Original Research Article

ROLE OF MOMETASONE FUROATE AQUEOUS NASAL SPRAY IN THE TREATMENT OF ADENOID HYPERTROPHY IN CHILDREN OF 5 -12 YEARS

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Abstract:

Background: Adenoid hypertrophy is the unusual growth of the adenoid (pharyngeal tonsil). Adenoid hypertrophy will cause an obstruction of the nasal airways. These will lead to a dentofacial growth anomaly that was defined as "adenoid facies". Surgical removal was the primary mode of treatment in chronic cases of adenoid hypertrophy. With expanding knowledge about the disease process and the immunological importance of adenoids, conservative management of adenoids was tried and various studies support this. Hence this study was taken up to find out the efficacy of intranasal mometasone furoate in the treatment of adenoidal hypertrophy.

Methods: This is a prospective observational qualitative study has got Institutional ethics committee (IEC) approval (Vide IEC Application No:ACAD,IE3B/2020-2021) included a total of 70 patients were selected for the study after applying inclusion and exclusion criteria .The study was carried out in outpatient clinic of Otorhinolaryngology department, Government general hospital, Kadapa between January 2021 to June 2022 after obtaining the written informed consent from caregivers of all 70 subjects in the age group of 5 to 12 years .

Results: In this study, the age of patients is 5 years to 12 years. 24.3% of patients belong to 5-6, 22.9% belongs to 7-8 years, 28.6 % belongs to 9-10 years, 24.3% between 11-12 years. The maximum clustering was 28.6% in the age group of 9-10 years. The mean age is 8.60 years. In this study total number of patients is 70 .48 out of 70 are male patients (68.6%), 22 out of 70 are female patients (31.4%). In this study 32.9 % patients have 4-5 months duration of symptoms, and 42.9% patients have 6-7 months of symptoms, 20.0% patients have 8-9 months of duration of symptoms, 4.3% have 10 to 11 months of duration of symptoms. In this study Xray nasopharynx showing grade- 2 adenoid hypertrophy 57.1% patients and grade -3 adenoid hypertrophy 42.9 % of patients at week 0, before intervention. Later after intervention at week 12 repeat Xray nasopharynx showing grade 1 adenoid hypertrophy is 57.1% and grade 2 AH is 32.9% and grade-3 adenoid hypertrophy is 10.0%. p value is <0.001 is statically significant. In this study after intervention, at week 12, 48.6% had absent symptom on nasal obstruction.41.4% had occasional nasal obstruction, and 10 % of patients had frequently nasal obstruction. p value is <0.001 is statistically significant. In the present study at first time presentation (week 0), 57.1 % patients are grade 2 adenoid hypertrophy, which accounted for 40 patients of total study population. 42.9% patients had grade 3 adenoid hypertrophy, which accounted for 30 patients of study population. In this study after intervention at (week 12),57.15 patients are grade1 of adenoid hypertrophy which accounted for 40 patients of total study population.32.9% patients had grade 2 adenoid hypertrophy .10.0 % patients had grade 3 adenoid hypertrophy .P value is <0.001 is statistically significant.

Conclusion: Intra nasal Mometazone furoate (MF) therapy can reduce adenoid hypertrophy and decrease obstructive symptoms. It is a useful alternative to surgery, especially in cases where surgery is contraindicated or likely to post pone. Further studies with longer follow up period are warranted to determine the fate of adenoid after medical treatment

Key words: Adenoids, Adenoid hypertrophy, Intranasal corticosteroids.

INTRODUCTION

The adenoid, or nasopharyngeal tonsil, is situated in the roof and posterior wall of the nasopharynx1 and it forms part of waldeyer's ring of lymphoid tissue at the entry to the upper respiratory tract. Surgical removal was the primary mode of treatment in chronic cases of adenoid hypertrophy. With expanding knowledge about the disease process and the immunological importance of adenoids, conservative management of adenoids was tried and various studies support this .2 Adenoid hypertrophy usually present with nasal obstruction, nasal discharge and sneezing which are milder symptoms. Sometimes it may present with snoring and obstructive sleep apnoea. Otitis media with effusion may complicate the disease process. Severe cases have a typical facial expression called 'adenoid facies'.3 Adenoid hypertrophy is the unusual growth of the adenoid (pharyngeal tonsil) first described in 1868 by the Danish physician Meyer(4) (1824–1895) in Copenhagen. He described an adenoid hypertrophy that will

cause an obstruction of the nasal airways. These will lead to a dentofacial growth anomaly that was defined as "adenoid facies"

In 1861 George Catlin published many engravings illustrating adenoid facies and its complications in his book Breath of Life (5), where he advocated nose-breathing. Denmark, proposed that adenoid vegetations were responsible for nasal symptoms and impaired hearing.

