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Original Research Article

Adequacy of traditional curette versus powered shaver for adenoid clearance: a comparative study

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ABSTRACT

Background: Adenoid growth is a prevalent aetiology of blockage of nasal passage in paediatric patients, and multiple techniques exist for their surgical removal. The objective of this investigation was to study the efficacy of the conventional curette versus the endoscopic guided powered shaver in the context of adenoid clearance.
Methods: In this study, a comparative analysis was performed on a sample of 119 patients, consisting of two distinct groups. Group I-60 patients who underwent conventional adenoidectomy, while group II-59 patients who underwent endoscopic microdebrider-assisted adenoidectomy. The methods employed in this study were in accordance with established medical practises. The research evaluated outcome measures including surgical duration, haemorrhage, and perioperative and postoperative adverse events.
Results: Group I, 17 (28.3%) received adenoidectomy as a standalone procedure, group II, 22 (37.3%) received adenoidectomy as a standalone procedure. An adenotonsillectomy was executed on 21 patients, accounting for 35% of group I, and 10 patients, accounting for 16.9% of group II. The study found that group I exhibited significantly reduced operation time and blood loss compared to group II (20.88±4.41 vs. 29.00±4.15 minutes and 13.47±3.02 vs. 18.64±3.16 millilitres, respectively). Intraoperative complications were observed in 10% of patients in group I and 5.1% of patients in group II. The group II participants exhibited a more rapid onset of symptomatic relief compared to those in group I. There was no evidence of recurrence in the cohort of patients who underwent endoscopic microdebrider-assisted adenoidectomy.
Conclusions: Endoscopic microdebrider-assisted adenoidectomy is a superior and dependable technique compared to curettage, exhibiting improved clearance rates and patient contentment.

Keywords: Adenoidectomy, Blood loss, Endoscopic adenoidectomy, Microdebrider assisted adenoidectomy

INTRODUCTION

Nasopharyngeal tonsil usually occurs during 6 months to 1 year of life, and the size grows enormously during 6-8 years of age and usually atrophies during adolescence.[1]Adenoid hypertrophy is the major cause of nasal obstruction in children. Adenoidectomy is the widely used surgical modality alone or combined with tonsillectomy or by inserting ventilating tubes. Adenoidectomy is the common pediatric procedure for removing potential respiratory pathogens in the nasopharyngeal reservoir and obstruction of the nasal airway.[2,3]

Apart from surgical workload, patients visiting for nasal obstruction, sleep disturbances, and snoring disorders contribute to additional workload for otolaryngology and allergy specialists. Above symptoms might affect quality

of life of children and impose unwanted developmental effects such as sleep-related breathing difficulties. Airway obstruction due to adenotonsillar hypertrophy may impart chronic complications like sleep abnormalities. It can be associated with long-term consequences such as failure to thrive and sleep disturbances, leading to inability to concentrate, daytime somnolence, and low psychometric tests.[3]

Adenoid hypertrophy comprises of a dual phenomenon in the pathology of otitis media; first, it causes mechanical blockage of the Eustachian tube orifice and serves as a reservoir of microbial growth. Adenoidectomy, an additional surgical modality, might prevent the otitis media by reducing the bacterial pool or by improving the Eustachian tube function.[4] Adenoidectomy is challenging, and many methods are mentioned. Adenoid curette, performed by indirect trans-oral mirror and headlight, is an easy and faster method, but it imposes the risk of recurrence.[5-7] Due to the demerit of the conventional method, there is a shift towards more effective alternative methods, such as endoscope-guided power shaver adenoidectomy.

Recent techniques, including curved suction electrical coagulator and trans-oral curved microdebrider shaver with an attachment of trans-oral indirect mirror or a 45º endoscope, are also effectively used.[8-10] Cannon et al widely used endoscopic assisted adenoidectomy for complete adenoidectomy.[11] The aforementioned techniques exhibit both benefits and drawbacks; nonetheless, the indications of adenoidal hypertrophy may relapse or persist. Against this backdrop, the present study compared the efficacy of conventional adenoidectomy and endoscopic microdebrider-assisted adenoidectomy in terms of accuracy, removal extent, intra-operative complications, and postoperative morbidity.

