e-ISSN: 0975-1556, p-ISSN:2820-2643
Available online on www.ijpcr.com
International Journal of Pharmaceutical and Clinical Research 2024; 16(8); 137-143
Original Research Article

Role of Steroids in Patients with Adenoid Hypertrophy

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Received: 25-05-2024 / Revised: 23-06-2024 / Accepted: 25-07-2024
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Conflict of interest: Nil

Abstract:

Introduction: Adenoid hypertrophy refers to the enlargement of the adenoid, causing mechanical blockage and inflammation in the nasopharynx, predominantly in children aged 1-6 years. Symptoms include oral breathing, snoring, and hyponasal voice. Treatment varies from adenoidectomy for severe cases to intranasal corticosteroids for less severe cases. Systemic steroids are effective but have significant side effects, unlike topical nasal steroids which are safer with minimal systemic effects.

Aims and Objectives: To investigate the role of steroids in adenoid hypertrophy.

Methods: This prospective 18-month study at the National Institute of Medical Sciences & Research Hospital in Jaipur examined adenoid hypertrophy frequency. Using purposive sampling, 242 participants aged 2-12 were chosen based on specific criteria. Data was collected via clinical exams, X-rays, and interviews. Adenoid hypertrophy was graded into three levels. Statistical analysis with SPSS 27 assessed clinical and psychosocial parameters, comparing symptom improvement between groups over time.

Results: Before treatment, the distribution of adenoid hypertrophy grades showed that Grade 3 hypertrophy was the most prevalent with 136 patients, followed by Grade 2 with 55 patients and Grade 1 with 51 patients. Nasal symptoms such as obstruction and discharge were more common in females, with 102 females (80.95%) experiencing these symptoms compared to 89 males (76.72%). Snoring and mouth breathing were less common but still present in both genders. After treatment, the number of patients with Grade 1 hypertrophy increased significantly to 99, while those with Grade 2 and Grade 3 hypertrophy decreased to 39 and 94, respectively. These changes in patient numbers were statistically significant for Grade 2 ($p=0.048$) and Grade 3 ($p=0.031$), indicating effective treatment outcomes. Additionally, 9 patients showed no hypertrophy post-treatment. The effectiveness of oral steroid treatment was further supported by a significant improvement in grading ($p=0.036$) and a reduction in the need for adenoidectomy ($p=0.0344$).

Conclusion: The study concluded that oral corticosteroids can significantly decrease the grading of adenoid hypertrophy from higher to lower grades and that early medication with oral steroids can be used to avoid adenoidectomy.

Keywords: Steroid, Adenoidectomy, Adenoidectomy Hypertrophy, Adenoid.

Introduction

The term "adenoid hypertrophy" describes the enlargement of the adenoid, which is the pharyngeal tonsil. This condition is linked to mechanical blockage and/or long-term inflammation in the nasopharynx. Adenoiditis is the term used to describe inflammatory conditions of swollen adenoids. Adenoid hypertrophy can result in various local (nose, ear) and systemic alterations and consequences. it is mostly commonly seen in children between 1-6 years of age as it decreases in size in adolescents [1]. It is caused by the enlargement of the germinal centers of lymphoid follicles and tissues. These enlarged adenoids cause obstruction of the obstruction of nasopharyngeal airway especially when the patient is lying down on his or her back. Oral breathing, nocturnal snoring, and hyponasal voice are the symptoms observed in nasopharyngeal obstruction caused by adenoids [1,2].

The treatment of adenoidal hypertrophy for children is determined by the degree of obstruction of the nasal airways and any accompanying health issues. Adenoidal and tonsillar hypertrophy are typically involved in cases of obstructive sleep apnea (OSA) and cardio-respiratory syndrome, and in these situations, an adenoidectomy is usually advised. Non-surgical interventions might be an option for cases of less severity, although there are currently limited medical choices. Typically,

medical management focuses on treating both the infections that occur at the same time and the problems that arise from adenoidal hypertrophy. Several studies have evaluated the impact adenoidal hypertrophy in children treated with intranasal corticosteroids [3].

