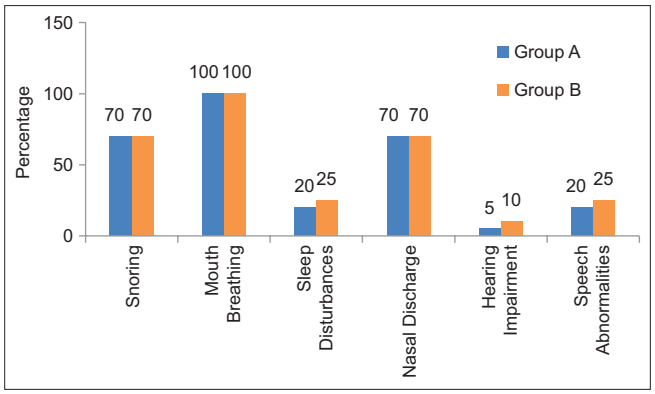
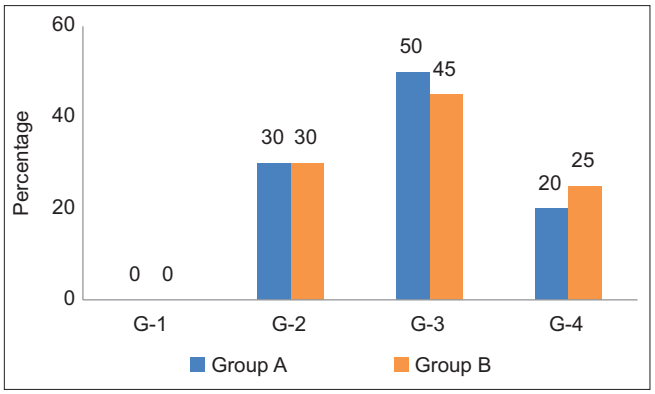
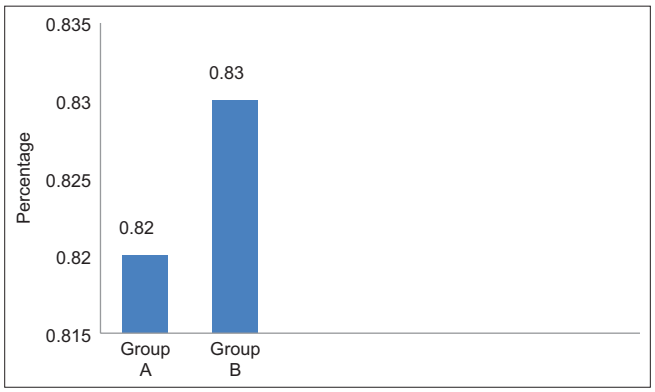


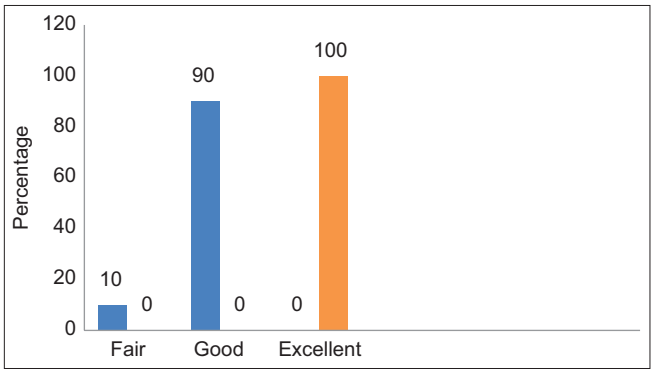
Graph 1: Various symptoms among two groups



