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Comparison of traditional adenoidectomy with endoscopically assisted micro-debrider adenoidectomy: A study conducted at a tertiary healthcare facility

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Abstract
Introduction and Background: Adenoid hypertrophy frequently leads to otitis media, recurrent infections, and blockage of the upper airway in children, and surgical removal is often necessary to alleviate these symptoms. The purpose of this research is to evaluate TA and EAMA in a tertiary care setting for paediatric adenoidectomy patients, comparing their effectiveness, safety, and postoperative results.
Materials and Methods: Over the course of 18 months, 120 children with adenoid hypertrophy participated in this prospective comparative study. This study was conducted at the department of ENT, I-Care Institute of Medical Sciences and Research, Haldia, West Bengal, India from July 2018 to June 2019. Two groups were randomly assigned to the patients: There were 60 patients in Group A who had curettage for a conventional adenoidectomy. Members of Group B (n = 60) had adenoidectomy procedures that were aided by endoscopes. Time to resume regular food, recurrence rates, remaining adenoid tissue, intraoperative haemorrhage, postoperative discomfort (VAS score), and time to reopen nasal passages were all recorded during a 6-month follow-up.
Results: Although EAMA required a slightly longer amount of time to perform the operation, the advantages of increased precision, decreased complications, and greater symptom relief more than compensated for this brief disadvantage. A considerable reduction in intraoperative haemorrhage, a decrease in the amount of residual adenoid tissue, a reduction in postoperative pain, and a speedier recovery were all observed using EAMA. The rate of recurrence was reduced in EAMA, and the clearance of nasal obstruction was higher in this category.
Conclusion: A safer and more effective alternative to traditional adenoidectomy, endoscopically assisted micro-debrider adenoidectomy (EAMA) provides improved surgical precision, reduced intraoperative bleeding, faster recovery, and lower recurrence rates. All things considered, EAMA is the way to go when it comes to adenoidectomy in kids. To validate these results and evaluate long-term effects, additional large-scale investigations are suggested.

Keywords: Adenoidectomy, endoscopic surgery, pediatric ENT, airway obstruction

Introduction
Recurrent upper respiratory tract infections, snoring, persistent nasal congestion, mouth breathing, sleep-disordered breathing, and upper airway blockage are prominent symptoms of adenoid hypertrophy, a frequent condition in children. Complications like otitis media with effusion might develop as a result, which can lower quality of life, impede speech development, and impair hearing. Surgical excision of the adenoids is required when non-invasive medical treatments do not alleviate symptoms. It is well-known that adenoidectomy improves nasal airflow, resolves recurring infections, and prevents complications [1-3].
For many years, the gold standard surgical procedure for adenoidectomy (TA) was curettage or electrocautery. Despite its effectiveness, this procedure does have certain drawbacks. These include the possibility of recurrence, significant intraoperative bleeding, and partial removal of adenoid tissue. Blind surgery, in which the surgeon relies on tactile cues instead of direct vision, raises the possibility of leaving leftover adenoid tissue behind. The apertures of the Eustachian tubes and other nearby structures can be severely damaged by conventional methods, which increase the risk of postoperative problems and lengthens the time it takes to recover [2-4].
A new surgical approach called endoscopically aided micro-debrider adenoidectomy (EAMA) has been developed recently. This method employs a motorised rotating micro-debrider system that is guided by endoscopes.

This technique allows for precision adenoid tissue excision with minimal injury to neighbouring structures by providing real-time visualisation of the surgical site. Reducing intraoperative bleeding, improving surgical field clarity, and lowering the risk of recurrence are all outcomes of using a micro-debrider for controlled, suction-assisted excision of hypertrophic adenoid tissue. When compared to conventional adenoidectomy, EAMA has been shown in multiple studies to have better long-term benefits, less postoperative pain, and a quicker recovery time [5-7].

Despite all these benefits, there hasn't been a thorough clinical trial comparing EAMA with TA to determine which is better and safer. Although there have been studies suggesting that EAMA improves surgical results, the evidence is still inconclusive and more research is required to confirm its advantages over conventional procedures. Considering the increasing demand for less invasive surgical procedures, it is crucial to determine if the improved visibility and accuracy provided by EAMA result in substantial therapeutic benefits for paediatric patients having an adenoidectomy [6-8].

In this tertiary care paediatric study, we will compare endoscopically assisted micro-debrider adenoidectomy versus standard adenoidectomy. In order to better understand the efficacy and safety of both procedures, this study analyses important surgical characteristics like operative time, intraoperative blood loss, postoperative discomfort, symptom resolution, recurrence rates, and overall recovery. This study's results will aid in clinical decision-making and better patient outcomes by establishing whether EAMA is the best strategy for adenoidectomy in children [7-9].

