



EFFECTIVENESS OF MOMETASONE NASAL SPRAY IN CHILDREN WITH ADENOID HYPERTROPHY

Dr Lekshmi Devi V*	Junior resident, Department of ENT, Sree Uthradom Thirunal Academy of medical Sciences, Trivandrum 695028. *Corresponding Author
Dr Nayana Dileep	Junior resident, Department of ENT, Sree Uthradom Thirunal Academy of medical Sciences, Trivandrum 695028.
Dr Swapna U P	Professor and HOD, Department of ENT, Sree Uthradom Thirunal Academy of medical Sciences, Trivandrum 695028.
Dr Anjali Vinod	Assistant Professor, Department of ENT, Sree Uthradom Thirunal Academy of medical Sciences, Trivandrum 695028.
Dr Vaishnavi Sangeeth	Assistant Professor, Department of ENT, Sree Uthradom Thirunal Academy of medical Sciences, Trivandrum 695028.

ABSTRACT **Background:** Adenoid hypertrophy (AH) is the commonest cause of nasal obstruction and sleep disorder in children. Though adenoidectomy remains the mainstay of treatment, intranasal corticosteroids are emerging as an effective non-invasive alternative. **Objective:** To evaluate the effectiveness of mometasone furoate nasal spray in reducing symptoms of AH in children. **Methods:** This longitudinal hospital-based study involved 60 children aged 3–14 years diagnosed with AH. Mometasone furoate nasal spray (100 mcg/day) was administered for 12 weeks. Symptom scores and endoscopic grading were compared pre- and post-treatment. **Results:** 50 children responded to treatment. Statistically significant improvement ($p < 0.001$) was observed in all key symptoms: nasal obstruction, snoring, mouth breathing, hyponasality, and recurrent upper respiratory infections. Endoscopic grading showed marked reduction in adenoid size. **Conclusion:** Mometasone furoate nasal spray is an effective and safe medical therapy for symptomatic AH in children, with potential to delay or avoid surgery.

KEYWORDS :

INTRODUCTION

The adenoid is a mass of lymphoid tissue that becomes recognizable at 4 to 6 weeks of gestation. It is located in the mucous membrane of the roof and posterior wall of nasopharynx and is considered as a part of Waldeyer's ring. It may also extend into the fossa of Rosenmuller and the opening of the Eustachian tube, referred to as Gerlach's tonsil.¹

The adenoids play a key role in immune system development. They are at their smallest size at birth and gradually grow as immune development progresses. Both adenoids and tonsils are primarily composed of B-cells (50–65%), with a smaller presence of T-cells (40%) and mature plasma cells (3%). These structures are also involved in regulating the production of secretory immunoglobulins.²

Adenoid hypertrophy is a major cause of nasal airway obstruction in children. It is linked to a variety of clinical symptoms like nasal obstruction, mouth breathing, hypo nasal speech, chronic rhinosinusitis, recurrent otitis media, chronic otitis media with effusion, and sleep issues such as snoring, frequent awakenings, as well as severe obstructive sleep apnea. Chronic adenoiditis can also increase the risk of bacterial sinusitis. In otherwise healthy children, adenotonsillar hypertrophy is the primary cause of sleep-disordered breathing or obstructive sleep apnea.³

Delayed diagnosis and treatment of adenotonsillar hypertrophy can lead to complications such as dentofacial changes in children who breathe through their mouth. These may include palatal atresia, open bite, facial retrusion, increased inferior and total anterior facial height, and retroclination of the mandibular and maxillary incisors. It can also result in swallowing difficulties, reduced appetite, growth retardation, and in severe cases, cor pulmonale and congestive heart failure.⁴

The treatment of adenoid hypertrophy can involve either surgical or medical management, depending on the severity of symptoms. The most common surgical intervention is adenoidectomy, which significantly improves symptoms. However, this procedure can be associated with various complications, including hemorrhage, pain, infection, velopharyngeal insufficiency, pulmonary edema, dehydration, anesthesia-related risks, and atlantoaxial subluxation etc.⁵

Medical treatments for reducing adenoid size are limited. Infections can contribute to adenoid hypertrophy, so current medical

management primarily focuses on treating underlying infections. Although antibiotics, antihistamines, nasal decongestants, and saline douching have been used for a long time, their effectiveness has been found to be limited. Systemic steroids can temporarily reduce adenoid size, but their use is questioned due to potential adverse effects. Recently, topical nasal corticosteroid sprays have been used as a more effective option to reduce adenoid size and alleviate symptoms of nasal airway obstruction.