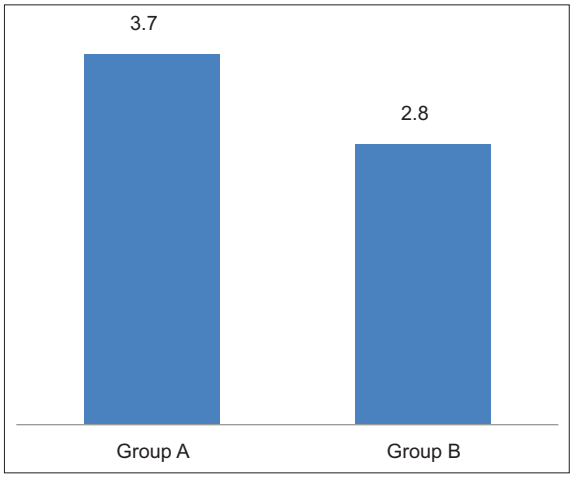
Graph 2: Preoperative on table grading of adenoid hyperplasia as per Clemens and McMurray scale among two groups



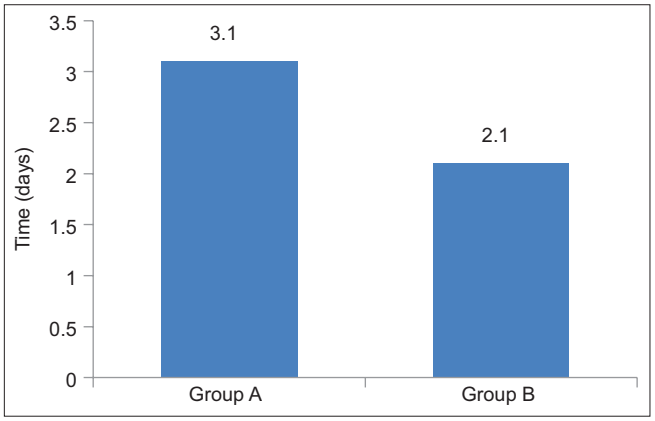
Graph 3: Preoperative adenoid/nasopharynx ratio on X-ray nasopharynx lateral view among two groups



Graph 4: Comparison based on surgical clearance among the two groups



Graph 5: Comparison based on postoperative pain score among two group

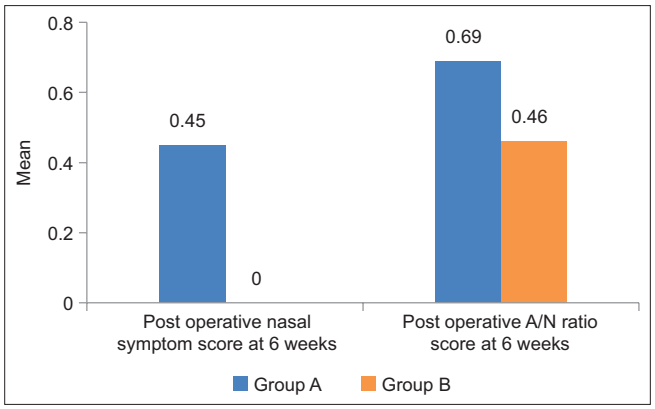


Graph 6: Duration to return to normal diet and activities in the two groups

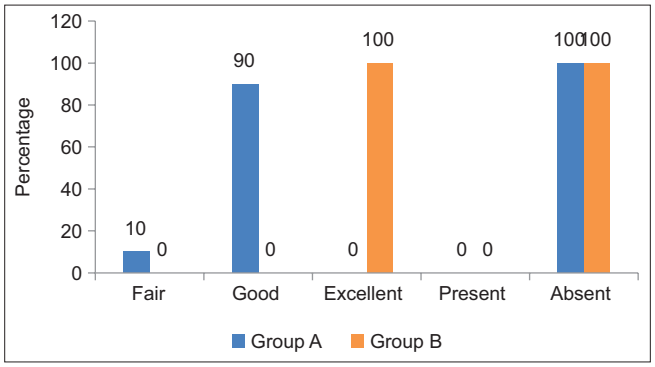
showed the efficacy of complete tissue removal in only 30% of cases.[5] Dissatisfaction with conventional technique has led to the development of more advanced techniques, such as endoscope-guided power shaver adenoidectomy.[1]

Power-assisted adenoidectomy offers several advantages over conventional adenoidectomy. These are well recognized and include the realization of surgery by the direct view and recording of the procedure on a video tape, removal of adenoid tissue to adequate depth, not causing any trauma to surrounding structures, and better and direct control of bleeding. Furthermore, the main advantage of microdebrider adenoidectomy is its precision. However, the use of microdebrider has few disadvantages. First, prolong the surgical duration. Second, high cost of required equipment including the cost of blades that need regular replacement.[6,7]