Materials and Methods

This prospective, comparative investigation was performed at a tertiary healthcare institution over 18-month duration. This study was conducted at the department of ENT, I-Care Institute of Medical Sciences and Research, Haldia, West Bengal, India from July 2018 to June 2019. The study sought to assess the disparities in surgical outcomes between traditional adenoidectomy (TA) and endoscopically aided micro-debrider adenoidectomy (EAMA) in paediatric patients exhibiting symptomatic adenoid hypertrophy. One hundred twenty paediatric patients, aged 4 to 12 years, necessitating adenoidectomy for clinically determined adenoid hypertrophy, were included in the study. Patients were randomly allocated into two groups: Group A (TA, n = 60): Received conventional adenoidectomy via curettage. Group B (EAMA, n = 60): Received endoscopically assisted micro-debrider adenoidectomy.

Inclusion Criteria

1. Children aged 4 to 12 years diagnosed with symptomatic adenoid hypertrophy.
2. Evidence of adenoid enlargement on nasal endoscopy or lateral nasopharyngeal X-ray.
3. No history of prior adenoidectomy or other nasopharyngeal surgeries.

Exclusion Criteria

1. Coagulation disorders or any systemic conditions that increase surgical risk.
2. Acute infections of the upper respiratory tract at the time of surgery.
3. Children with a history of recurrent tonsillitis requiring concurrent tonsillectomy.
4. Parents/guardians who did not consent to participation in the study.

Results

The study comprised 120 paediatric patients with adenoid hypertrophy, with an average age of 7.2±2.3 years. Half of the patients had endoscopically aided micro-debrider adenoidectomy (EAMA) and the other half had traditional adenoidectomy (TA). Time spent operating, blood loss during surgery, amount of leftover adenoid tissue, pain felt after surgery, length of time to recovery, symptoms completely gone, and rates of recurrence over a 6-month follow-up were the variables included for analysis.

Table 1: Comparison of Intraoperative and Postoperative Parameters

Parameter	Traditional Adenoidectomy (TA) (n = 60)	Endoscopic Micro-Debrider Adenoidectomy (EAMA) (n = 60)	p-value
Operative Time (min)	17.8±3.4	21.2±4.1	0.038
Intraoperative Blood Loss (mL)	18.5±4.2	9.8±2.1	0.001
Residual Adenoid Tissue (%)	18.3%	3.5%	0.002
Postoperative Pain (VAS) – Day 1	4.7±1.3	3.2±1.1	0.006
Postoperative Pain (VAS) – Day 3	3.5±1.2	1.9±0.8	0.009
Return to Normal Diet (days)	2.8±0.9	1.9±0.7	0.012

Although the EAMA group had a slightly longer operating time (21.2±4.1 minutes) than the TA group (17.8±3.4 minutes), this disparity was not found to be statistically significant (p = 0.038). Nonetheless, there was a considerable decrease in intraoperative bleeding (9.8±2.1 mL vs. 18.5±4.2 mL, p = 0.001) and remaining adenoid tissue (3.5% vs. 18.3%, p = 0.002) as a consequence of EAMA. On both postoperative days 1 and 3, the EAMA group had significantly less postoperative pain as evaluated by the Visual Analogue Scale (VAS) (3.2±1.1 vs. 4.7±1.3, p = 0.006) and 1.9±0.8 vs. 3.5±1.2, p = 0.009). A quicker recovery to regular eating and activity was noted in the EAMA group of patients (1.9±0.7 days vs. 2.8±0.9 days, p = 0.012).

Table 2: Symptom Resolution and Recurrence Rates at 6-Month Follow-Up

Outcome Parameter	Traditional Adenoidectomy (TA) (n = 60)	Endoscopic Micro-Debrider Adenoidectomy (EAMA) (n = 60)	p-value
Nasal Obstruction Resolution (%)	78%	92%	0.015
Snoring Reduction (%)	72%	89%	0.021
Recurrence of Adenoid Hypertrophy (%)	10%	2%	0.025
Need for Additional Intervention (%)	8%	3%	0.032

There was a statistically significant difference between the EAMA and TA groups at the 6-month follow-up in the rate of nasal obstruction resolution (92% vs. 78%, p = 0.015). Another finding indicated that the EAMA group had a decreased rate of adenoid hypertrophy recurrence (2% vs. 10%, p = 0.025). Patients in the EAMA group needed less supplementary medical treatment for lingering symptoms. Nasopharyngeal stenosis, infections, or severe bleeding were not recorded in either group.

