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Original Research Article

Efficacy of power assisted microdebrider in endoscopic adenoid resection

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ABSTRACT

Background: Nasal obstruction, snoring, mouth breathing, ear ache is some of the most common problems encountered in pediatric otorhinolaryngological practice. The most common cause for the above symptoms is adenoid hypertrophy.
Methods: Patients with age group of 4-16 years with symptoms of adenoid hypertrophy such as snoring, mouth breathing, ear ache and adenoid hypertrophy confirmed by Diagnostic Nasal Endoscopy and Radiological Investigations were included. Previous H/o surgery for adenoidectomy, bleeding disorders, cases with cleft palate or previous H/o cleft palate repair neuromuscular / craniofacial anomalies were excluded.
Results: 3.10 mean grade was seen among study participants, with 39% of children having Grade 4 adenoids, 35% having Grade 3 adenoids, and 26% having Grade 2 adenoids. Snoring, nasal obstruction, and breathing scores all decreased statistically significantly.
Conclusions: A microdebrider-assisted adenoidectomy has shown to provide full clearance with only a minor increase in haemorrhage and process time.

Keywords: Adenoid hypertrophy, Adenoid resection, Microdebrider, Nasal obstruction, Snoring, Mouth breathing

INTRODUCTION

Adenoidectomy is one of the most common surgeries performed in children today, either alone or in conjunction with tonsillectomy or insertion of ventilation tubes. The standard curette adenoidectomy, which is still in use today, was initially reported in 1885.[1] From the simple curette, which was essentially a blind technique, to the power aided microdebrider, it has undergone a revolution. Children frequently have adenoidal enlargement, which can manifest as mouth breathing, nasal discharge, snoring, sleep apnea, and hyponasal speech.[2] Moreover, it has a role in the pathophysiology of otitis media with effusion, recurrent otitis media, and rhinosinusitis.[3] Adenoid hypertrophy is the most common cause of the aforementioned symptoms. Assessments for glue ear, adenoid hypertrophy, and ET dysfunction should be performed in cases of reduced hearing and academic regress.[4] Adenoid hypertrophy has also been connected to adult obstructive sleep apnea. According to research, cor pulmonale may develop as a result of persistent airway obstruction brought on by adenoid hypertrophy.[5,6] The purpose of the current study was to determine whether microdebrider assisted adenoid resection was effective in terms of surgery time and the extent of adenoid tissue removal.

METHODS

Present study was conducted in department of ENT with clinical diagnosis of Adenoid Hypertrophy. Patients who have Adenoid hypertrophy and who will undergo

Adenoid Resection using Microdebrider during the period of 1st Jan 2021 to 30th June 2022.

Inclusion criteria

Age group of 4-16 years with symptoms of Adenoid hypertrophy such as snoring , mouth breathing, ear ache. Adenoid Hypertrophy confirmed by Diagnostic Nasal Endoscopy and Radiological Investigations.

Exclusion criteria

Previous H/o surgery for Adenoidectomy. Bleeding Disorders. Cases with cleft palate or previous H/o cleft palate repair. Neuromuscular / Craniofacial anomalies.