TREATMENT OF ADENOID HYPERTROPHY (22)

1. MILD /INFREQUENT SYMPTOMS -MEDICAL MANAGEMENT: Control of recurrent respiratory /aural infection with Antibiotics ,Anti-histamines , decongestants , Steroid nasal spray like Mometasone may be tried along with improving nutritional status and breathing exercises .

2. MODERATE -SEVERE/PERSISTENT SYMPTOMS:

Adenoidectomy ,Myringotomy and grommet insertion may be required if associated with associated otitis media with effusion .

ROLE OF INTRA NASAL STEROIDS IN INFLAMMATION: Intranasal corticosteroids are effective in adenoid hypertrophy associated with nasal congestion (29) .'Intranasal corticosteroids' decrease the adenoid hypertrophy as well as nasal congestion and decrease inflammatory mediators secreted from activated lymphocytes, epithelial cells, mast cells and inflammatory cells. These are now the mainstay of treatment in symptom management in adenoidal hypertrophy.

1. Given "as needed" to relieve intermittent or worsening symptoms, on a regular basis for one month in cases of adenoidal hypertrophy with recurrent nasal symptoms.

2. The choice between oral or systemic antibiotics, antihistamines, NSAID's and combination therapy depends on the availability of medications and every patient's individual response in terms of both symptom relief and side effects.

A course of intranasal corticosteroid is more effective than a course of treatment with antibiotics and antihistamines, but it is more expensive. Compared with systemic or oral corticosteroids, intranasal corticosteroids are related with fewer adverse effects. In comparison with surgical management for grade I and II patients with adenoid hypertrophy due to its complications, intranasal corticosteroids are preferred.

MOMETASONE FUROATE:

Mometasone furoate is a long-acting, synthetic corticosteroid used topically to reduce the inflammation of skin or airways. It is a free form - mometasone.

Mometasone furoate is used in treatment of inflammatory adenoid hypertrophy and also in dermatological disorders such as eczema and psoriasis(topical form) , allergic rhinitis (topical form), asthma (inhalation form for patients unresponsive to less potent corticosteroids). In terms of steroid strength, it is more potent than hydrocortisone, and less potent than dexamethasone.

There is also evidence suggesting the use of mometasone for symptomatic improvement in children with adenoid hypertrophy. Intranasal mometasone is employed in adults and children over 2 years, diminishing the symptoms such as seasonal allergic rhinitis and perennial rhinitis, including nasal congestion, discharge, pruritus, sneezing and adenoidal hypertrophy. Mometasone is used for two to four weeks before a pollination season in reducing the severity of symptoms. It is also indicated for treatment of nasal polyps and symptoms associated with it like nasal obstruction and rhinorrhoea.

Sir St. Clair Thompson designed the curette with the cage which entangles the tissue fragments which is still in use .In1967, William Meyer performed the first adenoidectomy using a specially designed ring knife.

Dr. Ayaz Rehman (2013) Dep of ENT, SKIMS Medical college, Bemina the Effect of MF Nasal Spray on AH and Its Related Obstructive Sleep Apnoea in Paediatric Age Group (6) In this study, they investigated whether intranasal steroids could result in 1) improvement of lateral neck radiographic and or fibreoptic endoscopic findings of adenoid hyperplasia and 2) decreasing airway obstruction symptoms. Topical intranasal MF therapy can be measured a good therapeutic choice to lessening AH as this treatment works effectively regardless of allergic status, sinusitis, and obesity.

U Sakarya (2017) This analysis studied the usefulness of intranasal corticosteroids improving for adenotonsillar hypertrophy (7). nasal steroids topically affect the anatomical constituent by reducing inspiratory upper airway resistance at nasal, adenoidal or tonsillar levels. corticosteroids intra nasally reduce cellular proliferation and production of pro-inflammatory cytokines in tonsil and adenoid .

IN 2014 Cambridge University Press article published by R Bhargava Dep of Ent, Lady Hardinge Medical College, New Delhi, in there study the role of the MF spray for management of AH (8) in children with greater than 50 per cent obstruction, and evaluate its impact on modification in quality of life. A statistically substantial change in quality-of-life scores was seen in the patients treated with the MF nasal spray as compared with patients those given with the saline nasal spray MF spray intra nasally appears to be effective in treating the children with obstructive adenoids

In 2020, Venkatesh. dept of Ent, ss. institute of medical sciences and research centre ,davanagere,Karnataka. he published one article Role of mometasone furoate aqueous nasal spray in children with adenoid hypertrophy: impact on life style changes (9). according to his study, mometasone furoate aqueous nasal spray improves the symptoms of nasal obstruction,

snoring, hypo nasality, frequent cold and quality of life in non-allergic children With Adenoid Hypertrophy.