METHODS

Following approval from the institutional ethical board at Akash institute of medical sciences and research a comparative, randomised study was conducted at otorhinolaryngology department of a hospital between February 2021 and November 2022. The medical diagnosis was ascertained through a comprehensive clinical assessment and diagnostic testing for all 119 study participants. The subjects were randomised into two cohorts using a random allocation method. A randomised distribution was employed, with a randomly generated number table to facilitate the randomization procedure. The initial group comprised numbers ranging from 1 to 60, whereas the subsequent group consisted of numbers spanning from 61 to 119. The cohort was provided with an uncertain set of numbers that were odd/even for analysis. Group I had a standard adenoidectomy procedure, in accordance with established medical practises. This group was assigned the label of even-numbered group for the purposes of the study. The procedure of adenoidectomy utilising the microdebrider technique was executed on the cohort with odd numerical values, and this particular cohort was assigned the nomenclature of group II.

Inclusion criteria

Adenoid as the cause of obstruction in the nasal passage, sleep apnoea, or recurrent otitis media, the age group from 2 to 14 years, were included in the study.

Exclusion criteria

Patients with bleeding diathesis, craniofacial disorders, motor/ developmental disorders, and suspected tumours, including angiofibroma, nasopharyngeal carcinoma, cleft lip, and cleft palate patients were excluded.

The institutional ethical committee approved the study, and informed consent was obtained from parents. Detailed physical and clinical examinations and routine laboratory investigations were done for all the subjects. Flexible nasopharyngoscopy after preparing the nose with lignocaine and xylometazoline spray on both sides. Adenoids were categorised according to the adenoid tissue percentage that causes the posterior choana's blockage. “Grade I: adenoid tissue obstructing 0-25% of the posterior choana, grade II: adenoid tissue obstructing 26-50% of posterior choana, grade III: adenoid tissue obstructing 51%-75% of posterior choana, grade IV: adenoid tissue obstructing 76-100% of posterior choana.”[12] Radiological investigation like X-ray nasopharynx lateral view, occasionally X-ray paranasal sinus (Water’s view) was obtained. Additional tests, including impedance audiometry and pure tone audiometry, were done according to need.

Acute infections in children were managed accordingly and then recruited for the following procedure. The technique used was conventional or endoscopic microdebrider-assisted adenoidectomy. A surgeon independently performed both surgical procedures, and observations were documented; depending on the type of procedure, intra-operative time taken for the procedure, blood loss, and complications. Immediate post-operative pain and complications were also noted. All patients received oral antibiotics with amoxicillin and clavulanic acid post-operatively for 5 days. The follow-up was done-1st week, 4th week, 2nd month, and 4th month post-operatively. Post-operatively a record was then maintained of any complications. On the subsequent visits, anterior rhinoscopy was examined, nasal discharge, cold spatula test, and posterior rhinoscopy or endoscopy for signs of recurrence and the final findings were compared. Adenoidectomy was performed along with other procedures, which can interfere with the comparative study; a few parameters such as intra-operative bleeding, time taken for the procedure, post-operative pain, starting of normal daily activity, and food intake post-surgery were compared only in those patients

where adenoidectomy alone as a technique to increase accuracy.

Technique of conventional adenoidectomy

Patients underwent conventional adenoidectomy using St Clair Thomson adenoid curette. Completeness was assessed using post nasal mirror, and hemostasis was achieved.

Endoscopic microdebrider-assisted adenoidectomy

After receiving general anaesthesia with orotracheal intubation, patients were placed in Rose's position with the extension of the head (or a more neutral position). The mouth was opened with Boyle-Davis mouth gag. Further, 0 degrees 4 mm or 30-degree 2.7 mm endoscope was inserted through a trans nasal approach into the nasopharynx, and adenoid tissue was evaluated. The extent of obstruction at the posterior choanae was assessed. Under endoscopic guidance, it was removed using a microdebrider with irrigating blades of 0, 15.45 degrees or a special adenoid blade. A powered trans nasal shaver adenoidectomy method with trans-nasal video endoscopy was employed during the procedure. The transoral approach was performed in smaller children with 45° angled microdebrider blades or adenoid blades.