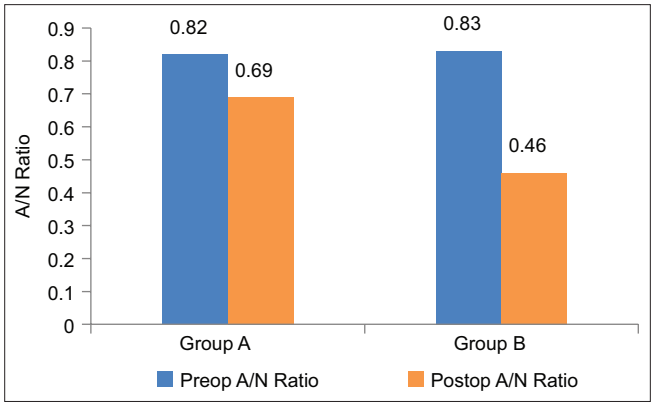
The present study has been conducted to compare conventional adenoidectomy with endoscopic power-assisted adenoidectomy



Graph 7: Comparison of different parameters by two methods of adenoidectomy



Graph 8: Comparison of different parameters by two methods of adenoidectomy



Graph 9: Mean preoperative and postoperative A/N ratio in two groups

Table 1: Various symptoms among two groups

Symptoms	Group (A), *n* (%)	Group (B), *n* (%)
Snoring	14 (70)	14 (70)
Mouth breathing	20 (100)	20 (100)
Sleep disturbances	4 (20)	5 (25)
Nasal discharge	14 (70)	14 (70)
Hearing impairment	1 (5)	2 (10)
Speech abnormalities	4 (20)	5 (25)

Table 2: Preoperative on table grading of adenoid hyperplasia as per Clemens and McMurray scale among these two groups

Grade	Group (A)	Group (B)
G-1	0	0
G-2	6 (30)	6 (30)
G-3	10 (50)	9 (45)
G-4	4 (20)	5 (25)
Total	20 (100)	20 (100)

Table 3: Preoperative adenoid/nasopharynx ratio on X-ray nasopharynx lateral view among two groups

A/N ratio	*n*	Mean	SD	Range
Group A	20	0.82	0.041	0.8–0.9
Group B	20	0.83	0.044	0.8–0.9

SD: Standard deviation, A/N: Adenoid/nasopharynx

Table 4: Comparison based on surgical clearance among the two groups

Surgical clearance	Group (A)	Group (B)	*P*
Fair	2 (10)	0	<0.001*
Good	18 (90)	0	
Excellent	0	20 (100)	
Total	20 (100)	20 (100)	

*P<0.05 Statistically significant

Table 5: Comparison based on postoperative pain score among two groups

Pain score	*n*	Mean	SD	Range	*P*
Group A	20	3.7	1.63	2–6	0.043*
Group B	20	2.8	1.01	2–4	

*Statistically significant difference (P<0.05). SD: Standard deviation

and collect data regarding the same in terms of surgical clearance of adenoids, injury to surrounding structures, operative time taken for the procedure, symptom score improvement on follow-up after 3 and 6 weeks.

Materials and Methods

A total of 40 patients were planned as the sample size and were divided into two groups:

- Group 1: Adenoidectomy by conventional curettage method was performed under general anesthesia
- Group 2: Power-assisted adenoidectomy using microdebrider with irrigating angled blade of 60° after accessing the posterior choana and nasopharynx with 0° rigid endoscope was performed under general anesthesia.