Data collections

After obtaining approval from Ethical committee and obtaining consent form from the parents, a radiograph of the nasopharynx and a nasal endoscopy with 0 sinuscope both showed adenoid hypertrophy. In a teaching institution for tertiary care, the senior author underwent a comprehensive endoscopic power aided adenoidectomy. The patients received general anaesthesia with rotracheal intubation. A standard functional endoscopic sinus operation was set up and performed in the operating room. The nasal canals were cleaned using pledgets dipped in 4% lignocaine and 1:10,000 adrenaline. That was a mouth gauze. A 0 2.7 mm rigid telescope was used to look at the posterior choanae and nasopharynx (4 mm for older children). It was done using an adenoid blade or a microdebrider with irrigating blades at 0, 15, 45, and 60 degrees. A window on the convex side of the longer, specially crafted adenoid blade can be employed transorally to conform to the nasopharynx's roof. Either the sinusscope and debrider were inserted through the same nostril or they were inserted into different nostrils. A sinuscope and a debrider with an angled blade were occasionally inserted into the nose and the mouth, respectively. Younger children were treated with a transoral approach utilising an angled microdebrider or adenoid blades with a 45° scope. When using endoscopic vision, the shaver cannula was placed into the nose, and suction was switched off to protect the septum and turbinates. The adenoid tissue was then dragged in by the spinning blade as the suction was switched on, all while being constantly watched endoscopically. The upper limit of the adenoid tissue, which is frequently difficult to reach with conventional curettes, was located high in the nasopharynx, where the adenoidectomy was started. The resection was carried out side to side on an even level until the inferior border of the adenoid pad was reached. The shaver's cutting and aspirating action, along with simultaneous irrigation to remove both adenoid tissue and blood, allows for a decent vision. Underlying structures are shielded by better management of the depth of adenoid removal. Suction diathermy or hydrogen peroxide-soaked pledgets were utilised in a few cases to produce hemostasis. A nasopharyngeal pack was applied for a brief period of time before being taken off. Mouth gag was removed. The patient received postoperative care and was released the following day. Following a week and up to 14 days, all patients were followed up with. During a follow-up surgery, an endoscopic nasopharyngeal examination was done to assess the degree of the removal and healing. The following intraoperative variables were recorded: adenoid size, operating time, blood loss, completeness and depth of removal, surgeon satisfaction, and complications. The size of the adenoid was categorised as small to moderate (50% obstruction), large (50-75% obstruction), or very large ([75% obstruction]) based on the level of nasopharyngeal obstruction found during nasal endoscopy. The operational period, measured in minutes and seconds, was started when the mouth gag was fixed and ended when it was removed. The exact measurement of blood loss was made possible by the difference between the amount of irrigating fluid used and the amount of fluid collected in the vacuum flask. During the adenoidectomy, the in-line irrigation tool of the microdebrider was employed. Hence it was reported how much irrigation fluid flowed from the saline bottle accurately. The suction canister material was filtered to remove tissue at the end of the treatment, and the remaining fluid—which included blood and irrigating fluid—was measured. The blood loss in millilitres was calculated using the difference between this quantity and the previous amount of saline used for irrigation. The amount of blood that stained the nasopharyngeal pack didn't get quantified after surgery. Completeness of the adenoid resection was assessed as acceptable, outstanding, or extraordinary. When the adenoid tissue was completely removed from the choanae, the eustachian tube orifices, and the roof of the nasopharynx, excellent outcomes were recorded. If only a few unintentional adenoid tags remained after resection, it was considered good; if large adenoid leftovers were found, it was considered fair. The depth of the resection was categorised as shallow, adequate, or excessive depending on the tissue dissection plane that was attained. Assessment of intraoperative concerns, such as harm to neighbouring structures, might be done within the operating room itself. The treating physician noted how satisfied he was with the outcome. Following a week, the patients' pain, neck stiffness, speech problems, and swallowing disorders were examined. A nasopharyngeal endoscopy was used to assess the success of the adenoidectomy. The length of time the patient required to recover before returning to his normal diet and activities was observed.

Statistical analysis

IBM SPSS Version. 21 was used for statistical analysis. Student’s paired ‘t’ test was used to calculate difference preoperatively and postoperative parameters. Microsoft Excelbook 2019 was used to prepare tables and graphs. P value <0.05 was considered for significance.

RESULTS

5% neonates were observed having age less than or equal to 5 years of age, 46% each neonates were observed having age from 6 to 10 years and 11 to 15 years, 3% cases were observed having age more than 15 years of age. All infants were female cases having age less than or equal to 5 years of age. Infants having 6-10 years, 45.65% were male infants and 54.35% were female infants. Out of 11–15 age infants 50% were male infants and 50% were female infants where All cases were male child who had age more than 15 years. Overall 10.45 mean age was observed among the study participants. 11.12 years mean age was observed in male child cases where 9.73 years mean age was statistically no significant difference was observed between the blood loss (p=0.96). Statistically significant decrease was observed between the Nasal obstruction score (p≤0.0001***).

Table 1: Age and gender distribution.

Age (years)	Male		Female		Total	
	No. of cases	Percentage (%)	No. of cases	Percentage (%)	No. of cases	Percentage (%)
≤5	0	0	5	100	5	5
6–10	21	45.65	25	54.35	46	46
11–15	28	50	28	50	46	46
>15	3	100	0	0	3	3
Total	52	52	58	58	100	100

Table 2: Duration of surgery and features.