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 (10)

Study by Sobhy on effect of intranasal spray on nasal obstruction due to adenoid hypertrophy, authors found highly significant results in reduction in nasal obstruction(11)

Study by Berlucchi et al assessed the effectiveness of mometasone furoate in treatment of adenoid hypertrophy(12) after 40 days course of treatment, of patients enrolled ,77.7% of children showed symptomatic improvement .

In 2011 Yong gi jung, dept of Ent, of Samsung medical centre, Seoul, Korea published an article 'role of intra nasal topical steroid (MF) in paediatric sleep dis ordered breathing and influence of allergy, sinusitis, obesity on treatment outcome' (13) according to this study total osa -18 score and AN ratio decreased significantly after treatment, there was no complication after treatment of MF .

In 2017 Vikram Bhat, dept of Ent, Karnataka institute of medical sciences, Hubli published an article named 'steroid nasal spray versus curettage adenoidectomy in school children' (14) according to his study topical nasal steroid spray can be used as an alternative treatment in chronic adenoiditis when surgery is contraindicated, it can also be considered when surgery needs to be postponed at the request of the patient .

In (2020) Muhammad Hazim Abdul Ghafar Dept of Ent, School of Medical Sciences, University Sains Malaysia published a research article named ''MF intranasal spray is effective in reducing symptoms and adenoid size in children and adolescents with adenoid hypertrophy'' (15) According to his study MF intranasal spray is effective in improving the symptoms attributed to AH as well as reducing the adenoid size for both children and adolescence. MF intranasal spray is advocated as a treatment option before adenoidectomy is considered .

Our study aims at treating the cause of adenoid hypertrophy, conservatively. The conservative management for adenoid includes antibiotics, anti-inflammatory drugs and antihistamines. In the past few years, there has been a renewed interest in the management of adenoid hypertrophy with various topical intranasal corticosteroids like fluticasone, beclomethasone and mometasone furoate.

Hence this study was taken up to find out the efficacy of intranasal mometasone furoate in the treatment of adenoidal hypertrophy

AIMS AND OBJECTIVES: The aim of this study is to find out the effect of mometasone furoate intranasal spray on adenoid hypertrophy in children by endoscopy.

➢ **Primary objective:** To find out the effectiveness of mometasone furoate nasal spray in the children with adenoid hypertrophy without the need of surgery.

➢ **Secondary objective:** To find out use of mometasone furoate as an alternative in the children with adenoid hypertrophy who are not willing for surgery.

MATERIALS AND METHODS

This is a prospective observational qualitative study has got Institutional ethics committee (IEC) approval (Vide IEC Application No:ACAD,IE3B/2020-2021) included a total of 70 patients .They were selected for the study after applying inclusion and exclusion criteria .The study was carried out in outpatient clinic of Otorhinolaryngology department, Government general hospital, Kadapa between January 2021 to June 2022 after obtaining the written informed consent from caregivers of all 70 subjects in the age group of 5 to 12 years .

INCLUSION CRITERIA:

1. Patients aged 5 to 12 years old, with symptoms of adenoid hypertrophy.

2. Patients with no sign of improvement despite medical treatment with antibiotics for 3 months.

EXCLUSION CRITERIA:

Patients with

1. History of using any nasal or systemic steroid within past 1 year

2. Use of any nasal decongestant or anti allergic medication with in past 2 weeks

3. History of upper respiratory tract infection within past 2 weeks

4. Hypersensitivity to mometasone furoate

5. History of one or more following conditions: genetic crania facial, neuromuscular syndromes, Chronic epistaxis, Asthma, Nasal surgery, septal perforation, nasal trauma within the last 3 months.

After considering inclusion and exclusion criteria the patients were enrolled into the study group. A detailed history was taken, a complete ENT examination including ear examination and lymph node status and a diagnostic nasal endoscopy was done. The diagnosis of adenoid hypertrophy was confirmed and grading done. Based on the history, examination and endoscopy, patients were diagnosed to have adenoidal hypertrophy.

Patients will be treated with MOMETASONE FUROATE INTRA NASAL SPRAY, 1 PUFF (50 mcg) twice daily in each nostril for 12 weeks. The patients were asked to take this therapy for a period of 12 weeks, during which they were asked to note down the improvements and to report

if they had any other symptoms. The patients were done diagnostic nasal endoscopy (DNE) to assess the presentation of adenoid hypertrophy at baseline and at end of 12 weeks.