Inclusion criteria

- Children between 3 and 10 years of age
- Patients with hypertrophic adenoids on X-ray nasopharynx presenting with symptoms like:
  - Nasal blockage, runny nose, postnasal drip, change in voice

Table 6: Duration to return to normal diet and activities in the two groups

Group	*n*	Mean	SD	Range	*P*
Group A	20	3.1	0.0307	3–4	0.001*
Group B	20	2.1	0.224	2–3	

*Statistically significant difference ($P<0.05$). SD: Standard deviation

Table 7: Comparison of different parameters by two methods of adenoidectomy

Parameter	Group (A)		Group (B)		*P*
	Mean	SD	Mean	SD	
Postoperative Nasal symptom score at 6 weeks	0.45	0.83	0.00	0.00	0.043*
Postoperative A/N ratio at 6 weeks	0.69	0.081	0.46	0.109	<0.001*

*Statistically significant difference ($P<0.05$). SD: Standard deviation, A/N: Adenoid/nasopharynx

Table 8: Comparison of different parameters by two methods of adenoidectomy

Parameter	Group (A)	Group (B)	*P*
Surgical clearance			<0.001*
Fair	2 (10)	0	
Good	18 (90)	0	
Excellent	0	20 (100)	
Injury to surrounding structures			
Present	0	0	-
Absent	20 (100)	20 (100)	

*$P<0.05$ Statistically significant

Table 9: Mean pre- and postoperative adenoid/nasopharynx ratio in two groups

Group	Preoperative A/N ratio		Postoperative A/N ratio		*P*
	Mean	SD	Mean	SD	
Group A	0.82	0.041	0.69	0.081	<0.001*
Group B	0.83	0.044	0.46	0.109	<0.001*

*Statistically significant difference ($P<0.05$). A/N: Adenoid/nasopharynx, SD: Standard deviation

- Ear pain, decreased ability to hear, delayed speech
- Snoring, sleep apnea, hyponasal oration.

Exclusion criteria

- Children <3 or more than 10 years of age
- Children underwent cleft palate repair or having a submucous cleft palate
- Children with bleeding and coagulation defects
- Children having craniofacial abnormalities.

Completeness of adenoid resection

- Excellent: If the adenoid tissue gets completely removed superiorly from the roof of nasopharynx, anteriorly to the choana, and laterally up to the eustachian tube opening
- Good: If only few tags of adenoid are found postoperatively
- Fair: If considerable amount of adenoid tissue was left behind.

Postoperative pain and recovery period: To measure postoperative pain, the pain scale of Hanallah *et al*. (objective) was used. The following markers were used:

- Blood pressure-2 (Systolic)
- Crying-2
- Movement-2
- Agitation-2
- Change in posture-2
- Complaint of pain-2.

A total score was calculated Minimum score = 0 Maximum score = 12.

The degree of pain rises as the score increases.

- No pain – 0
- Mild pain – 1-4
- Moderate pain – 5–8
- Severe pain – 9–12.

In this study, the follow-up of patients was scheduled 3 weeks postoperatively, and the following parameter was analyzed:

- Pain
- Stiffness in neck
- Voice change
- Difficulty in swallowing
- Symptomatic improvement.

Nasal symptoms scoring:

- Nasal obstruction:
  - Predominant nose breather-0
  - Habitual nose breather-1.
- Snoring:
  - Mild = 0
  - Moderately loud = 1
  - Loud snoring = 2.
- Colored nasal discharge with upper respiratory tract infection:
  - For <1 week-0
  - For > than 1 week-1.

Radiological clearance (by comparing X-ray nasopharynx lateral view preoperatively and postoperatively after 6 weeks).

Results

Patients presented with more than one symptom. Mouth breathing was present in all patients snoring and nasal discharge were present in 28 patients 14 (70%) in group (A) and group (B). Sleep disturbance and speech abnormalities were present in 9 patients, 4 (20%) ingroup (A) and 5 (25%) each in group (B). Hearing impairment was present in 3 patients 1 (5%) in group (A)and 2 (10%) in group (B) [Table 1 and Graph 1].

Most of the patients in our study were having G3 adenoid hyperplasia that is 10 (50%) patients in group (A) and 9 (45%)

in group (B) it was followed by G2 6 (30%) patients in each group. G4 adenoid hyperplasia was present in 4 (20%) patients in group (A) and 5 (25%) patients in group (B) [Table 2 and Graph 2].