The current study is conducted to evaluate the effectiveness of mometasone furoate nasal spray in children with adenoid hypertrophy attending ENT department of Sree Uthradom Thirunal Academy of Medical Sciences, Thiruvananthapuram.

MATERIALS AND METHODS

The present study was a hospital based prospective observational study conducted in the Department of Otorhinolaryngology, Sree Uthradom Thirunal Academy of Medical Sciences, Thiruvananthapuram from September 2023 to August 2024 after obtaining clearance from the Institutional Ethical committee.

SAMPLE SIZE

Sample size is calculated in reference to the study of Role of mometasone furoate nasal spray in children with adenoid hypertrophy: impact on life style changes by Venkatesha B.K and Ravi Shekhar in the department of ENT ,S.S.Institute of Medical Sciences and Research Centre, Davangere, Karnataka ,from november 2017 to November 2019.⁶

$$n_{pairs} = \frac{(Z_{1-\alpha/2} + Z_{1-\beta/2})^2}{\Delta^2} + \frac{(Z_{1-\alpha/2})^2}{2} = \frac{(1.96 + 0.84)^2}{(0.31/0.68)^2} + \frac{2}{2} = 40$$

Inclusion Criteria

Children in the age group 3 to 14 years, both boys and girls, with adenoid hypertrophy who attended the outpatient department of Otorhinolaryngology of Sree Uthradom Thirunal Academy of Medical Sciences, Thiruvananthapuram during the study period were included.

Exclusion Criteria

Children with history of adenoidectomy and those who were not

willing to participate in the study were excluded from the study.

METHOD OF DATA COLLECTION

Demographic data, detailed clinical history, general examination and ENT examination were done and recorded on predesigned proforma. Clinical symptom evaluation was done by symptom scoring which included nasal obstruction, snoring, mouth breathing, recurrent attacks of upper respiratory infection (URI), hyponasal speech. Each of these symptoms were scored as 0 (absent), 1 (mild), 2 (moderate) and 3 (severe) based on Visual Analogue Scale (VAS). By nasal endoscopic examination adenoid size was assessed based on Clemens and McMurray Clinical grading and recorded.

Children were treated with mometasone furoate nasal spray 50 micrograms per nostril per day (total 100 microgram) for 8 weeks. Follow up of all recruited cases were done after 8 weeks. For non-responders, spray was discontinued and was proceeded with adenoidectomy. For responders, treatment was continued till 12 weeks. Pre-treatment and post-treatment symptom scores were compared statistically and endoscopic evaluation was done.

Statistical Analysis

Pre-treatment symptom scores were compared with post treatment symptom scores using paired t test. P value of < 0.05 was considered statistically significant. Data analysis was done using SPSS version 22.

RESULTS

1) Age Distribution

A total of 60 children were recruited out of which 10 did not show any improvement after 8 weeks of therapy, so they were proceeded with adenoidectomy. Remaining 50 patients aged between 3-14 years were included in the study. Out of the total 50 patients, 15 patients were less than 7 years of age, 20 patients were in the age group 7-10 years and 15 patients were in the age group 11-14 years.

