

Original Research Article

Role of mometasone furoate nasal spray in children with adenoid hypertrophy: impact on life style changes

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ABSTRACT

Background: Adenoid hypertrophy (AH) is a common cause of upper airway obstruction and obstructive sleep apnea syndrome (OSAS) in children having major impact on child's growth and development. Symptoms like nasal congestion, mouth breathing, nasal discharge, snoring, day time sleepiness, hyponasal voice, ear popping, and craniofacial abnormalities are observed. Adenoidectomy is considered the treatment of choice for symptomatic children. Co-existing medical illnesses and choice of surgical treatment is governed by the paediatricians and apprehensive parents. Need for conservative treatments in alleviating symptoms have been tried. Topical, intranasal administered, steroid preparations have been proven effective in the literature.

Methods: In this prospective study, 35 symptomatic children (3-12 years) with adenoid hypertrophy were included. Each of the symptoms was scored from 0 (absent) to 4 (severe) over Visual Analogue Scale (VAS). Nasal obstruction index was calculated. Results of mometasone furoate nasal spray 100 microgram/day used once daily at the interval of 8 weeks and 12 weeks were analysed using statistical tests.

Results: A statistically significant reduction in nasal obstruction index and other symptoms were noted at the end of third month follow up.

Conclusions: Mometasone furoate nasal spray caused improvements in outcomes of nasal obstruction, snoring, total nasal symptoms, ear symptoms and overall quality of life.

Keywords: Adenoid hypertrophy, Mometasone furoate, Nasal obstruction index, Adenoidectomy, Obstructive sleep apnea syndrome

INTRODUCTION

Adenoidal hypertrophy (AH), a common disorder in children, presents with symptoms ranging from nasal obstruction to obstructive sleep apnea syndrome (OSAS). Present at birth, this lymphoid structure undergoes hypertrophy until 7 years of age, reaching a maximal size around the age of 4 years; later begins to atrophy until it almost invariably disappears in adulthood.

Adenoidectomy is considered the treatment of choice for symptomatic children. In view of surgical risks involved,

younger age, adenoid as an immune organ, parents are often apprehensive and view adenoidectomy as their last option, which is also endorsed by many pediatricians and general practitioners. Co-existing medical illnesses and choice of surgical treatment is often governed by the pediatricians and apprehensive parents. Need for conservative treatment in alleviating symptoms has been tried. Topical, intranasal administered, steroid preparations have been proven effective in the literature.

Demain et al described the first successful use of intranasal steroid therapy, and found significantly reduced nasal

obstruction symptom score and mean reduction in adenoid choana ratio at the end of 24 weeks of treatment.¹

Mometasone furoate (MF) being a potent 17-heterocyclic corticosteroid and on intranasal administration, has higher binding affinity to corticosteroid receptors, poor systemic concentration (0.1%), and extensive first pass metabolism.² MF is preferred for following reasons: the drug had been reported previously not to cause any adverse tissue changes in the nasal mucosa of patients treated for long periods, it has no effects on growth in children, it has no effects on the hypothalamic-pituitary-adrenal axis and the systemic availability of the drug after topical administration is lower than that of other steroids.³⁻⁶

In this study we are examining the effects of the intranasal mometasone on nasal obstruction symptom relief as assessed by nasal obstruction index and other symptom score and its effect on quality of life.

METHODS

A prospective study of 2 years duration duration (November 2017 to November 2019), after obtaining institutional ethical committee clearance, 42 children of consenting parents attending ENT OPD of SSIMS and RC Hospital, Davangere, aged between 3-12 years diagnosed to have symptomatic adenoid hypertrophy, with size of adenoid obstructing >75% of nasopharynx, were included in the study.

Children with concomitant tonsillar hypertrophy; positive history of allergy or atopy, upper respiratory infection in past 2 weeks; nasal anatomical anomaly like nasal septum deviation; sinonasal disease such as nasal polyposis; craniofacial malformation including cleft lip, cleft palate; genetic disorders like Down’s syndrome; neurologic disorders; cardiovascular disease; immunodeficiency and children with history of epistaxis or hypersensitivity to steroids were excluded from the study.

Clinical symptom evaluation was done by eliciting response from parent/child in a pre-structured questionnaire which encompassed, nasal congestion, mouth breathing, nasal discharge, snoring, day time sleepiness, hyponasal voice, ear popping. Each of these symptoms was scored from 0 (absent) to 4 (severe) over visual analogue scale (VAS). Nasal obstruction index was calculated by averaging the scores measured over point scale for mouth breathing and speech hyponasality symptoms.