Improvement of symptoms like nasal obstruction, snoring, mouth breathing will be assessed at each visit. 12 weeks after treatment by using a clinical scoring system ranging from 0 to 3. [0-absent; 1-occasional; 2-frequent; 3-daytime and night time symptoms]. symptom score will be obtained for each patient At the baseline and at the end of 12 weeks, the findings will be evaluated by nasal endoscopic grading.

Clemens and Mc Murray grading system of adenoid size

(GRADE 1-adenoid occupying less than 25% of choanal area;

GRADE 2-adenoid occupying 25-50% of choanal area;

GRADE 3-adenoid occupying 50-75% of choanal area;

GRADE 4-adenoid occupying 75-100% of choanal area) .

XRAY GRADING OF NASOPHARYNX LATERAL VIEW : Soft tissue shadow in nasopharynx 0- 50 % is grade 1 AH , and 50 – 75% is moderate AH , grade 3 is severe AH. Assesment is based on study by Cohen and Konak .

ADVERSE EFFECTS:

Eventual adverse effects like burning in nose or bitter taste were recorded at each visit.

FOLLOW UP: Follow up of patients was done at the end 12 weeks by clinical scoring and endoscopic scoring.

RESULTS

In this study, the age of patients is 5 years to 12 years. 24.3% of patients belong to 5-6 , 22.9% belongs to 7-8 years , 28.6 % belongs to 9-10 years , 24.3% between 11 -12 years . The minimum age was 5 years, and the maximum age was 12 years. The maximum clustering was 28.6% in the age group of 9-10 years. The mean age is 8.60 years. In this study total number of patients is 70 .48 out of 70 are male patients (68.6%), 22 out of 70 are female patients (31.4%) . In this study 32.9 % patients have 4-5 months duration of symptoms, and 42.9% patients have 6-7 months of symptoms, 20.0% patients have 8-9 months of duration of symptoms, 4.3% have 10 to 11 months of duration of symptoms .The minimum duration of symptoms in this study is 4 months and maximum duration of the symptoms is 11 months. The mean duration of the symptoms is 6.41 months. The standard deviation of this study is 1.65 and median for this study is 6. In this study Xray nasopharynx showing grade- 2 adenoid hypertrophy 57.1% patients and grade -3 adenoid hypertrophy 42.9 % of patients at week 0, before intervention. Later after intervention at week 12 repeat Xray nasopharynx showing grade 1 adenoid hypertrophy is 57.1% and grade 2 AH is 32.9% and grade-3 adenoid hypertrophy is 10.0%. p value is <0.001 is statically significant. In

this study at first presentation week 0, 58.6% of patients had frequent nasal obstruction which accounted to 41 patients of study population .30.0 % of patients had occasional nasal obstruction. 11.4% of patients in this study had day time and night time symptoms of nasal obstruction. In this study after intervention, at week 12, 48.6% had absent symptom on nasal obstruction.41.4% had occasional nasal obstruction, and 10 % of patients had frequently nasal obstruction. p value is <0.001 is statistically significant .In this study at first presentation week 0, 51.4% of patients had frequent mouth breathing which accounted to 36 patients of study population .32 % of patients had occasional symptom of mouth breathing .2.9 % of patients in the current study had day time and night time symptoms of mouth breathing. In this study after intervention, at week 12, 58.6% had absent symptom of mouth breathing .38.6% had occasional symptom of mouth breathing, and 2.9% of patients had frequent symptom of mouth breathing. p value is <0.001 is statistically significant . In This study at first presentation week 0, 35.7% of patients had frequent snoring which accounted to 25 patients of study population .52.9 % of patients had occasional symptom of snoring. 2.9% of patients in this study had day time and night time symptoms of snoring. In this study after intervention, at week 12, 51.4% had absent symptom of snoring .42.9% had occasional symptom of snoring, and 5.7% of patients had frequent symptom of snoring. P value is <0.001 is statistically significant. In the present study at first time presentation (week 0), 57.1 % patients are grade 2 adenoid hypertrophy, which accounted for 40 patients of total study population. 42.9% patients had grade 3 adenoid hypertrophy, which accounted for 30 patients of study population. In this study after intervention at (week 12),57.15 patients are grade1 of adenoid hypertrophy which accounted for 40 patients of total study population.32.9% patients had grade 2 adenoid hypertrophy .10.0 % patients had grade 3 adenoid hypertrophy .P value is <0.001 is statistically significant.