Intraoperative time was calculated using a stopwatch from the time required to set up of instrumentation which is the beginning of the insertion of Boyle Davis mouth gag, to the removal of the mouth gag.

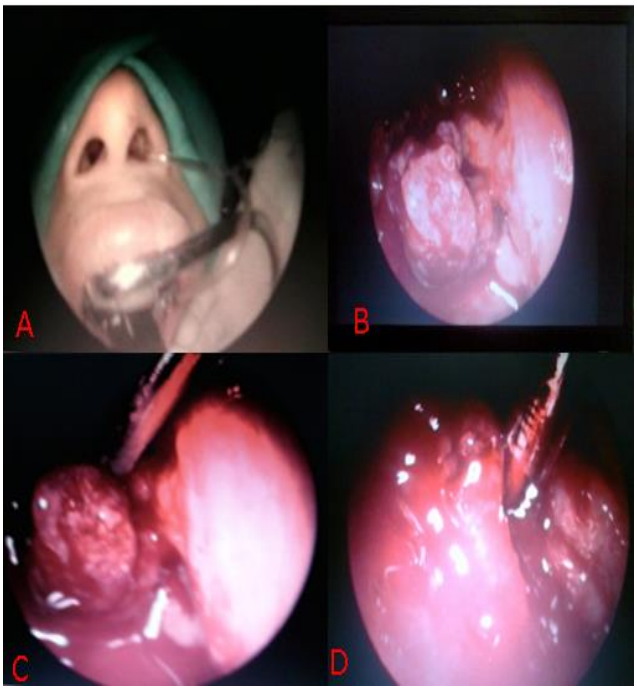

Figure 1 (A-D): Intraoperative pictures. Pre-operative position and set up for adenoidectomy. Endoscopic image of adenoid hypertrophy. Microdebrider-assisted adenoidectomy.

The direct endoscopic view observed homeostasis, and absence of haemorrhage from the nasopharynx before the termination of anaesthesia. The amount of irrigating fluid used and the collected fluid in the vacuum flask was used to estimate haemorrhage. During adenoidectomy, a line irrigation system of the microdebrider was used. So, the exact amount of irrigating fluid from the saline bottle was noted. While concluding, the material collected from the suction canister was filtered to remove tissue and volume of irrigating fluid along with blood were recorded. Blood loss was calculated in millilitres as a difference between the amount of fluid and saline used for irrigation.

All the discharges were done on the same day or the 1st postoperative day and the severity of the postoperative pain score was measured using the visual analogue scale and documented in both groups. It is a subjective scoring technique that is then determined by the patient or their guardians and categorised into no pain -0, mild pain-1, 2 and 3, moderate pain-4, 5 and 6, and severe pain-7, 8, 9 and 10.

Statistical analysis

The analysis was done using SPSS v 18. The results were shown as mean ± SD. The comparison between the groups was made using the student t test. A $p<0.05$ was considered statistically significant.

RESULTS

Table 1: Demographics of patients in group 1 and 2.

Age group (In years)	<5	6-10	11-14	Mean age (In years)
Group I	37	19	4	5.6
Group II	28	25	6	6.49

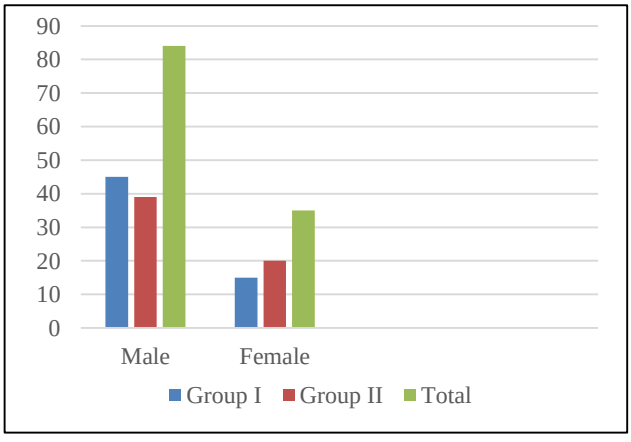

Figure 2: Male-to-female distribution.