Systemic corticosteroids rapidly and temporarily reduce the size of the adenoids and resolve middle ear effusion. However, the considerable adverse effects associated with these medications make them unsuitable for long-term usage in children. Topical nasal steroids, in contrast to systemic steroids, have minimal systemic effects and are primarily effective in reducing inflammation in the nose, Eustachian tube, and nasopharynx. Although systemic steroids have been thoroughly researched, the effectiveness of using topical nasal steroids alone to treat adenoid hypertrophy and Otitis media with effusion (OME) has not been sufficiently assessed [1].

Oral steroids inhibit the degradation of membrane phospholipids and hinder the production of inflammatory mediators. The decrease an direct lympholytic action and a general anti-inflammatory impact on respiratory tissues may be responsible for changes in adenoid size. The alleviation of nasal blockage occurs due to the reduction of inflammation and the decrease in the size of the adenoids [4]. The notable it was believed that adenoids shrinking in size was a result of direct impact of intranasal corticosteroids (INCS). According to recent research, kids with adenoid hypertrophy have a significant presence of glucocorticoid receptors in their adenoid tissue. These findings imply that the youngsters in question would react favorably to INCS treatment [3]. Potential explanations for steroid efficacy in reducing nasal airway obstruction include the ability of glucocorticoid receptors to directly reduce the size of the adenoids through lymphocytic action, the ability of steroids to reduce inflammation in reducing adenoid inflammation, or the ability of steroids to modulate recurrent infection in the adenoids. Another potential factor could be the reduced importance of the source of infection being the adenoid tissue. Topical steroids are not like oral steroids have a localized action and therefore have little systemic side effects [4, 5].

Materials and Method

Research Design: This prospective study examined the frequency of adenoid hypertrophy within the Otorhinolaryngology Outpatient Department (OPD) at the National Institute of Medical Sciences & Research Hospital in Jaipur, Rajasthan, for 18 months. The determination of the sample size was based on a method that takes into account a 95% confidence level and a 6% margin of error. This calculation yields a minimum sample size of 242. The research utilized a purposive sampling methodology, wherein participants were chosen based on predetermined criteria about adenoid hypertrophy. Data collection was facilitated through clinical examinations, medical records, and patient interviews, all of which were undertaken by healthcare professionals who have received specialized training. X-ray grading of adenoid hypertrophy involves categorizing the extent of adenoid enlargement: Grade I (0-50%, mild), Grade II (50-75%, moderate), and Grade III (75-100%, severe). The analysis of data involved the application of descriptive statistics to summarize the extent of adenoid hypertrophy within the population under study. The study compared psychosocial parameters between two groups of HIV patients: those in the Multimodal Stress Management Programme (MSMP) and those receiving Treatment as Usual (TAU). A total of 150 patients were divided equally between the two groups. The analyzed parameters included age, gender, religion, education level, marital status, having children, occupation, family monthly income, type of family, and area of residence. Additionally, clinical parameters such as depression, anxiety, and quality of life scores were assessed. These parameters were measured at baseline and periodically over six months. Statistical analyses, including Friedman's ANOVA and Mann-Whitney U Test, were utilized to process and evaluate the differences and changes in these parameters within and between the groups over time. This approach aimed to determine the effectiveness of the MSMP compared to the TAU. The research conducted in this study complies with established ethical norms, which include collecting informed consent from participants, maintaining confidentiality of their personal information, and receiving the required permits from the institutional ethics committee. The study's research design incorporates a comprehensive methodology aimed at gaining a thorough understanding of the occurrence of adenoid hypertrophy, hence providing useful insights into the area of otorhinolaryngology.

Inclusion and Exclusion Criteria

Inclusion

- Patients with adenoid hypertrophy symptoms lasting beyond 12 months.
- Parents of enrolled patients will provide written informed consent for study participation.
- Participants aged 2-12 years old were included.