Intervention

Children were treated with MF nasal spray 50 microgram per nostril per day (total 100 microgram) for 8 weeks. Follow up of all recruited cases was done after 8 weeks. For non-responders spray discontinued and for responders’ treatment was continued till 12 weeks. Pre-treatment and

post-treatment symptom scores were compared statistically.

Statistical analysis

Pre-treatment symptom scores was compared with post treatment symptom scores using unpaired t test. P value of <0.05 was considered statistically significant. IBM SPSS Version 22 for windows was used for analyzing the data.

RESULTS

Age distribution

A total of 42 children were recruited out of which 4 children were lost in follow up and 3 had not shown any improvement after 8 weeks of therapy, and hence were excluded from the study. Total 35 patients aged between 3-12 years were included in study. Out of total 35 patients 8 patients were less than 5 years of age. Majority (20) of patient were in age group 6-10 years; 7 patients were in the age group of 11-12 years. Youngest patient was 3 years old and oldest patient was 12 years old (Table 1). Mean age of patients included in study is 7.7 years. Minimum age was 3 years and maximum age was 12 years.

Table 1: Age distribution of study population.

Age (in years)	Frequency
< 5	8
6-10	20
11-12	7
100.0	100.0

Snoring symptom

35 patients had mean symptom score of 2.31 Mean score after intervention was 1.40, mean difference obtained was 0.914.

Frequent cold

31 patients had mean symptom score of 1.40 on day of inclusion in the study. Mean score after intervention was 0.71, mean difference obtained was 0.686.

Mouth breathing

35 patients had mean symptom score of 2.40 and standard deviation of 0.50 on day of inclusion in the study. Mean score after intervention was 1.51 and standard deviation of 0.51, mean difference obtained was 0.886.

Nasal obstruction

35 patients had mean symptom score of 2.31 on day of inclusion in the study. Mean score after intervention was 1.31 mean difference obtained was 1.

Table 2: Total symptom score before and after treatment.

Symptom Score	No. of patients (N)	Before		After		Mean difference	Paired t test	
		Mean	Standard Deviation	Mean	Standard Deviation		P value	Significance
Snoring	35	2.31	0.47	1.40	0.55	0.914	<0.000	S
Frequent cold	31	1.40	0.77	0.71	0.57	0.686	<0.000	S
Mouth breathing	35	2.40	0.50	1.51	0.51	0.886	<0.000	S
Nasal obstruction	35	2.31	0.47	1.31	0.53	1.000	<0.000	S
Hyponasality of voice	35	2.00	0.64	1.40	0.60	0.600	<0.000	S
Ear popping	16	0.71	0.86	0.40	0.50	0.314	<0.000	S

Table 3: Nasal obstruction index symptom score before and after treatment.

Total nasal obstruction index	No. of patients (N)	Mean	Standard Deviation	Mean difference	Paired t test
Before	35	0.53	0.11	0.15	P<0.000, Significant
After	35	0.38	0.11		