In group I, patients with age <5 were 37 (61.7%), 6-10 years were 19 (31.7%), and 11-14 years were 4 (6.7%). In group II, <5 years were 28 (47.5%), 6-10 years were 25 (42.4%), and 11-14 years were 6 (10.2%). The mean age of group I is 5.60±2.78 years, and in group II is

6.49±3.14 years. In group I, 45 (75%) were males, and 15 (25%) were females, while in group II, 39 (66.1%) were males, and 20 (33.9%) were females. Overall, there were 84 (70.5%) male patients and 35 (29.4%) female patients Samples are gender matched with p=0.223.

Table 2: Surgical procedure.

Type of surgery	Group I, (n=60)		Group II, (n=59)	
	N	%	N	%
Adenoidectomy alone	17	28.3	22	37.3
Plus tonsillectomy	21	35.0	10	16.9
Myringotomy ± grommet insertion	17	28.3	13	22.1
RFT (Radiofrequency turbinoplasty)	12	20.0	4	6.8
Antral wash	2	3.3	5	8.5
Tongue tie release	1	1.7	0	0.0
Total	60	100	59	100

The results of Table 2 show that adenoidectomy was performed, with 28.3% in group I and 37.3% in group II. Adenotonsillectomy was more in group I (35%) and group II (16.9%). Myringotomy with or without grommet insertion was performed on 28.3% of group I and 22.1% in group II. At the same time, radiofrequency turbinoplasty was done on 20% in group I and 6.8% in group II and antral wash in group II and group I, respectively, was 8.5% and 3.3%. Only one patient in group I underwent tongue tie release.

Table 3: Comparison of surgical outcomes and adenoid hypertrophy grading between groups I and II.

Variables	Group I	Group II	P value
Time taken (minutes)	20.88±4.41	29±4.15	<0.001
Blood loss (ml)	13.47±3.02	18.64±3.16	<0.001
Grading of adenoid hypertrophy before surgery (%)			
Grade II	23.3	27.11	
Grade III	60	58.3	
Grade IV	16.6	13.55	
Grading of adenoid hypertrophy after surgery (%)			
Grade I	11.6	93.2	<0.001
Grade II	54.6	6.7	<0.001

Results (Table 3) indicate significant differences between the two groups time taken and blood loss. Group II took significantly longer and had significantly more blood loss compared to group I. The assessment of adenoid hypertrophy grading pre-and post-surgical intervention for both groups was done. Prior to the surgical intervention, both groups had a comparable distribution of patients across all grades. Postoperatively, a notable disparity in the grading was observed between the two groups (p<0.001). The utilisation of microdebrider-assisted adenoidectomy in group II yielded a greater percentage of patients classified as grade I and a lesser percentage classified as grade II, in contrast to the conventional adenoidectomy performed in group I.

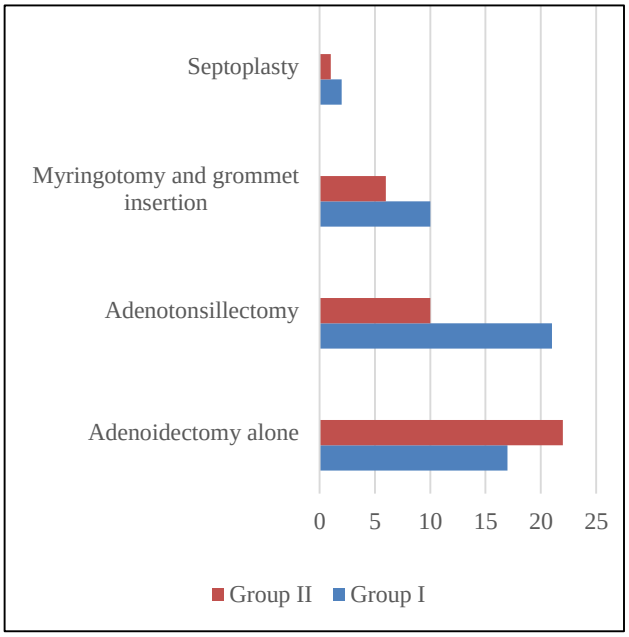

Figure 3: Surgical procedures in group I and II.