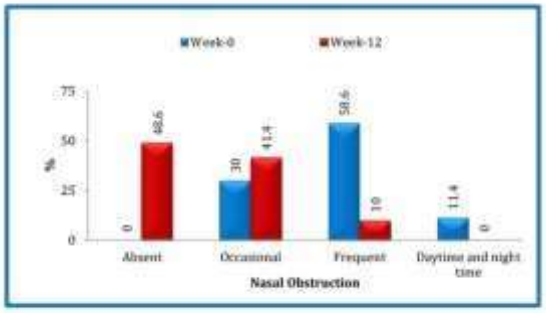

Figure-5: Nasal Obstruction scoring at 0 week & 12 weeks

Figure-7:Snoring symptom at 0 week & 12 weeks in the present study population

Figure-3 : Duration of symptoms (months) in the present study population

Figure-4:Grading of Adenoid hypertrophy on X-ray at 0 week & 12 weeks

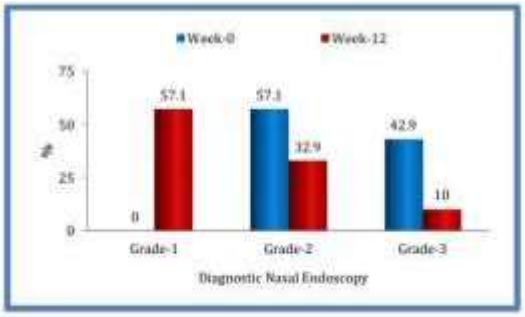

Figure-8:Grading of Adenoid hypertrophy on diagnostic nasal endoscopy at 0 week & 12 weeks of treatment.

Table 1: Age Distribution of Patients		
Age	Frequency	Percent
5--6	17	24.3
7--8	16	22.9
9--10	20	28.6
11--12	17	24.3
Total	70	100.0

Variable	Minimum	Maximum	Mean	SD	Median	IQR
Age in year	5	12	8.60	2.20	9	4

Table 2: Sex Distribution of Patients		
Sex	**Frequency**	**Percent**
Male	48	68.6
Female	22	31.4
Total	70	100.0

Table3.Duration of Symptoms in Mnths		
Duration in months	**Frequepncy**	**Percent**
4--5	23	32.9
6--7	30	42.9
8--9	14	20.0
10--11	3	4.2
Total	100.070	

Variable	Minimum	Maximum	Mean	SD	Median	IQR
Duration (in months)	4	11	6.41	1.65	6	2

Table 4 .x ray nasopharynx				
Xray				
Nasopharynx	**Week-0**		**Week-12**	
Frequency	Percent		Frequency	Percent
Grade-1	0	0	40	57.1
Grade-2	40	57.1	23	32.9
Grade-3	30	42.9	7	10.0
Total	70	100.0	70	100.0
P<0.001				

Table 5. Nasal Obstruction			
Nasal			
Obstruction	**Week-0**		**Week-12**
Frequency	**Percent**	**Frequency**	**Percent**
Absent	0 0	34	48.6
Occasional	21 30.0	29	41.4

Frequent	41	58.6	7	10.0
Daytime and night time	8	11.4	0	0
Total	70	100.0	70	100.0
P<0.001				

Table- 6. Mouth Breathing

Mouth Breathing	**Week-0**		**Week-12**	
	Frequency	**Percent**	**Frequency**	**Percent**
Absent	0	0	41	58.6
Occasional	32	45.7	27	38.6
Frequent	36	51.4	2	2.9
Daytime and night time	2	2.9	0	0
Total	70	100.0	70	100.0
P<0.001				

Table 7. Snoring

Snoring	**Week-0**		**Week-12**	
	Frequency	**Percent**	**Frequency**	**Percent**
Absent	6	8.6	36	51.4
Occasional	37	52.9	30	42.9
Frequent	25	35.7	4	5.7
Daytime and night time	2	2.9	0	0
Total	70	100.0	70	100.0
P<0.001				

8. Diagnostic Nasal Endoscopy (DNE)

DNE	**Week-0**		**Week-12**	
	Frequency	**Percent**	**Frequency**	**Percent**
Grade-1	0	0	40	57.1

Grade-2	40	57.1	23	32.9
Grade-3	30	42.9	7	10.0
Total	70	100.0.	70	100.0
P<0.001				

Statistical analysis: Data Were Entered in Ms-Excel and analysed in SPSS V25. Descriptive Statistics were represented with percentages. For Qualitative Data, Mean With SD Or Median With IQR .For Quantitative Data Mc Nemar Test, Wilicoxon Test were applied To Test Association Between Certain Variables At Week 0 And Week 12 and $P<0.05$ was considered Statistically Significant.