Duration of surgery	Mean±S.D	P value
≤15	20.0±9.13	0.96
16–30	21.59±11.08	
>0	21.36±11.85	
Nasal obstruction		
Preop nasal obstruction	2±0.0	<0.0001***
Postop day1 nasal obstruction	2±0.0	
Postop day2 nasal obstruction	1.9±0.30	
Postop_day3_nasal_obstruction	1.88±0.33	
Postop day4 nasal obstruction	1.88±0.33	
Postop day7 nasal obstruction	1.19±0.39	
Postop day14 nasal obstruction	0.00±0.0	
Snoring		
Preop snoring	3±0.0	<0.0001***
Postop_day1_snoring	2.96±0.20	
Postop day2 snoring	2.89±0.31	
Postop day3 snoring	2.80±0.40	
Postop day4 snoring	2.58±0.50	
Postop day7 snoring	1.13±0.53	
Postop day14 snoring	0.0±0.0	
Obstructive breathing score		
Preop obstructive breathing	3±0.0	<0.0001***
Postop day1 obstructive breathing score	3±0.0	
Postop day2 obstructive breathing score	2.83±0.38	
Postop day3 obstructive breathing score	2.66±0.48	
Postop day4 obstructive breathing score	2.66±0.48	
Postop day7_obstructive_breathing_score	1.51±0.50	
Postop day14 obstructive breathing score	0.0±0	
Grades of adenoid		
Preop grade adenoid	3.13±0.80	<0.0001***
Postop grade adenoid	0.51±0.50	

Statistically significant difference was observed between the snoring score (p≤0.0001***). also statistically significant decrease was observed in obstructive breathing score (p≤0.0001***). All child cases were observed with 3 mean mouth breathing score, postoperatively at day 1, 2.97 mean score was observed,

at day 2 2.86 mean score was observed, at day 3 2.72 mean score was observed, at day 4 2.56 mean score was observed, at day 7 1.23 mean score was observed where at day 14, 0.4 mean mouth breathing score was observed. Statistically significant decrease was observed among the child with respect to mouth breathing score (p≤0.0001***). In the present study 39% child were observed with Grade 4 of adenoid, 35% cases were observed with grade 3 and 26% cases were observed with grade 2. 3.10 mean grade was observed among study participants. At post operatively 51% children were observed with Grade 1 adenoid and 49% children were observed with grade 0 adenoid. Post operatively 0.5 mean grade was observed among the children which shows statistically significant decrease in grade postoperatively (p≤0.0001***).

Table 3: VAS score.

Outcome	Mean±S.D.	P value
VAS		
Postop day1	3.22±0.58	<0.0001***
Postop day2	2.54±0.54	
Postop day3	1.54±0.54	
Postop day4	0.54±0.54	
Postop day7	0±0	

Significant decrease in VAS was observed postoperatively (p≤0.0001***). In the present study 9% children were recovered in less than or equal to 5 days, 57% children required 6 to 10 days, 32% children were observed having recovery time from 11 to 15 years and 2% children required more than 15 days to recover. 9.1 days mean recovery time was observed among the children with adenoid.

DISCUSSION

One of the procedures that is most frequently carried out on children is an adenoidectomy. Although not regarded as a risky procedure, bleeding (0.5–8% occurrence) is the most significant consequence.[7] The intraoperative haemorrhage, postoperative pain, and recovery time can all be significantly impacted by the surgical approach. This is crucial for day surgery procedures like adenoidectomy. Moreover, albeit uncommon, issues like nasopharyngeal stenosis and eustachian tube stenosis can be challenging to manage when they do.[8]

Adenoidectomy with power assistance and a microdebrider is a recently published technique. We prospectively evaluated patients in whom we did endoscopic guided power aided adenoidectomy and reviewed its strengths and demerits. For tissue debridement during endoscopic sinus surgery, when accuracy is needed to prevent orbital or cerebral invasion, the microdebrider has been used extensively.[9] A transnasal endoscopic method for adenoidectomy with microdebrider has been described.[10] Others have substituted a mirror for an endoscope when using it for visualisation.[11]

