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THE ROLE OF MOMETASONE FUROATE AQUEOUS NASAL SPRAY IN THE TREATMENT OF ADENOID HYPERTROPHY IN CHILDRENS OF 5-12 YEARS- AN OBSERVATIONAL STUDY

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Abstract:
Background: One of the common causes for nasal obstruction in children is adenoid hypertrophy which is a common indication for surgical removal due to associated diseases.
Objectives: The aim of the current study was to determine the effectiveness of mometasone furoate nasal spray in treatment of children with adenoid hypertrophy.
Methods: a prospective study comprised about analysis of mometasone furoate (MF) nasal spray for the treatment of adenoid hypertrophy on 72 children of age range between 5-12 years. MF nasal spray was prescribed to all patients for 3 hourly everyday for 3 months. Symptoms like Adenoid hypertrophy grading, nasal obstruction, snoring and interruption in mouth breathing were evaluated Pre and post treatment. Nasal obstruction was counted as mild, moderate and severe. Presence of snoring and interruption in mouth breathing were observed. The follow up was taken on 15th day, at the end of 1st month and 3rd month.
Results: Few common symptoms of adenoid hypertrophy were observed prior and after the treatment. Follow up period was evaluated on 15th day, 1 month and 3 month. Out of 72 patients, only 12 (16.66%) patients showed nasal obstruction by 3rd month, 9 (12.50%) patients had increase in adenoid size, 7 (9.72%) patients showed snoring and 10 (13.88%) patients showed interrupted mouth breathing. All the findings were statistically significant. Snoring was found to be more relieved symptom in all group patients than any other symptoms i.e. 7 (9.72%) patients.
Conclusion: Long term MF nasal spray treatment has good efficacy in treatment of nasal obstruction due to adenoid hypertrophy.
Keywords: adenoid hypertrophy, adenoidectomy, nasal obstruction, mometasone furoate (MF) nasal spray.

Introduction:

In conjunction with the palatine tonsils, lingual tonsils, and tubal tonsils, the adenoids make up the structure known as Waldeyer's Ring, a collection of mucosal-associated lymphoid tissue situated at the entrance of the upper aerodigestive tract. Blood supply to the adenoids includes the ascending pharyngeal artery, with some contributions from the internal maxillary and facial arteries.[1] the glossopharyngeal and vagus nerves provide sensory innervations to adenoids. Adenoid size tends to increase during childhood, usually reaching maximal size by age 6 or 7 before regressing by adolescence.[2] One of the common causes for nasal obstruction in children is adenoid hypertrophy.

Adenoidal hypertrophy (AH) and Adenotonsillar hypertrophy are common disorders in the pediatric population and can cause symptoms such as mouth breathing, nasal congestion, hyponasal speech, snoring, and obstructive sleep apnea (OSA), as well as chronic sinusitis and recurrent otitis media.[3] More serious long-term sequelae, typically secondary to OSA, include neurocognitive abnormalities (e.g. behavioral and learning difficulties, poor attention span, hyperactivity, below average intelligence quotient); cardiovascular morbidity (e.g. decreased right ventricular ejection fraction, left ventricular hypertrophy, elevated diastolic blood pressure); and growth failure.[4]

Adenoid hypertrophy can occur because of infectious and non-infectious etiologies. Infectious causes of adenoid hypertrophy include both viral and bacterial pathogens. Viral pathogens associated with adenoid hypertrophy include adenovirus, coronavirus, coxsackievirus, cytomegalovirus (CMV), Epstein-Barr

virus (EBV), herpes simplex virus, human bocavirus parainfluenza virus, and rhinovirus.[5] Many aerobic bacterial species have been implicated in contributing to infectious adenoid hypertrophy including alpha-, beta-, and gamma-hemolytic *Streptococcus* species, *Fusobacterium*, *Pept ostreptococcus*, and *Prevotella* species have also been identified as anaerobic organisms involved in causing infectious adenoid hypertrophy.[6] Multiple non-infectious causes of adenoid hypertrophy have also been suggested including gastroesophageal reflux, allergies, and exposure to cigarette smoke.[7] In adults, adenoid hypertrophy can also be a sign of a more serious condition such as HIV infection , lymphoma, or sino-nasal malignancy.[5,6]