DISCUSSION

The current study findings were derived from conducting a study of 70 patients who attend Ent opd, gmc, Kadapa with symptoms of adenoid hypertrophy during the period of January 2021 to June 2022 .In this study a total number of 70 patients were selected. adenoid hypertrophy was diagnosed by nasal endoscopy and Xray nasopharynx .At present, nasal endoscopy is considered the best diagnostic technique for diagnosis of adenoid related nasal obstruction .in addition to providing information about nasopharyngeal secretions, Sino nasal anatomical anomalies or dis orders, nasal endoscopy can provide direct verification of the presence of adenoid pad, to estimate adenoid size, and relation with eustachian tube.

The age group present in our study ranges from 5 to 12 years .the maximum age presented with the disease were 9 to 10 years ,with mean age is 8.60 ,this mean age was almost similar to Priyadarshini et al (31).(2019) who found in her study the mean age of presentation is 8.7,rabia Monga et al (32).(2020) found the mean age is 7.2 ,while Yong gi Jung et al (13)(2011) report it as 6.4 .a study by Venkatesh et al, shows mean age of 7.7 , Fahad Alharbi et al (33)(2018) found the mean age of adenoid hypertrophy presentation as 6.3. Vipin Gupta et al (34) 2014) shows that mean age of presentation to be 6.3

In this study, the disease is affected more in males (48 cases) than females (22 cases). in this study males 68.6% and females are 31.4%. Priyadershini et al (31) (2019) in her study found 55.55% are males and 44.44% are females are affected with AH. Yong gi Jung et al (13) (2011) found 75.6% males and 24.4% are females are affected. Vipin Gupta et al (34) (2014) found 56.36% males and 43.63% females are affected with AH. Fahad Alharbi et al (33) (2018) found 58.3% are males and 41.66% are females. aboubakar et al (35) (2020) study results are 52% males and 48% are females.

In this study maximum time of the symptoms is 4 months and minimum time of the symptoms is 11 months. The mean duration of symptoms is 6.41 months. Prith pal Matreja et al (36) (2014) who found in his study the duration of the symptoms mean is 4.23 months. Berlucci et al (12) (2010) found that duration of symptoms mean in his study is 5.72 months. Yong Gi Jung et al

(13) (2011) found that duration of symptoms mean is 4.56 months. a study by Rabia Monga et al (32) (2020) shows a duration of symptoms mean is to be 12.1 months .

In present study at baseline patients presented with grade 2 are ah are 57.1% and grade3 ah are 42.9%.the study Fahd Alharbi (33) et al found that patients presented with grade 1 are 31 %and grade 2 are 58.3% and grade 3 are 10.7%. priyadershini et al in her study found that 40.27% presented with grade 1 and 36.1% presented with grade 2 and 23.63% presented with grade3. aboubakr ras (35) et al in his study, patients presented with grade 1 are 0% and grade 2 are 78% and grade 3 are 22%. this is almost similar to our present study .

In this study at week 12 patients presented with grade 1 are ah are 57.1% and grade2 are 32.9% and grade 3 are10% .the study Fahd Alharbi et al (33) found that patients presented with grade 1 are 52.5% and grade 2 are 40.5% and grade 3 are 7%.priyadershin et al in her study found that 49.5% presented with grade 1 and 42.0%presented with grade 2 and 8.5% presented with grade3.aboubakr Ras et al (35)in his study ,patients presented with grade 1 are 60.4% and grade 2 are 30.6% and grade 3 are 9.0%. this is almost similar to our present study.at end of week 12 by using endoscopy grades are evaluated. almost all studies showed significant reduction in grades at end of the therapy.

The mean value of nasal obstruction in this study at base line was 1.81 and at the end of week 12 is 0.61, the severity of nasal obstruction was not only reduced but also at a faster rate, there was highly statistically significant differences in mean nasal obstruction scoring at week 12 (p value is < 0.001) study of Zhang et al and demirhan et al (40), it was suggested that intra nasal steroids significantly improved nasal obstruction in children with hypertrophy of adenoid and subsequently reduction in size of adenoids on long term treatment .

The results of the present study with respect to nasal obstruction were similar to the study of venkatesha. b et al, and ravishekar et al (9), 35 symptomatic children with ah are included, MF nasal spray 100 mcg /day used daily for 12 weeks. 35 patients had symptom score of 0.53 and SD of 0.11 on day of inclusion in the study, mean score after intervention 24 weeks was 0.38 and SD OF O.11, P value is, <0.000, which is statistically significant, according to this study MF improves nasal obstruction, therefore improves value of life.