In the current study, an average procedure took 21.5 minutes, and there was a 23.82 ml blood loss. Those who underwent surgery for less than 15 minutes experienced a mean blood loss of 20.0, those who underwent surgery for 16 to 30 minutes experienced a mean blood loss of 21.59, and those who underwent surgery for more than 30 minutes saw a mean blood loss of 21.36 ml. According to statistics, there was no discernible difference between the blood loss. The concordance investigation by Harugop et al and Balia et al found that (p=0.96).[12,13] The surgeon discovered that continuous suction keeps a clear view while the oscillating cutting action of the razor blade reduces bleeding, improving safety. As opposed to the pushing and cutting action of the curette, which could leave bleeding tissue behind, the microdebrider's suction and shaving action draws the loose tissue into the window, allowing it to be removed down to a less vascular fascial plane. Using irrigation in conjunction with a microdebrider speeds up hemostasis. The outcomes of comparative investigations of partial adenoidectomy using the two techniques were comparable. To prevent velopharyngeal insufficiency, partial adenoidectomy is performed while keeping the lower portion of adenoid tissue in place.[8] This necessitates more precise tissue removal, which the microdebrider may provide. The adenoid curettes lack the control required to guarantee a restricted resection.[11]

In the present study 39% child were observed with Grade 4 of adenoid, 35% cases were observed with grade 3 and 26% cases were observed with grade 2. 3.10 mean grade was observed among study participants. Post-operatively, 51% of children had Grade 1 adenoid and 49% had Grade 0 adenoid, according to observations. Children's postoperative grades dropped by 0.5 mean grade points on average, which is statistically significant (p≤0.0001***). In a study by Harugop et al, they noted that five children had Grade 2 adenoid, twelve had Grade 3 adenoid, and three had Grade 4 adenoid prior to surgery.[12] After surgery, Grade 1 adenoids were found in 19 cases and Grade 2 adenoids in one case. The completeness of clearance is statistically significant when comparing pre- to post-operative endoscopic adenoid grading, it was clear from the paired test.

Two (7.3%) of the 26 children in the trial by Das et al who had grade 3 at the beginning of the treatment also had grade 1, sixteen (61.5%) had grade 2, and eight (30.8%) had grade 3 AH after standard adenoidectomy.[13] After a conventional adenoidectomy, only 9 (26.5%) of the 34 children who initially had grade 4 AH also had grade 2, 20 (58.8%), grade 3, and 5 (14.7%) had grade 4 AH.

Using a microdebrider rather than a curette, Stanislaw et al discovered that the tissue dissection was more thorough and reached the proper depth.[11] Also, the

surgeon reported feeling happier. According to a prospective study using endoscopic evaluation of cases treated with a curette and a microdebrider, 39% of patients who had traditional curette adenoidectomy had obstructive tissue that was later entirely removed by powered shaver adenoidectomy.[10]

These tests confirmed our experience with the microdebrider in terms of the thoroughness of adenoid tissue removal to the necessary depth and inflicting no harm to neighbouring structures. While being a subjective measure, surgeon satisfaction was undoubtedly high. None of the patients who came in for long-term follow-up displayed any Eustachian tube stenosis symptoms or indicators. There are benefits to using a rigid endoscope or sinuscope. It enables clear visualisation, guaranteeing the removal of all adenoid tissue—even that located intranasally and at great heights—without causing any harm to neighbouring structures.

An endoscopic power assisted adenoidectomy takes advantage of the telescope and the microdebrider's advantages. Using a microdebrider has some drawbacks. It necessitates the use of pricey machinery, including the expense of replacing blades. A telescope on the same side of the nose can make it difficult to get the microdebrider tip into the nasopharynx, according to some writers.[14]

CONCLUSION

Adenoidectomy is a popular Otolaryngologic treatment done in kids of all ages for a variety of reasons, and often after standard curettage, there is remaining adenoid tissue that doesn't help the symptoms. Adenoidectomy with help from a microdebrider has proven to offer complete clearance with only a slight increase in bleeding and procedure time. Despite the higher cost of surgery, the precise dissection carried out under vision, fewer issues, and more disease clearance make this treatment a safe and effective alternative to the blind curettage method.

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