Exclusion

- Submucosal and cleft palate patients
- Patients with substantial nasal septal deviations.

- Patients with type 1 diabetes and contraindications to oral steroids.

Statistical Analysis: The study used SPSS 27 for effective analysis. The collected data will undergo statistical analysis for validity. Significant improvement in individual and overall symptom scores was observed in group A compared to group B after 8 weeks of treatment ($p<0.001$). At 8 weeks post-treatment, nasal endoscopy showed considerable improvement in mean adenoid grade ($p<0.001$), which was not observed after 4 weeks of therapy.

Results and Findings

The demographic characteristics and patient history presented in this study shows the age and sex distribution among the participants (Table 1). The average age of the patients was 7.16 years, with a standard deviation of 3.32 years, indicating some variability in the ages of the study subjects. In terms of sex distribution, the study included a slightly higher number of female patients (126) compared to male patients (116), resulting in a fairly balanced gender representation.

Table 1: Demographic characteristics and History of the patients in this study

Parameter	Total
Age	7.16±3.32
Sex	
Male	116
Female	126

Figure 1 shows the distribution of patients based on adenoid hypertrophy grades prior to receiving drug treatment. The data indicates that Grade 3 hypertrophy is the most common, with 136 patients in this category. Grade 2 hypertrophy is observed in 55 patients, and Grade 1 hypertrophy in 51 patients. This distribution highlights a predominance of more severe cases (Grade 3) in the study population before drug treatment began. The figure visually represents this baseline distribution, providing a crucial reference for evaluating the drug intervention's effectiveness on adenoid size.

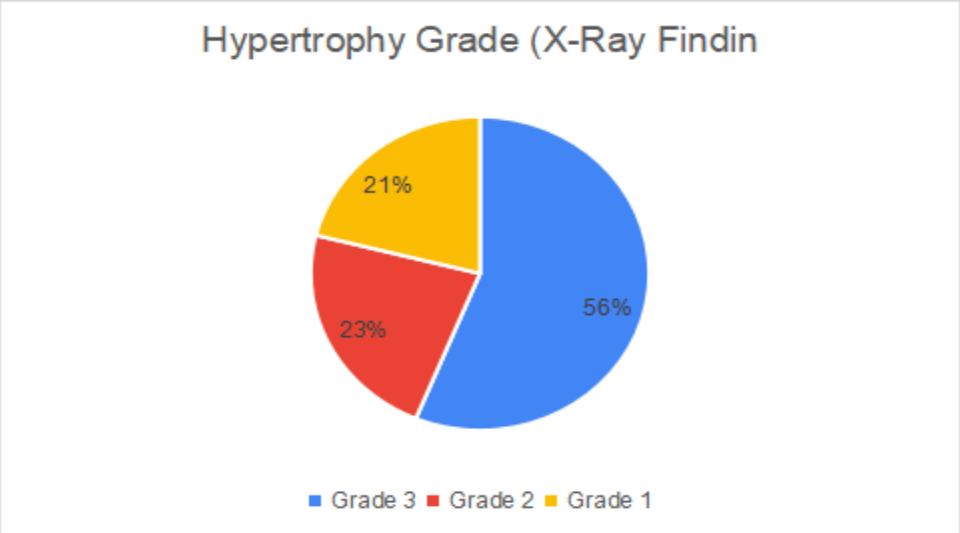
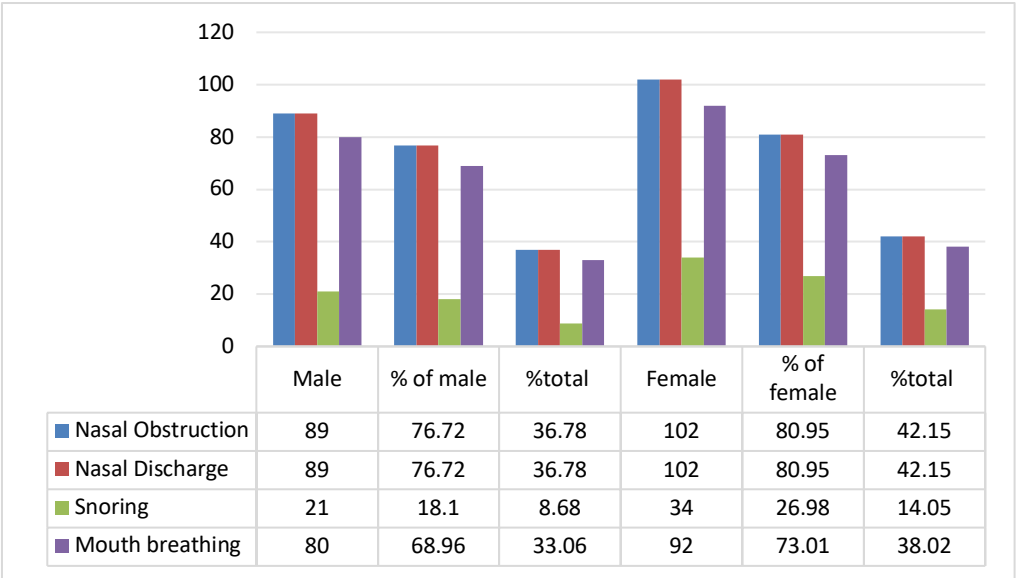