Study of Saleh mohebbi (36) et al ,51 with AH with symptoms are included, each pt. receives MF nasal spray (one puff each nostril), for 3 months and, p value is <0.001 after 3 months. they conclude that MF Therapy can reduce AH and eliminate or decrease obstructive symptoms.it is a useful alternative to surgery, especially in cases whose surgery contraindicated study of Asli sahin Yilmaz (37) et al,28 patients with symptoms of AH are included, each pt. receive 200mcg /day, for 6 weeks overall (symptom)score was obtained by a scoring system clinically is 0.006, they concluded that significant improvement in total subjective scores of symptom with the usage of MF for AH.

The mean value of snoring in the present study at baseline was 1.57 and at end of the week12 is 0.54, there is statistically significant difference in mean value of snoring at week 12. p value is <0.001.

In the study of Vipinguptha et al (34) (2014) , 55 children having snoring due to adenoids were taken ,assessment of each patient by entering following history physical examination, parental obstructive sleep apnea quesstionnare,the children were put on intranasal MF therapy, the outcome was done using same osa 18 questionnaire after the period of 4 weeks ,the changes of osa 18 score before the treatment and after the treatment are improved from 56.33 to 51.51 which is significant (p<0.001) ,they concluded in this study that short term use of nasal steroids significantly improve snoring ,this improvement appears to be related with a reduction adenoid size study of Praveen prasannan,80 children suspected of having sleep disordered breathing due to hypertrophy of adenoids , whose parents were not willing for surgery were administrated with MF nasal spray, pre and post intervention Xray nasopharynx taken, this study concluded that there is strong positive correlation between adenoid size and ODI. that mf spray leads to substantial reduction in size of adenoid and gives symptomatic relief for children with sleep disordered breathing, it can be recommended as the prime treatment modality for children for snoring study of Yong Jung et al (13) (2011),41 children having habit of snoring for last 3 months or more and adenoid hyper trophy confirmed with Xray or endoscopy are included ,all patients received MF (100 mcg) spray intra nasally for 4 weeks .after 4 weeks of therapy ,all patients were reassessed to evaluate the efficacy of treatment .they compared osa 18 quality of life score and lateral neck Xray before and after the treatment parents questionnaire results (osa-18) before is 5.53 and after is 3.90 .p value is <0.001 which is stastically significant . in this study among numerous commercially obtainable steroid they selected MF spray because this spray had been stated previously not to cause any antagonistic effect on nasal mucosa and it has no outcome on growth and hypothalamic pituitary adrenal axis .this study concluded that 4 weeks course MF spray intranasally can be an effective regardless of allergic status ,sinusitis, obesity.

The mean value of mouth breathing in our study at baseline is 1.57 and at end of week 12 is 0.44, there is a statistically significant reduction of mouth breathing p value is <0.001

In the study of firas mowaffak (2013) et al in ,35 patients were treated by mometasone furoate of 100mcg/day for 12 weeks .at the end of 12 weeks stastically significant improvement in mouth breathing p value <0.05. average symptom score before treatment is 2.85 and after 12 weeks treatment average symptom score is 1. This study concluded that MF is a better alternative to surgical treatment in children with hyper trophy of adenoids .

Akyol (38) (2006) assessed the efficacy of in treatment of adenoid hypertrophy, in a clinical trial, (100mcg/day)MF Therapy for 6 weeks, whereas 55 patients were allotted to control group, after treatment a significant decrease of the adenoid mass was detected for 67.25 of the study

group, whereas the clinical situation was unaffected in the control group. they reported that the a/c rate decreased by 50 %.there is significant reduction in mouth breathing

These results of majority of studies, which have shown reductions in adenoid hypertrophy and related symptoms, one exception is the work of Lepcha et al (2002), but her results .no effect of beclomethasone on symptoms, we as based on the analysis of only 13 patients, and the results were not statistically significant.

Demain et al (39)(1995) and his colleague have used endoscope for adenoid size survey and reported good relation between symptoms score and adenoid size survey and reported good relation between symptoms score and adenoid to choana ratio these results can mention idea that obstructive symptoms improvement after intranasal steroid therapy may be due to adenoid size reduction .in our study it was shown that reduction of obstructive symptoms related to percent of airway obstruction in radiography .

Demirhan (40) et al, study used intranasal MF in treated group and fluticasone nasal drops in control group, at the end of the 8 weeks, statistically significant improvement was detected in the treated group compared to control group in relations to nasal obstruction, mouth breathing, and apnea .

Rezende (41) et al used mometasone intra nasally and nasal symptoms and snoring suggestively improved after nasal douching . saline douching did not influence adenoid size, whereas significant reduction on adenoid size was observed after 40 days of MF.