In acute and chronic infectious adenoid hypertrophy, medical management with antibiotics is an appropriate first step. Amoxicillin can be used for uncomplicated acute adenoiditis, however, a beta-lactamase inhibitor such as clavulanic acid should be included for chronic or recurrent infections. Clindamycin or azithromycin are considered as alternatives in patients with penicillin allergies.[10] Nasal steroids have been suggested as an additional option for medical treatment with some short-term success noted. Adenoid hypertrophy is generally a self-limiting condition which resolves as the adenoids atrophy and regress by adolescence. However, given the potentially serious complications and impact on patient quality of life, surgical management of adenoid hypertrophy is employed for many patients annually.[11,12]

Topical nasal steroids most likely affect the anatomical component by decreasing inspiratory upper airway resistance at the nasal, adenoidal or tonsillar levels.[13] Corticosteroids, by their lympholytic or anti-inflammatory effects, might reduce adenotonsillar hypertrophy. Intranasal corticosteroids reduce cellular proliferation and the production of pro-inflammatory cytokines in a tonsil and adenoid mixed-cell culture system.[14] It is common indication for surgical removal in these patients due to multiple morbidities. In severe symptoms adenoidectomy is recommended, however there are limitations for surgery like cleft palate.[14,15] The safety of nasal steroid spray has been well reported. The aim of the current study is to determine the effectiveness of mometasone nasal spray in treatment of children with adenoid hypertrophy.

MATERIAL AND METHODS

This was a prospective study conducted in the outpatient department of ENT, Akash institute of medical sciences and research center, Devanhalli, Banglore, Karnataka; in the period of 6 months since January 2019 to July 2019. Study comprised about analysis of mometasone furate (MF) nasal spray for the treatment of adenoid hypertrophy on 72 children of age range between 5-12 years. The study was approved by the Institutional Research Ethics Committee and written informed consent was obtained from parents of all participants.

The inclusion criteria were as follows:
1. Patients aged between 5 to 12 years old,
2. Adenoid hypertrophy without tonsillar hypertrophy for a minimum of 12 months,
3. No sign of improvement despite medical treatment with antibiotics under parental control.
The exclusion criteria were as follows:
1. Use of any nasal or systemic steroid within the past 1 year.
2. Use of any nasal decongestant or anti-allergic medication within the past 2 weeks.
3. History of upper respiratory tract infection within the past 2 weeks.
4. History of one or more of the following conditions: genetic craniofacial, or neuromuscular syndromes, chronic epistaxis, immune disease, asthma, nasal surgery, septal perforation, nasal trauma within the last 3 months and hypersensitivity to MF.
Patients were divided in 3 groups according to age 5-8 year, 8-10 year and 10-12 year group. Mometasone Furoate nasal spray (Metaspray from Cipla Pharma) was prescribed to all patients for 3 hourly everyday for 3 months.

Adenoid hypertrophy endoscopic classification according to its anatomical relationship with adjacent structures such as vomer, soft palate and torus tubaris.[23]

- Grade 1- the adenoid tissue contacts with the torus tubaris;
- Grade 2- the adenoid tissue contacts with torus tubaris and vomer;
- Grade 3- the adenoid tissue contacts with torus tubaris, vomer and soft palate in resting position.

Symptoms like Adenoid hypertrophy grading, nasal obstruction, snoring and interruption in mouth

breathing were evaluated Pre and post treatment. Nasal obstruction was counted as mild, moderate and severe. Presence of snoring and interruption in mouth breathing were observed. The follow up was taken on 15th day, at the end of 1st month and 3rd month.

Statistical analysis: All the data was tabulated and transferred on MS excel sheet. Data analysis was carried out using statistical package for social science (SPSS, V 21) software. In all cases "p" value of less than 0.05 was indicative of statistical significance.