Table 4: Intraoperative complications looked for in both groups and given in the following table.

Intra-op complications	Group I, (n=60)		Group II, (n=59)	
	N	%	N	%
Absent	54	88.3	56	91.5
Present	6	10.0	3	5.1
Bleeding	2	3.3	2	3.4
Injury to torus	2	3.3	0	0.0
Injury to uvula	1	1.7	1	1.7
Injury to choana	1	1.7	0	0.0
Injury to cervical spine ligament	0	0.0	0	0.0

In group I, intra-operative complications were observed in 6 (10%) patients and group II, only in 3 (5.1%) patients. Two out of six (3.3%) had an intraoperative bleed; one was managed with postnasal packing inward, and the other was taken to theatre. The bleeding point was identified with an endoscope and cauterised. Two (3.3%) patients had an injury to the torus; one recovered without subsequent complication, and the other needed myringotomy and grommet insertion 5 months after adenoidectomy surgery due to unresolved SOM. In group II, 2 (3.4%) patients had an intra-operative bleed, one was managed on the table with cauterisation, and the other needed a postnasal pack for 2 hours, removed and no further episode of bleeding. Trauma was seen to the uvula in either group and managed conservatively without

postoperative sequelae. Incidence of Intra-operative complications are statistically less in group II (5.1%) compared to group I (10.0%) with p=0.311 (Table 4).

Table 5: Comparison of postoperative pain between groups I and II using visual analogue scale.

Post-op pain	Group I, (n=60)		Group II, (n=59)	
	N	%	N	%
1, 2 and 3 (Mild)	32	53.3	38	64.4
4, 5 and 6 (Moderate)	28	46.7	21	35.6
7, 8, 9 and 10 (Severe)	0	0.0	0	0.0
Mean ± SD	3.63±1.38		3.37±1.46	

Both groups had comparable postoperative pain levels in Table 5, with group I experiencing mild pain in 53.3% of cases and group II in 64.4%. Moderate pain was reported in 46.7% of group I and 35.6% of group II cases. There were no reported cases of severe pain in either group. The mean pain score was 3.63±1.38 in group I and 3.37±1.46 in group II.

Table 6: Comparison of duration of pain, activity and food intake in two groups.

Post-operative findings	Group I, (n=60)	Group II, (n=59)	P value
Pain lasted for in days	3.63±1.38	3.37±1.46	0.319
Normal activity started in days	3.67±1.27	3.20±1.55	0.077
Normal food intake started in days	3.93±1.57	3.36±1.62	0.051

The duration of pain was not significantly different between group I and group II (Table6), with mean pain lasting for 3.63±1.38 days in group I and 3.37±1.46 days in group II (p=0.319). The time taken to resume normal activity was also not significantly different between the two groups, with mean values of 3.67±1.27 days in group I and 3.20±1.55 days in group II (p=0.077). However, the time taken to resume normal food intake was borderline significant, with mean values of 3.93±1.57 days in group I and 3.36±1.62 days in group II (p=0.051).

Persistence of nose block, mouth breathing and snoring, and nasal discharge was assessed on subsequent postoperative visits on 1st week, 1 month, 2 months and 4 months post-surgery in both groups (Table 7). The most common symptom on postoperative follow-up at one week was persistent nose block and mouth breathing, which resolved over time in both groups. However, by the end of 4 months, all patients in group II were symptom-free, compared to group I. Thus, symptomatic relief was faster in group II than in group I, as shown in Table 7.

Table 7: Symptoms and Signs on follow up of patients.