Figure 1: Number of patients with Grade 1, Grade 2 and Grade 3 before the drug treatment

Figure 2 illustrates the prevalence of various nasal symptoms among a sample population, categorized by gender. For nasal obstruction, 89 males (76.72% of the male population) and 102 females (80.95% of the female population) were affected, constituting 36.78% and 42.15% of the total sample, respectively. Similarly, nasal discharge affected an equal number of individuals, with 89 males (76.72% of males) and 102 females (80.95% of females) representing 36.78% and 42.15% of the total sample, respectively. Snoring was less common, reported by 21 males (18.1% of males), accounting for 8.68% of the total population, and by 34 females (26.98% of females), making up 14.05% of the total sample. Mouth breathing was reported by 80 males (68.96% of males), representing 33.06% of the total population, and by 92 females (73.01% of females), accounting for 38.02% of the total sample. These data highlight the prevalence and distribution of nasal symptoms among males and females in the study population.



	Male	% of male	%total	Female	% of female	%total
Nasal Obstruction	89	76.72	36.78	102	80.95	42.15
Nasal Discharge	89	76.72	36.78	102	80.95	42.15
Snoring	21	18.1	8.68	34	26.98	14.05
Mouth breathing	80	68.96	33.06	92	73.01	38.02

Figure 2: Nasal symptoms and th number of patients with respective percentage within male and female and in total sample

Table 2 presents the number of patients with Grades 1-3 before and after treatment, along with the changes in patient numbers between these two instances. Before treatment, the distribution of patients based on hypertrophy grades was as follows: 51 patients with Grade 1, 55 with Grade 2, and 136 with Grade 3, assessed by both DNE and X-ray grading methods. After treatment, the number of patients with Grade 1 hypertrophy increased to 99, while those with Grade 2 and Grade 3 hypertrophy decreased to 39 and 94, respectively. This represents a change of +48 patients in Grade 1, -16 in Grade 2, and -42 in Grade 3. Additionally, 9 patients exhibited no hypertrophy post-treatment.

The changes in patient numbers were statistically significant for Grade 2 (p=0.048) and Grade 3 (p=0.031), whereas the change in Grade 1 was not statistically significant (p=0.059). This improvement was sustained at the one-month follow-up, with the patient distribution remaining unchanged: 99 patients with Grade 1 hypertrophy, 39 with Grade 2, 94 with Grade 3, and 9 with no hypertrophy, as confirmed by both DNE and X-ray grading methods.