RESULTS

This was a prospective analytical study performed on 72 children suffering from adenoid hypertrophy. Children of age range between 5-12 year, were divided into three age groups i.e. 5-8 year, 8-10 year and 10-12 year group. Out of 72 patients 40 (55.55%) were male and 32 (44.44%) were female.

Group A included 20 (27.77%), Group B 27 (37.50%) and Group C had 25 (34.72%) patients. According to the findings as shown in Table 1, male predominance was higher and 8-10 year age group had highest number of patients.

Few common symptoms of adenoid hypertrophy were observed prior to the treatment. 29 (40.27%) patients had mild, 24 (33.33%) patients had moderate and 19 (26.38%) patients had severe nasal obstruction. Adenoid stage 1st grade was observed in 29 (40.27%) patients, 2nd grade in 26 (36.11%) patients and 3rd grade in 17 (23.61%) patients. Snoring was present in 48 (66.66%) patients. Mouth breathing was found to be interrupted in 52 (72.22%) patients. All the findings were statistically significant. According to Table 2, Snoring and mouth breathing were most predominant symptoms.

Follow up period was evaluated on 15th day, 1 month and 3 month. Out of 72 patients, only 12 (16.66%) patients showed nasal obstruction by 3rd month, 9 (12.50%) patients had increase in adenoid size, 7 (9.72%) patients showed snoring and 10 (13.88%) patients showed interrupted mouth breathing. All the findings were statistically significant. Snoring was found to be more relieved symptom in all group patients than any other symptoms i.e. 7 (9.72%) patients. All the findings were described as shown in Table 3.

Table 1: Demographic variables.

	Subgroup	Number	%
Gender	Male	40	55.55
	Female	32	44.44
Age in years	Group A (5-8)	20	27.77
	Group B (8-10)	27	37.50
	Group C (10-12)	25	34.72

Table 2: pre operative Severity of symptoms

Group	Nasal obstruction			Adenoid stage grading			Snoring		Mouth breathing		p-value
	Mild	Moderate	Severe	1	2	3	Present	Absent	Normal	Interrupted	
Group A	8	7	5	8	8	4	15	5	5	15	0.02
Group B	11	9	7	11	9	7	16	11	8	19	0.001
Group C	10	8	7	10	9	6	17	8	7	18	0.01
Total	29	24	19	29	26	17	48	24	20	52	
%	40.27	33.33	26.38	40.27	36.11	23.61	66.66	33.33	27.77	72.22	

Table 3: follow up.

Symptoms	Follow up Period	Group A	Group B	Group C	Total (%)	p-value
Nasal obstruction	15th day	12	13	17	42 (58.33)	0.001
	1 month	6	10	12	28 (38.88)	
	3 month	2	5	5	12 (16.66)	
Adenoid size	15th day	10	14	12	36 (50.00)	0.001
	1 month	7	9	8	24 (33.33)	
	3 month	3	4	2	9 (12.50)	
Snoring	15th day	11	12	13	36 (50.00)	0.005
	1 month	3	7	9	19 (26.38)	
	3 month	1	3	3	7 (9.72)	
Mouth breathing	15th day	13	15	16	44 (61.11)	0.002
	1 month	10	10	10	30 (41.66)	
	3 month	5	2	3	10 (13.88)	

DISCUSSION

Adenoid hypertrophy is one of the most common pathologic conditions in the pediatric age group. They present with nasal obstruction, which may be associated with snoring and mouth breathing. The most common treatment recommended is adenoidectomy, the surgery itself has some significant risks and postoperative complications. Also, there is a fear of surgery in children's parents.

In the previous study conducted by Paulussen et al,[11] hypothesized that the removal of adenoidectomy may harm the immunologic system.

This was a prospective analytical study performed on 72 children suffering from adenoid hypertrophy. Children of age range between 5-12 years, were divided into three age groups i.e. 5-8 year, 8-10 year and 10-12 year group. Out of 72 patients, 40 (55.55%) were male and 32 (44.44%) were female.