Pre operative A/N ratio on X-Ray nasopharynx lateral view was 0.82 + - 0.041 in group (A) while in group (B) it was 0.83 + - 0.044 [Table 3 and Graph 3].

Surgical clearance of adenoids in group A was fair in 2 (10%) patients and good in 18 (90%) patients while in group B it was excellent in all 20 patients. the difference was statistically significant [Table 4 and Graph 4].

Postoperative pain score in Group A was 3.7 ± 1.63, whereas with power-assisted method in Group B, it was 2.8 ± 1.0 1. The difference was statistically significant [Table 5 and Graph 5].

Duration for recovery to return to normal diet (in terms of the number of days) and activities in Group A was 3.1 ± 0.3, whereas in Group B, it was less 2.1 ± 0.2. The difference was statistically significant [Table 6 and Graph 6].

A Post operative nasal symptom score at 6 weeks was 0.45+-0.83 and Post operative A/N ratio at 6 weeks 0.69+-0.08 where as in Group B Post operative nasal symptom score at 6 weeks it was zero and Post operative A/N ratio at 6 weeks 0.46+-0.10 showing statistically significant difference b/w two groups [Table 7 and Graph 7].

Surgical clearance was fair in 2 cases and good in 18 cases in group A while it was excellent in all cases in group B. This difference was also highly significant statistically. However, there was no injury to surrounding structures in any method of adenoidectomy [Table 8 and Graph 8].

For the conventional Group A, preoperative A/N ratio was mean of 0.82 ± 0.04 which improved postoperatively to mean of 0.69 ± 0.08, whereas in Group B preoperatively, it was mean of 0.83 ± 0.04 which improved postoperatively to mean of 0.46 ± 0.109 showing statistically significant difference [Table 9 and Graph 9].

Discussion

Although removal of a hypertrophied adenoid mass with conventional curette adenoidectomy frequently shows a significant symptomatic improvement, adenoidectomy without leaving any adenoid tissue is very difficult with a blind surgical technique. Studies that have evaluated the success of a blind adenoidectomy have proved that the removal of adenoid tissue using a conventional instrument was quite often incomplete. Any remnant has the potential to hypertrophy, which can lead to recurrence of symptoms and another surgery may be required. Power-assisted adenoidectomy is an alternative for reducing the risk of recurrence and consequent revision surgery by providing completely removing the remnant adenoid tissue in a shorter operating time.[8]

In this study, a total number of patients were 40 in the age group of 3–10 years. Out of which randomly selected 20 patients underwent conventional adenoidectomy represented in Group A and in 20 patients power-assisted adenoidectomy was done using a microdebrider named Group B. The sample size and distribution in the two groups were similar to the study by Datta *et al*. in 2009 and Anand *et al*. in 2015 who also compared conventional adenoidectomy with endoscopic adenoidectomy using microdebrider.[9,10]

In our study, the mean age in Group A was 6.4 ± 2.04, whereas in Group B was 7.4 ± 1.67. This difference in age group was not significant statistically. Similar observations were reported in the literature by Anand *et al*. in 2015 and Datta *et al*. in 2009.[10]

The assessment of adenoid size was done endoscopically on operating table after administration of general anesthesia and graded according to Clemens and McMurry scale. Most of them had G3 adenoid enlargement 50% in Group A and 45% in Group B followed by G2 30% in Group A and Group B both. G4 adenoid hyperplasia was present in 20% of patients in Group A and 25% in Group B. These findings were similar to the study by Sarin *et al*.[11] (2016), Basista and Saxena[6] in 2015, Anand *et al*.,[10] and Sarin *et al*.[11] in 2015 who also reported in the study G3>G2>G4.