Symptoms and signs	1st week	1 month	2 months	4 months
Group I, (n=60)				
Nasal obstruction	41 (68.3)	23 (38.3)	4 (6.7)	1 (1.7)
Mouth breathing	45 (75)	24 (40)	4 (6.7)	1 (1.7)
Snoring	32 (53.3)	21 (35)	5 (8.3)	1 (1.7)
Nasal discharge	2 (3.3)	3 (5)	-	-
Group II, (n=59)				
Nasal obstruction	39 (66.1)	21 (35.6)	3 (5.1)	0
Mouth breathing	39 (66.1)	14 (23.7)	1 (1.7)	0
Snoring	27 (45.8)	16 (27.1)	3 (5.1)	0
Nasal discharge	4 (6.8)	4 (6.8)	0	0
P value	0.791	0.674	0.848	1

Table 8: Advantages and drawbacks of newer microdebrider-assisted adenoidectomy procedure.

Parameters compared	Group I	Group II	Significance
Completeness of removal	+	++	More complete in group II
Surgeon satisfaction	+	++	More in group II
Collateral damage	++	+	Significantly less in group II
Postoperative pain score	3.63± 1.38	3.37± 1.46	Less in group II but statistically similar
Recovery time (days)	3.74	3.31	Faster in group II by 0.43 days
Recurrence of adenoid	1+	0	Significant
Operative time (min)	20.88± 4.41	29± 4.15	P≤0.001, significantly more in group II
Intra-operative blood loss (ml)	13.47± 3.02	18.64± 3.16	P≤0.001, significantly more in group II

The newer micro-debrider-assisted adenoidectomy procedure (Group II) has several advantages compared to traditional curettage adenoidectomy (Group I). Group II showed a more complete removal of adenoid tissue, resulting in higher surgeon satisfaction. There was also

significantly less collateral damage during the surgery in group II. Recovery time was faster in group II by 0.43 days, but postoperative pain scores were statistically similar between the two groups. The recurrence of adenoid was less in group II, but it is unclear if this difference is significant. However, the operative time and intra-operative blood loss were significantly more in group II as in Table 8.

DISCUSSION

Worldwide, adenoidectomy is one of the routinely performed procedures by otolaryngologists.[13] The complete adenoidectomy elicits a wide range of advantages, such as minimising bacterial growth, particularly in children with nasopharyngitis, otitis media and sinusitis and also minifies the recurrent airway obstructive symptoms. Research study by Havas et al shows there is the greatest amount of remaining tissue following an adenectomy or when using the curette approach. This is especially true in the choanal and tubaric areas.[14]

The essential demerit of the curettage method is laceration of choanae and torus tubarius, a gauge of the nasopharyngeal mucosa, skimming the adenoid bulk and leaving the obstructing tissue.[7] Endoscopic vision-mediated adenoid punch or avulsion with grasping forceps also leads to traumatic injury. So, the demerits mentioned above of the conventional curette method leads to dissatisfaction among the patients, and thus there is a search for new techniques. Techniques such as fibre optics, endoscopic instrumentation, and insulated suction diathermy adenoid ablation have been used as an effective alternative.[10,15]

The suction diathermy ablation reduces the blood loss but imposes the risk of cicatrisation and collateral burns and thus needs carbon dioxide laser, which also implicates potential adverse complications. Trans-nasal direct endoscopic vision, in combination with micro-debrider, aids the accurate removal of obstructive tissue and also preserves mucosal integrity and nasopharyngeal structures. The oscillating motion of the shaver blade reduces the haemorrhage, and frequent suction elicits a clear view.

In this study, intra-operative time taken for the procedure was measured in both groups and compared only in the patients undergoing adenoidectomy alone surgery to enhance accuracy. We found that the time taken for surgery in group II was more (29±4.15 min) compared to group I (20.88±4.41 min) and found it to be significant. The more time in newer technique, endoscopic micro-debrider-assisted adenoidectomy might be due to the increased instrumentation setup time, decongestion of the nasal mucosa, endoscopic view, and removal of adenoid in small fragments. In the present study, the intra-operative blood loss was significantly higher in endoscopic microdebrider-assisted adenoidectomy compared to the conventional method.