Group A included 20 (27.77%), Group B 27 (37.50%) and Group C had 25 (34.72%) patients. According to the findings as shown in Table 1, male predominance was higher and 8-10 year age group had the highest number of patients. This finding was similar to the results in the previous study conducted by Gupta V. et al1[7] in 2014 and Pai V. K. et al[18] in 2019. In contrast, the study conducted by Rezende R. M. et al[20] in 2012, which found higher female predominance.

Pai VK,[18] describes the long term maintenance therapy. Voluntary suspension of maintenance therapy surgery of this disorder, whereas its regular administration, may lead to successful results. A few common symptoms of adenoid hypertrophy were observed before the treatment. 29 (40.27%) patients had mild, 24 (33.33%) patients had moderate and 19 (26.38%) patients had severe nasal obstruction. This finding was similar to the results in the previous study conducted by Gupta V. et al1[7] in 2014 and Minshall et al[21] in 1998. They also found similar severity of nasal obstruction by adenoid hypertrophy.

Adenoid stage 1st grade was observed in 29 (40.27%) patients, 2nd grade in 26 (36.11%) patients and 3rd grade in 17 (23.61%) patients. Snoring was present in 48 (66.66%) patients. Gupta et al17 revealed that 45 patients were Grade 1 and 10 patients were Grade 2. Mouth breathing was found to be interrupted in 52 (72.22%) patients. All the findings were statistically significant. According to Table 2, Snoring and mouth breathing was the most predominant symptoms. A study done by Gupta et al[17] on snoring due to adenoids showed a significant improvement in all domains of obstructive sleep apnea due to adenoid hypertrophy. Demain JG et al1[9] in 1995, showed intranasal budesonide to decrease the severity of respiratory distress and the size of the adenoids, although mildly, with 6 weeks of use in children with mild OSA.

Follow up period was evaluated on the 15th day, 1st month and 3rd months. Out of 72 patients, only 12 (16.66%) patients showed nasal obstruction by 3rd month, 9 (12.50%) patients had an increase in adenoid size, 7 (9.72%) patients showed snoring and 10 (13.88%) patients showed interrupted mouth breathing. All the findings were statistically significant. Snoring was found to be a more relieved

symptom in all group patients than any other symptoms i.e. 7 (9.72%) patients. Gupta V. et al[17] in 2014 and Minshall et al[21] in 1998, reported a significant improvement in loud snoring, breath-holding, frequent awakening from sleep, breathing from the mouth, URTI frequency, and nasal discharge after 4 weeks of intranasal mometasone furoate treatment in children.

Adenoid hypertrophy is more common in children than in adults; the adenoids naturally atrophy and regress during adolescence. A recent meta-analysis presented by Feres et al in 2011,[13] showed the prevalence of adenoid hypertrophy among a randomized representative sample of children and adolescents was 34.46%. Pereira L et al[12] in 2018, in his meta-analysis, revealed that long term use of MF nasal spray found to be very effective in minimizing the obstructive symptoms caused by adenoid hypertrophy.

CONCLUSION

Our prospective analytical study performed on children having adenoid hypertrophy. Intranasal MF spray was prescribed to administer for nasal obstruction caused due to adenoid hypertrophy. Symptoms like Adenoid hypertrophy grading, nasal obstruction, snoring and interruption in mouth breathing were evaluated Pre and post-treatment. Nasal obstruction was counted as mild, moderate and severe. The presence of snoring and interruption in mouth breathing were observed. The follow up was taken on the 15th day, at the end of 1st month and 3rd month. All the symptoms were found to be milder in severity at the end of the 3rd month. So we can conclude that the long-term effect of intranasal MF spray may significantly improve nasal obstruction symptoms in children with moderate to severe adenoidal hypertrophy, and this improvement may be associated with a reduction of adenoid size.

In patients were adenoidectomy is contraindicated, long term MF nasal spray treatment has good efficacy in the treatment of nasal obstruction due to adenoid hypertrophy. As the number of patients in our study was limited, more sample sizes required to decide any definite conclusion.

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