In present study we used mometasone for these reasons:

1. there was no destructive effect on nasal mucosa
2. no effects on children growth
3. no effects on hypothalamic pituitary adrenal axis
4. lower systemic absorb after intranasal prescription than other steroids

Bhargava et al. in his study conducted in 100 children of age 2 to 12 years the degree of obstruction were assessed by endoscopy conducted pretreatment and post treatment 24 weeks. subjects received MF spray at a dose of 200mcg for 8 weeks daily , and a dose of 200mcg on alternate days for 16 weeks. a statistically change in quality-of-life scores were seen in the patients treated with MF.

Jazi (42) et al. reported clinical improvement in patients six weeks after the end of treatment, but there is a significant improvement after six weeks of treatment .

Gupta et al 2015, in his study used MF spray as a treatment in 55 children for 4 weeks .and concluded that there is a improvement of symptoms in adenoid hypertrophy at the end of the therapy.

Mohebbi et al . used MF as a treatment and showed significant improvement in symptoms in 51 patients with adenoid hypertrophy in 12 weeks. this study is almost similar to the present study .

In 2007 berlucchi et al , (12) studied the efficacy of MF nasal spray in lessening size of adenoid and improving clinical symptoms in children .sixty patients were registered in a two stage ,prospective ,placebo controlled ,randomized study .all children presented with nasal obstruction symptoms lasting >12 months and adenoid mass obstructing 75% of the nasopharynx .in first stage ,30 children (group a) given a topical nasal administration of MF (50 mcg), whereas the remaining 30 patients (group B) underwent placebo saline solution for 40 days .assessment of long term nasal obstruction symptoms (i.e., nasal obstruction ,rhinorrhea ,cough ,snoring , sleep apnea) and adenoid mass by endoscopy was performed in every patient at baseline and at the end of first stage . after giving 40 days of treatment , 21 of 27 (77.7%) of the patients who treated with MF , showed a significant improvement in clinical picture .

In last decades, several researchers suggest intranasal steroids for adenoid hypertrophy reduction to serve an active immunologic tissue and to prevent anesthesia and surgery risks .In above studies, intra nasal spray was surveyed for this target and most of them reduction on symptoms and size of adenoid was significant. side effects mentioned in these studies are, epistaxis in two studies, sneeze in one study. these side effects are un common and after drug stop no side effect was seen in our study, we did not observe significant any side effect. fortunately, no complications were observed in course of treatment.

In our study we used nasal endoscopy and Xray nasopharynx for evaluation of adenoid hypertrophy, Berlucci et al 2007 in his study he used nasal endoscopy for evaluation of AH. Asli sahin et al 2013 conducted a study using nasal endoscopy for evaluation of AH. A study conducted by Rabia Monga et al 2020 used nasal endoscopy for symptoms evaluation in AH. Venkatesha et al 2020 considered nasal endoscopy for evaluation of grade of adenoid hypertrophy. Yong Gi Jung et al 2011 conducted a study by using both Xray nasopharynx, nasal endoscopy for evaluation of adenoid hypertrophy. this study matches our present study for diagnosis. Most of the studies used nasal endoscope for diagnosis as similar to our study.

This diagnostic method of endoscopy allows complete visualization of nasal cavity and nasopharynx providing evaluation of the extent of nasal airway obstruction . Lateral Xray nasopharynx view may be helpful in assessing the adenoid hypertrophy as Still main imaging study to evaluate adenoid over years.

The query of what dose is not specifically addressed in the reviewed studies. Although some inference can be arrived from comparing them. . Four previous studies used nasal MF spray 100mcg /day for different time periods and had statistically significant results after treatment .in our study we used 100mcg /day of MF for 12 weeks and have statistically significant results after treatment.

RECOMMENDATIONS:

The reliability of nasal steroids for the pediatric population is widely recognized. although the mechanism itself has not been clearly and totally explained.

it is important to determine the role of intranasal corticosteroids in treatment of adenoid hypertrophy in children, using MF alone for adenoid hypertrophy treatment before embarking on surgical treatment.

Further studies with longer follow up period are warranted to determine the fate of adenoid after medical treatment.

CONCLUSION

Intra nasal Mometazone furoate (MD) theraphy can reduce adenoid hypertrophy and decrease obstructive symptoms It is a useful alternative to surgery ,especially in cases where surgery is contraindicated or likely to post pone Intra nasal corticosteroids are well tolerated by children MF nasal spray for 12 weeks can be a effective treatment option to decrease the size of adenoids .and has significant improvement in symptoms and has reduced the need for adenoidectomy . It is important to determine the role of intranasal corticosteroids in treatment of adenoid hypertrophy in children, using MF alone for adenoid hypertrophy treatment before embarking on surgical treatment. Further studies with longer follow up period are warranted to determine the fate of adenoid after medical treatment

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