Table 2: Number of patients with Grade 1-3 before the treatment, after the treatment and the change in number of patients between the two instances

Grade	Before the treatment		After the treatment		Change in the number of patients		P-value
	DNE Grading	X-Ray Grading	DNE Grading	X-Ray Grading	DNE Grading	X-Ray Grading	
Grade 1	51	51	99	99	48	48	0.059
Grade 2	55	55	39	39	-16	-16	0.048
Grade 3	136	136	94	94	-42	-42	0.031
No Hypertrophy	0	0	9	9	9	9	

Table 3 displays the number of patients who underwent adenoidectomy, categorized by their adenoid hypertrophy grades before treatment, after treatment, and at the one-month follow-up, using both DNE and X-ray grading methods. Before treatment, there were no patients with Grade 1 hypertrophy. Grade 2 hypertrophy was observed in 14 patients, and Grade 3 hypertrophy was present in 120 patients, according to both DNE and X-ray grading. After treatment, the number of patients with Grade 2 hypertrophy increased significantly to 39, while those with Grade 3 hypertrophy decreased to 94, with both methods showing consistent results. At the one-month follow-up, the patient distribution remained stable, with 39 patients with Grade 2 hypertrophy and 94 patients with Grade 3 hypertrophy. No patients were recorded as having no hypertrophy at any stage.

Table 3: Number of patients (who went adenoidectomy) with Grade 1-3 before the treatment, after the treatment

With Adenoidectomy	Before the treatment		After the treatment		Follow-up after 1 month	
	DNE Grading	X-Ray Grading	DNE Grading	X-Ray Grading	DNE Grading	X-Ray Grading
Grade 1	0	0				
Grade 2	14	14	39	39	39	39
Grade 3	120	120	94	94	94	94
No Hypertrophy						

Table 4 presents the number of patients who did not undergo adenoidectomy, categorized by their adenoid hypertrophy grades before treatment, after treatment, and at the one-month follow-up, using both DNE and X-ray grading methods. Before treatment, there were 51 patients with Grade 1 hypertrophy, 41 with Grade 2, and 16 with Grade 3, as assessed by both methods. After treatment, the number of patients with Grade 1 hypertrophy increased to 99, while those with Grade 2 and Grade 3 hypertrophy decreased to zero. Additionally, 9 patients exhibited no hypertrophy post-treatment. This distribution remained unchanged at the one-month follow-up, with 99 patients having Grade 1 hypertrophy and 9 patients showing no hypertrophy. Both grading methods consistently reflected these results.

Table 4: Number of patients (who did not undergo adenoidectomy) with Grade 1-3 before the treatment, after the treatment

Without Adenoidectomy	Before the treatment		After the treatment		Follow-up after 1 month	
	DNE Grading	X-Ray Grading	DNE Grading	X-Ray Grading	DNE Grading	X-Ray Grading
Grade 1	51	51	99	99	99	99
Grade 2	41	41	0	0	0	0
Grade 3	16	16	0	0	0	0
No Hypertrophy	0	0	9	9	9	9

The statistical analysis of the data in Table 5 demonstrates the effectiveness of oral steroid treatment on adenoid hypertrophy. Table 5 presents the statistical analysis of oral steroid treatment's impact on adenoid hypertrophy. The improvement in grading has a p-value of 0.036, indicating significant improvement. Additionally, the ability to avoid adenoidectomy shows a significant p-value of 0.0344.

Table 5: Statistical Analysis of improvement in grading and adenoidectomy conducted with respect to oral steroid treatment

Clinical features	P-value
Improvement in Grading	0.036
Adenoidectomy avoided	0.0344

Discussion

A systematic review was conducted to examine the data on the efficacy Use nasal steroids in treating children who have adenoidal hypertrophy for symptoms of nasal blockage of the airways. It was suggested that children with adenoid hypertrophy may experience significantly worsening symptoms of nasal blockage if nasal steroids were used. Adenoids appear to be getting reduced in size in relation to this improvement. Although there is little data on long-term efficacy, what is known suggests that in a significant number of children, ongoing treatment is necessary to maintain symptom alleviation [5].