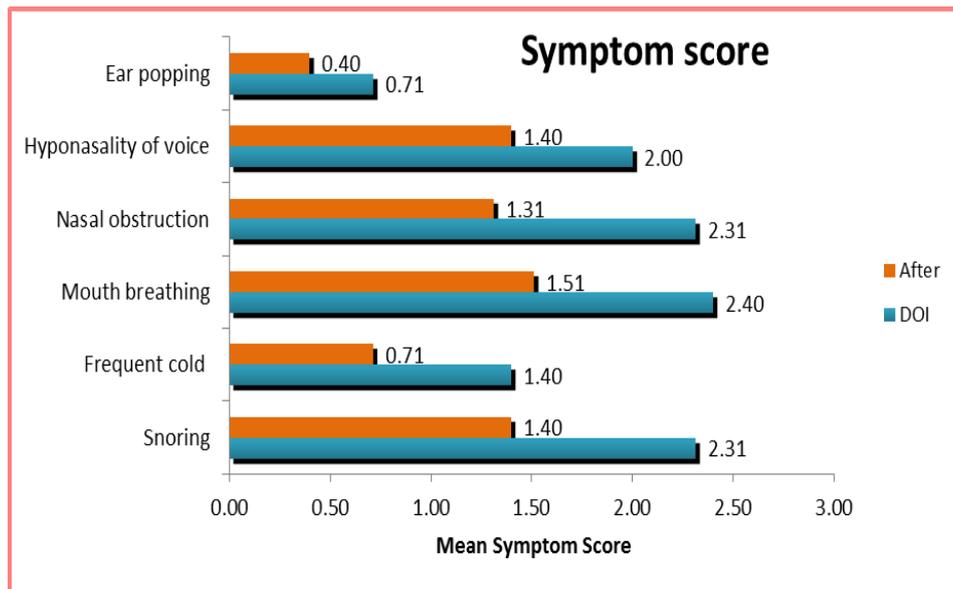


Figure 1: Symptom score improvement.

Hyponasality of voice

35 patients had mean symptom score of 2.0 and standard deviation of 0.64 on day of inclusion in the study. Mean score after intervention was 1.40 and standard deviation of 0.60, mean difference obtained was 0.60.

Ear popping

16 patients had mean symptom score of 1.56 on day of inclusion in the study. Mean score after intervention was 0.94, mean difference obtained was 0.16 (Table 2).

Nasal obstruction index

35 patients had mean symptom score of 0.53 and standard deviation of 0.11 on day of inclusion in the study. Mean score after intervention was 0.38 and standard deviation of 0.11, mean difference obtained was 0.15. P values obtained was <0.00 which was statistically significant (Table 3) (Figure 1).

DISCUSSION

Adenoidectomy though considered the treatment of choice for children with severe symptoms caused by AH, steroid

nasal sprays form an alternative to adenoidectomy or to postpone adenoidectomy. In view of choice of surgical treatment is governed by various factors like referring paediatrician, general physician's beliefs, co-existing medical illnesses, weight of the children and parents apprehension for surgery. Intranasal administration of corticosteroids is very popular because of its easy availability, being fast, well tolerated by patient, simple method of use, not requiring cooperation and can be used for longer duration. It is the simple way of treating the patients, to improve their quality of life, at the same time decreasing the risk of complications.⁷

Nasal obstruction index

It was introduced and used by Paradise et al. In a study of 'Assessment of adenoidal obstruction in children: clinical signs versus roentgenographic findings' author concluded that standardized clinical ratings of the degree of children's mouth breathing and speech hyponasality provide reliable and reasonably valid assessments of the presence and degree of adenoidal obstruction of the nasopharyngeal airway.⁸ Contradictory to this study, Torretta and Marchisio concluded that nasal obstruction index (NOI) cannot be utilised in assessment of adenoid hypertrophy.⁹ Hence in our study we included other clinical symptoms scoring along with NOI in determining the usefulness of the symptom score in evaluation of the responsiveness to mometasone nasal spray.

Hultcrantz et al in their study on 'To treat snoring with nasal steroids effects on more than one level?' concluded that receptors for corticosteroids are available in the uvular tissue as well as in the nasal mucosa, thus nasal steroids may have an effect on reducing oedema and snoring. For the patients who react positively, the treatment with intranasal steroids will be a user-friendly and safe method compared with other tested drugs.¹⁰

In a study by Bhat et al on 'Steroid nasal spray versus curettage adenoidectomy in school children', found that MF nasal spray is useful in controlling concurrent conditions of the nose like allergic rhinitis and sinusitis, which also contribute to running nose especially in children.¹¹ Our study results are in concurrent with the findings of the above study.

Study by Sobhy on effect on intranasal steroid spray on nasal obstruction due to adenoid hypertrophy, authors found highly significant results in reduction in nasal obstruction.¹² In another study by Bhargava and Chakravarti, they found statistically significant reductions in symptom scores for nasal obstruction (2.67 to 0.23; p=0.0001) after 24 weeks of use of MF nasal spray.⁸ They also noted that with six months of mometasone nasal spray statistically significant improvement in the otitis media with effusion (OME) with mometasone nasal spray as compared to the placebo group, and noted a statistically significant change in quality of life after MF nasal spray and results of our study matches with these studies.¹³

CONCLUSION

Mometasone furoate nasal spray improves the symptoms of nasal obstruction, snoring, ear popping, hyponasality, frequent cold and quality of life in non-allergic 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 if any. A placebo controlled RCT involving different for various age groups is required to evaluate its efficacy in children with adenoid hypertrophy.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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