To evaluate the success of two techniques of adenoidectomy in terms of efficacy in relieving nasal symptomatology, a simple scoring system for nasal symptoms of nasal obstruction, snoring, colored rhinorrhea with upper respiratory obstruction, and an irregular obstructive sleep pattern was devised for this study. Possible preoperative and postoperative scores range from 0 to 6 as used as used by Walker 2001 in his study.[12] Majority of the patients were having preoperative nasal symptom score of 3. For the conventional adenoidectomy Group A, the mean preoperative nasal symptom score was 2.65 which improved to 0.83 postoperatively ($P < 0.001$), whereas for the power-assisted adenoidectomy Group B, the mean preoperative nasal symptom score was 2.65 improving postoperatively to 0.00 ($P < 0.001$). The power-assisted adenoidectomy Group B had lower postoperative score than conventional Group A ($P = 0.043$) which was statistically significant. The utility of the score was comparable in the literature with the study by Walker 2001, who used it to compare curettage adenoidectomy with ablation diathermy.[12]

Our study followed the same method of calculation of preoperative adenoid/nasopharynx ratio as per Adedeji *et al*.,[13] who studied 150 children from 4 to 10 years in 1999.

In our study in both the groups, the preoperative A/N ratio was mean of 0.82 ± 0.04 and 0.83 ± 0.04, respectively, which improved postoperatively 20.69 ± 0.08 and 0.46 ± 0.1 0, respectively, showing significant reduction 6 weeks postoperatively in both the groups ($P < 0.001$). Although the post operative difference of A/N ratio in group B was more than group A with ($P<0.001$). It is highly significant statistically.

Gangadhara Somayayaji and Rajeshwari[14] 2012 statistically analyzed that ANR >0.7 is the candidacy for adenoidectomy.[14]

Surgical clearance of adenoids observed on endoscopy after completion of the procedure in Group A was fair in 2s (10%) patients and good in 18 (90%) patients, whereas in Group B, it was excellent in all cases that indicate a significant number of cases in Group A showing remnant adenoid tissue ($P < 0.001$). The complete removal of adenoid in both groups was comparable to a study by Sarin *et al*.[11] in 2014 who reported 100% complete removal by power-assisted method as compared to only 75% complete removal by curettage method.

The evidence of remnant adenoid tissue in Group A is also well supported by studies by Stanislaw *et al*.[15] in 2000, Havas and Lowinger[16] in 2002, Datta *et al*.[9] in 2009, Elwany S *et al*.[17] in 2010, and Hussein and Al Juboori[18] in 2012 within incidence of 39%, 39%, 30%, 14.5%, and 20%, respectively. Above-mentioned studies show the presence of significant remnants adenoid tissue, especially on torus tubarius and intranasal protrusions leading to unresolved initial symptoms and may need a revision adenoidectomy in the future. A study by Somani *et al*.[1] in 2010 showed excellent removal of adenoid tissue completely following endoscopic power-assisted adenoidectomy. Furthermore, Stanislaw *et al*.[15] in 2000 showed more complete removal of adenoid tissue with microdebrider.

The successful outcome of any surgery is completely removal of adenoid tissues and low incidence of comorbidity, the two groups were compared and statistically analyzed should a mean pain score of 3.7 ± 1.6 in Group A and 2.8 ± 1 in Group B which is statistically significant ($P = 0.043$). It was comparable to a study by Sarin *et al*.[11] in 2014 who reported more postoperative pain by the curettage method as compared to power-assisted method.

The recovery period in our study by the microdebrider was shorter than the conventional group. In the former, it was 2.1 ± 0.2 days and in the later, it was 3.1 ± 0.3 days which was statistically significant ($P < 0.001$). It was compable to a study by Sarin *et al*.[11] in 2009 who reported the mean recovery period by conventional method and by power-assisted method as 4.3 days and 3.83 days, respectively ($P = 0.01$). Similarly, a study by Somani *et al*.[1] in 2010 showed less morbidity after endoscopic power-assisted adenoidectomy.

Conclusion

From the results of the study, we concluded that power-assisted adenoidectomy is better surgical procedure than conventional adenoidectomy. The most common symptom in patients with adenoid hypertrophy was mouth breathing followed by snoring and nasal obstruction. There was better improvement in nasal symptoms score, surgical clearance, and radiological clearance by power-assisted adenoidectomy. Postoperative pain score and time taken for recovery after surgery were also less in power-assisted adenoidectomy.

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Conflicts of interest

There are no conflicts of interest.

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