Discussion

When adenoid enlargement causes symptoms in children, adenoidectomy is still a common surgical option. For a long time, the gold standard for adenoidectomy (TA) was curettage or electrocautery. However, these methods have their drawbacks, including the fact that they don't always remove all of the tissue, cause considerable bleeding during the procedure, and might potentially damage nearby structures. Equipped with benefits including real-time visualisation, controlled tissue removal, and fewer intraoperative complications, endoscopically assisted micro-debrider adenoidectomy (EAMA) has greatly enhanced surgical precision.

Surgery results, postoperative recovery, and recurrence rates were examined in this tertiary care study between TA and EAMA. Consistent with earlier research, the EAMA group had a somewhat longer average operating time (21.2±4.1 minutes) than the TA group (17.8±3.4 minutes). The use of endoscopic equipment and the meticulous dissection that is necessary with the micro-debrider are the reasons for the increase in time. The clinical benefits of better visualisation and accuracy, however, exceed the extra surgical time, so it's worth doing, even with this little increase [10-12].

When comparing the EAMA group (9.8±2.1 mL) with the TA group (18.5±4.2 mL, p = 0.001), there was a notable decrease in intraoperative blood loss. By sucking and removing tissue at the same time, a micro-debrider improves surgical field clarity and stops excessive bleeding. Conversely, conventional curettage frequently results in uncontrolled bleeding, necessitating extra haemostatic treatments; these measures can reduce visibility and heighten the dangers associated with the operation [11-13]. Using the Visual Analogue Scale (VAS), the EAMA group demonstrated noticeably reduced postoperative pain on both day 1 (3.2±1.1 vs. 4.7±1.3, p = 0.006) and day 3 (1.9±0.8 vs. 3.5±1.2, p = 0.009). The reason behind this is that the micro-debrider allows for more controlled tissue removal, resulting in less inflammation and collateral harm than the blind curettage approach. The speed at which patients in the EAMA group were able to resume their regular food and activities after surgery was directly influenced by the amount of pain they experienced; this difference was statistically significant (1.9±0.7 days vs. 2.8±0.9 days, p = 0.012) [14-16].

These results are in line with previous research that has shown endoscopic procedures can reduce postoperative morbidity, which in turn facilitates a more comfortable recovery for patients. Everyone wins when patients are able to heal faster: the hospital, the carers, and the patient themselves [17-19]. Snoring, nasal blockage, and mouth breathing are the most common reasons for adenoidectomy. Results showed that 92% of patients in the EAMA group and 78% of patients in the TA group had their nasal obstructions resolved after treatment (p = 0.015). Similarly, compared to TA patients, EAMA patients showed a much greater reduction in snoring (89% vs. 72%) (p = 0.021). More effective long-term symptom relief is achieved with EAMA because of its greater precision, which guarantees full removal of hypertrophic adenoid tissue [20-22].

The recurrence rate is an important metric for evaluating the efficacy of different adenoidectomy methods. The TA group exhibited a tenfold greater rate of adenoid hypertrophy recurrence than the EAMA group (2% vs. 10%, p = 0.025). Blind curettage leaves behind residual adenoid tissue, which can regenerate over time, and this is probably the cause of the higher TA recurrence. Adenoid tissue is nearly entirely removed with endoscopic guidance in EAMA, which decreases the chances of regrowth and revision operations.

The advantages of EAMA significantly surpass the little drawbacks, such as the need for specialised training, extra equipment, and a somewhat longer operating time [23-25].

There are certain drawbacks to this study, despite its positives. Recurrence rates may have been better studied with a larger sample size (more than 120 patients) and a longer duration of follow-up (more than 6 months). Results may also change across institutions due to differences in surgical experience and access to necessary equipment, as this investigation was only carried out at one tertiary healthcare facility. To confirm these results, larger cohorts and longer follow-ups from future multi-center trials are needed [25-27].

Conclusion

We found that endoscopically assisted micro-debrider adenoidectomy (EAMA) outperforms TA in surgical precision, intraoperative safety, postoperative recovery, and long-term symptom alleviation. Both methods relieve nasal blockage and symptoms, but EAMA reduces intraoperative blood loss, postoperative pain, recovery time, and recurrence rates. An endoscope improves visibility and thorough removal of adenoid tissue, reducing the likelihood of recurrence and revision surgery. EAMA is recommended in well-equipped surgical centres since its benefits outweigh its needs for training and equipment. These data suggest that EAMA should be the usual adenoidectomy procedure, especially for paediatric patients with hypertrophy adenoids. More multi-center studies with larger sample sizes and longer follow-ups are needed to confirm these results and examine long-term efficacy.

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None

Conflict of Interest

None

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