Table 1: Age Distribution Of Study Population

Age (in years)	Frequency	Percentage
Less than 7	15	30%
7 to 10	20	40%
11 to 14	15	30%
Grand Total	50	100%

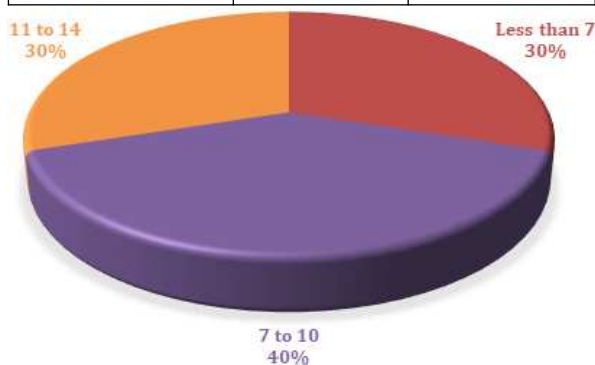


Figure 1: Age Distribution Of Study Population

2) Gender Distribution

Table 2: Distribution Of Study Population Based On Gender

Gender	Frequency	Percentage
Female	25	50%
Male	25	50%
Grand Total	50	100%



Figure 2: Distribution Of Study Population Based On Gender

3) Symptom Scoring

The mean symptom score for various symptoms among 50 children with adenoid hypertrophy is as follows:

- Snoring: 2.84 (before treatment), 1.4 (after treatment)
- Mouth breathing: 2.72 (before treatment), 1.12 (after treatment)
- Hyponasal speech: 2.6 (before treatment), 1 (after treatment)
- Nasal obstruction: 2.84 (before treatment), 1.14 (after treatment)
- Recurrent attacks of URI: 2.54 (before treatment), 1 (after treatment)

Table 3: Total symptom score before and after treatment

Symptom	No. of patients (N)	Before Treatment		After Treatment		Mean difference	Paired t test	
		Before Treatment	Standard Deviation	After treatment	Standard Deviation		P value	Significance
Snoring	50	2.84	0.37	1.4	0.49	1.44	<0.000	S
Mouth breathing	50	2.72	0.45	1.12	0.33	1.6	<0.000	S
Hyponasal speech	50	2.6	0.49	1	0	1.6	<0.000	S
Nasal obstruction	50	2.84	0.37	1.14	0.35	1.7	<0.000	S
Recurrent attacks of URI	50	2.54	0.5	1	0	1.54	<0.000	S

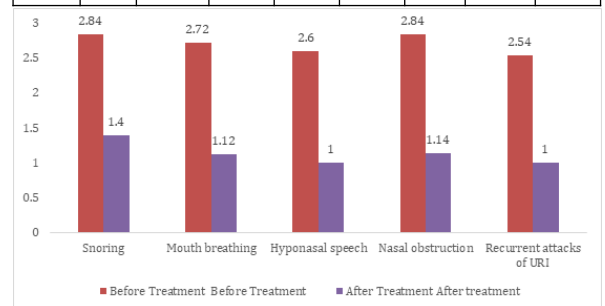


Figure 3: Total Symptom Score Before And After Treatment

4) Endoscopic Grading

Grade I: Adenoid filling 1/3rd of vertical height of choana.

Grade II: Adenoid filling 2/3rd of vertical height of choana.

Grade IV: Adenoid filling 2/3rd to nearly all of choana, but not completely obstructing it.

Grade IV: Adenoid completely obstructing the choana

Table 4: Pre-treatment Endoscopic Grading

Age Group	Grade 3	Grade 4
< 7	6	9
7-10	11	9
11 to 14	10	5

Table 5: Post-treatment Endoscopic Grading

Age Group	Grade 1	Grade 2
< 7	12	3
7-10	18	2
11 to 14	14	1

DISCUSSION

Although adenoidectomy is widely regarded as the treatment of choice for children with severe symptoms due to adenoid hypertrophy (AH), intranasal corticosteroids, particularly mometasone furoate (MF) nasal spray, offer a viable non-surgical alternative. They are often used either to avoid or delay surgery, especially in cases where various factors such as parental apprehension, co-existing medical conditions, and the child's nutritional status influence the decision for surgical intervention.

Intranasal corticosteroids have gained popularity due to their ease of availability, rapid onset of action, favorable safety profile, and convenience of administration. Their non-invasive nature and ease of application allows for long-term use, make them particularly suitable in pediatric populations. This simple therapeutic approach significantly improves quality of life while minimizing the risk of surgical complications.