A comparative study was conducted to assess the efficacy of therapy with intranasal steroids (INS) in individuals suffering from allergic rhinitis (AR) or adenoid tissue hypertrophy (ATH). The use of INS therapy was found to be more effective in lowering the adenoid/choana (A/C) ratio in those who do not have allergic rhinitis (AR) but have adenoid hypertrophy (ATH). When contemplating the INS treatment for ATH, it is important to take into account the AR status as it can help predict the efficacy of the treatment [6].

A study assessed the efficacy of momeyasone furoate as long-term maintenance therapy as a nasal spray for children having adenoidal hypertrophy. They described the initial long-term monitoring of children who had treatment for adenoidal hypertrophy using mometasone furoate aqueous nasal spray. Opting to temporarily stop maintenance therapy increases the likelihood of

choosing surgery for this condition, but consistently continuing the therapy may result in positive outcomes [7].

An investigation aimed to examine the effect of a 12-week topical steroid therapy over time upon middle ear effusion as determined by tympanometry, as well as on the size and mucus of the adenoid. Three to six months following completing twelve weeks of therapy, the data showed that topical steroids had no effect on the size, mucus, or otitis media in effusion (OME) of the adenoid. The choice between a tympanostomy and an adenoidectomy should not be postponed in light of the completed study [8].

A study was conducted to illustrate the part intranasal steroids play in keeping adenoids from growing again following adenoidectomy. There are no known factors that affect how well intranasal steroids work to inhibit adenoid regrowth. Nonetheless, children who get this therapy may be able to avoid a readenoidectomy [9].

When it comes to managing otitis media in effusion (OME) and adenoid hypertrophy, topical steroid therapy can be a highly effective substitute for surgery. Treatment with nose mometasone furoate monohydrate can effectively reverse obstructive symptoms and minimize adenoid hypertrophy. For otitis media severe effusion, it is a helpful short-term substitute for surgery. It has been shown that children having adenoidal hypertrophy who are experiencing nasal blockage respond better to metamidasone. A thorough examination was used to evaluate the nasal signs, otitis media for effusion, adenoid size, as well as quality of life in children with adenoidal hypertrophy. Results related to snoring, nasal obstruction, overall symptoms of the nose, pure tune audiometry, otitis media with effusion, size of the adenoid, and overall health were all improved with metamitrasone. The information is derived from a meta-analysis of poorly conducted RCTs. To assess mometasone's obvious safety and efficacy in children having adenoid hypertrophy, an excellent methodological quality, RCTs using placebos at different doses, and delivery durations is needed [10].

Conclusion

The study has concluded that oral corticosteroids can signficantly decrease the grading of adenoid hypertrophy from higher to lower grade. The study also showed that early medication of oral steroids can be used to avoid adenoidectomy. there is a predominance of Grade 3 adenoid hypertrophy and a fairly balanced gender distribution among patients, with slight variability in age. Nasal obstruction and discharge are prevalent symptoms, affecting both genders almost equally.

This study presents a comprehensive overview of patient demographics and the prevalence of adenoid hypertrophy and related symptoms. With an average patient age of 7.16 years and a nearly balanced gender distribution, the data highlight a significant predominance of Grade 3 adenoid hypertrophy among the subjects. Additionally, nasal obstruction and discharge are prevalent symptoms affecting a large portion of both male and female patients. These findings establish a critical baseline for evaluating the effectiveness of drug interventions and provide essential insights for optimizing treatment strategies for adenoid hypertrophy. This study provides critical baseline data on adenoid hypertrophy severity and associated nasal symptoms, offering valuable insights into the patient demographics and symptom prevalence. Such information aids in tailoring drug treatment approaches and improving clinical outcomes for patients with adenoid hypertrophy.

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