In support of our study findings, Modi et al reported more blood loss and time duration in endoscopic-assisted microdebrider adenoidectomy compared to conventional adenoidectomy.[16] Shin et al stated that the surgical time for the endoscopic adenoidectomy technique with photo documentation is 10-15 minutes. Similarly, we have reported only a transient increase in the surgical time endoscopic assisted adenoidectomy.[17] In another study by Yang et al endoscopic-assisted adenoidectomy displayed better outcomes in total surgical time, blood loss and complications than conventional methods.[18] However, Stanislaw et al reported that a marked decrease in blood loss during an endoscopic powered adenoidectomy is 20% more enhanced than the curette adenoidectomy.[6]

Concerned with intra-operative complications, the common complication was bleeding in both groups. Injury to surrounding structures was more common in the conventional method than in microdebrider-assisted adenoidectomy. Albeit collateral damage post adenoidectomy is a rare event, there is a high chance of Eustachian tube (ET) trauma which further leads to ET scarring and functional loss. Earlier reports show that the incidence of ET scarring and dysfunction is relatively lower in microdebrider-assisted adenoidectomy.[19]As postoperative pain was compared in two groups, we found that patients in group II had lesser pain than group I, but the difference was not significant. One patient in group I had a secondary bleed, while no such complication was seen in group II patients.

Debrider-assisted adenoidectomy displayed a shorter recovery period than the conventional method. Likewise, previous finding shows that at the end of the postoperative period of 6 months, 92% of patients are free from symptoms of adenoid after management with endoscopic adenoidectomy.[20] In this study, 1 patient in group I with recurrence and 2 patients had a recurrence following adenoidectomy by conventional procedure. However, no recurrence was noted in group II patients.

Using an endoscope and debrider aids in the accurate removal of adenoids by surgeons, and thus velopharyngeal sphincter is not disturbed.[21] A previous study by Ravishakar et al reported that endoscopic adenoidectomy is a reliable and safe method as the curettage method, with fewer injuries to the adherent structures during the surgery.[1]

Singh et al reported that the endoscopic-assisted powered technique is an efficient procedure for the adenoid tissue and thus reduces the risk of secondary surgery and improves the patient outcome. [22] In another study done by Das et al they stated that combining traditional curette and endoscopic microdebrider-assisted adenoidectomy is entirely safe for the effective removal of adenoids in large

size.[23] Selvam et al noticed increased intraoperative time with the use of microdebrider.[24]

Bidaye et al conducted a comparative study, and they concluded that coblation adenoidectomy is superior in terms of a decrease in blood loss, no residual tissue postoperatively and lower pain scores on day 1 postoperative as compared to traditional adenoidectomy.[25]

The newer methods have certain contraindications, such as not being applicable for biopsy and in suspicious cases of tissue diagnosis. In addition, in developing countries like India, its usability could be better due to the economic burden and high instrument cost.

CONCLUSION

In conclusion, our study compared conventional adenoidectomy to endoscopic microdebrider-assisted adenoidectomy. The endoscopic technique showed advantages such as better removal of adenoid tissue, higher surgeon satisfaction, and less collateral damage. However, it had longer operating times and increased blood loss. Postoperative pain levels were similar, but the endoscopic approach had a slightly faster recovery time. The recurrence rate of adenoid hypertrophy was lower but not statistically significant. Further research is needed to evaluate long-term outcomes and cost-effectiveness.

Recommendations

Based on our findings, we recommend considering endoscopic microdebrider-assisted adenoidectomy as an alternative to conventional adenoidectomy for cases requiring complete removal and preservation of surrounding structures. Surgeons should be aware of longer operating times and increased blood loss. Patient selection and proper training in endoscopic techniques are crucial. Future studies should focus on long-term benefits, recurrence rates, and cost-effectiveness to further establish its efficacy in clinical practice.

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