The findings of the current study are consistent with previous research. Bhat et al., in their comparative study titled "*Steroid nasal spray versus curettage adenoidectomy in school children*," reported that MF nasal spray effectively controlled co-existing nasal conditions such as allergic rhinitis and sinusitis, which are common contributors to persistent nasal discharge in children.⁸

According to a systematic review by Passali et al., MF intranasal spray has been shown to be effective in treating allergic and inflammatory conditions of the nose and paranasal sinuses, offering superior symptom control compared to other intranasal sprays, and is safe to use in children and pregnant women.⁹

Similarly, Sobhy et al. demonstrated a highly significant reduction in nasal obstruction symptoms following intranasal steroid spray administration in children with AH.¹⁰

Bhargava and Chakravarti also reported statistically significant improvements in nasal obstruction scores (from 2.67 to 0.23; $p=0.0001$) following 24 weeks of MF nasal spray use.¹¹ Moreover, their study noted substantial improvement in otitis media with effusion (OME) and overall quality of life, further supporting the efficacy of MF nasal spray in managing AH. The outcomes of the present study align closely with these previous reports, reinforcing the potential of MF nasal spray as an effective medical management strategy for adenoid hypertrophy in children.

CONCLUSION

Mometasone furoate nasal spray improves the symptoms of nasal obstruction, snoring, mouth breathing, hyponasalality, recurrent attacks of URI in children with adenoid hypertrophy. Studies involving larger population and a longer follow up for recurrence of symptoms might give insight into the long term efficacy of MF nasal spray and adverse events.

REFERENCES

1. Watkinson JC, Clarke RW. Chapter 26. Scott Brown's otolaryngology- head and neck surgery. 8th ed. Vol. 2. p. 285.
2. Flint PW, Haughey B, Lund VJ, Niparko JK, Richardson MA, Robbins KT et al. 61. Cummings otolaryngology head and neck surgery. 5th ed. Vol. 3. p. 1947.
3. Izu SC, Itamoto CH, Pradella-Hallinan M, Pizarro GU, Tufik S, Pignatari S, et al. Obstructive sleep apnea syndrome (OSAS) in mouth breathing children. *Braz J Otorhinolaryngol* 2010;76:552-556.
4. Shirley W, Wooley AL, Wiatrak BJ. Cummings Otolaryngology Head and Neck Surgery; P.W. Flint, B.H. Haughey, V.J. Lund (Eds.) et al. Mosby; 2010.
5. Ghafar MHA et al. Mometasone furoate intranasal spray is effective in reducing symptoms and adenoid size in children and adolescents with adenoid hypertrophy, *Acta Otorrinolaryngol Esp. Eng ed*:2020 May-June.
6. K VB, Ravi Shekhar. Role of mometasone furoate nasal spray in children with adenoid hypertrophy: impact on life style changes. *International Journal of Otorhinolaryngology and Head and Neck Surgery*. 2020 Aug 25;6(9):1709–9.
7. Peter J. Robb, The Adenoid and Adenoidectomy, Scott Brown's Otorhinolaryngology Head and Neck Surgery, Eighth Edition Volume 2- chapter 26, -285-290
8. Bhat VK, Razi AM, Kumar VB. Steroid nasal spray versus curettage adenoidectomy in school children-a randomized controlled trial. *J Otolaryngol ENT Res*. 2017;8(5):259
9. Passali D, Spinosi MC, Crisanti A, Bellussi LM. Mometasone furoate nasal spray: a systematic review. *Multidisciplinary Respiratory Medicine*. 2016 May 2;11(1).
10. Sobhy TS. Role of intranasal steroid in the prevention of recurrent nasal symptoms after adenoidectomy. *Int J Otolaryngol*. 2013.
11. Bhargava R, Chakravarti A. Role of mometasone furoate aqueous nasal spray for management of adenoidal hypertrophy in children. *J Laryngol Otol*. 2014;128(12):1060-6.