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Original Article

# The Role of Intranasal Corticosteroid Therapy in Pediatric Adenoidal Hypertrophy: A Randomized Clinical Trial Study

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## Abstract

**Background:** Adenoidal hypertrophy (AH) is a common disorder in pediatric population with severe complications due to nasal air way obstruction. Adenoidectomy is a choice treatment for children with severe symptoms due to AH; however, it is accompanied by several side effects such as complication of surgery and emotional distress. We evaluated the efficacy of intranasal corticosteroid therapy in size and symptoms of Adenoid Hypertrophy especially in atopic patients.

**Method:** In this clinical trial 45 children aged 2 to 14 years old with AH were enrolled. All of them underwent 8-week course of intranasal Fluticasone therapy and their symptoms before and after treatment were scored and compared by questionnaires. Also they were divided into Atopic and non- Atopic groups based on history, physical examination and positive skin prick test. Then the two groups were compared after the treatment according to their response to therapy.

**Results:** After 8 weeks' treatment with intranasal corticosteroid, improvement in all symptoms score of AH including (Snoring, Sleep Apnea, Mouth breathing and Nasal congestion) was statistically significant ($P$ = 0.000). The improvement in clinical symptoms of AH after treatment was observed in 92% of atopic patients in comparison with non-atopic patients was 50%, which was also statistically significant ($P$ = 0.024).

**Conclusion:** Our study demonstrated that 8-week intranasal corticosteroid was associated with a decrease in size of AH and all symptoms of obstruction. As a result, it can be suggested that intranasal corticosteroid therapy can prevent adenoidectomy especially in atopic patients.

**Keywords:** Adenoid Hypertrophy, Intranasal Corticosteroids, Adenoidectomy, Fluticasone

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## Introduction

Adenoidal hypertrophy (AH) is a common disorder in pediatric population with severe complications including sleep apnea, recurrent otitis media, chronic rhino sinusitis and open mouth breathing due to nasal air way obstruction (1). Obstructive sleep apnea due to adenoidal hypertrophy is accompanied by cognitive and behavioral disorders, hyperactivity, enuresis, developmental delay, pulmonary hypertension and cardiovascular morbidities (2).

Although adenoidectomy is a common treatment for obstruction, it may have fatal or severe complications with increased health related costs (3,4). On the other hand, adenoidal regrowth may occur in children after surgery which may be accompanied by the same symptoms (5).

Non-surgical therapy with nasal steroids may reduce the inflammation of adenoid mucosa and can be an effective option to reduce the size of the adenoids (6).

Since allergies due to hypersensitivity to a variety of allergens are a risk factor for hypertrophy of adenoid in children, early treatment with nasal steroids and antihistamines can be effective for reducing the adenoid size (7,8). The purpose of this study was to evaluate the effectiveness of medical and non-surgical treatment of AH and the comparison of the impact of medical treatment in atopic and non-atopic children.

## Material and Methods

In this Randomized clinical trial study, 45 children aged 2 to 14 years old with moderate to severe AH and clinical manifestations such as snoring, sleep apnea, mouth breathing were selected. They were referred to Otolaryngology and Allergy clinics of Tabriz University of Medical Sciences.

The diagnosis of AH was based on lateral X-ray findings which were taken from patients with symptoms of nasal obstruction. All patients were assessed based on lateral neck radiography and 4 major clinical symptoms of AH including snoring, sleep apnea, mouth breathing and nasal congestion and each symptom was scored from 0 to 3. (9,10).

0=no symptom 1=mild 2=moderate 3=sever

Children received intranasal fluticasone, 100 mcg to each nostril, twice a day for 8 weeks and the symptoms were reassessed. Then based on history of atopy (allergic rhinitis or asthma or atopic dermatitis or food allergy), the physical examination and positive skin prick test were divided into Atopic and non-Atopic groups and were compared according to their response to treatment. Any improvement or reduction in symptoms was considered a response to treatment.

Our inclusion criteria were Patients aged 2 to 14 years' old who had AH and Suffered from all or one of the clinical symptoms including snoring, sleep apnea, mouth breathing, and nasal Obstruction. Patients who had taken corticosteroids (systemic or topical) one month prior to the study, either with a history of anatomic disorders of the head and neck or with a history of adenoidectomy, were excluded.

The data was analyzed by a SPSS software (version 17.0). The comparison between the questionnaire scores before and after the treatment was analyzed by Wilcoxan Ranked Test and the statistical value of $p<0.05$ was considered significant in all comparisons.

## Results

There were 45 children aged 2 to 14 years old with AH in this study. The mean age of patients was 6.3 years old. Demographic characteristics of patients including sex, age,history of atopy (allergic rhinitis, eczema, asthma,) and familial history of allergy were recorded (**Table 1**).

After treatment, patients were divided into 2 groups. The atopic group consisted of 39 patients (87%) and the non- atopic group had 6 patients (13%). Their responses to nasal corticosteroid therapy were compared with each other. The significant improvement in clinical symptoms of AH after treatment was observed in 92% of atopic patients (36 of 39); however, this number in non-atopic patients was 50% (*P*-value=0.024). We analyzed 4 symptoms of AH separately.

**Table 2** shows changes in symptoms of patients before and after 8-week intranasal corticosteroid therapy. There was a significant improvement in all 4 symptoms after treatment (*P*-value=0.000). The comparison of the AH symptoms of patients showed that snoring had the best improvement by this therapy (89.5%). In general, the clinical manifestations of 39 of 45 patients (87%) improved or decreased after 8 weeks of treatment.

**Table1**. Demographic characteristics of the study patients

| Characteristics | Boys | Girls | Total |
|---|---|---|---|
| **Number of Subjects** | 24 | 21 | **45** |
| | (53%) | (46.7%) | **(100%)** |
| **Mean age group** | (5-8) | (5-8) | **(5-8)** |
| **(year)** | (54%) | (50%) | **(53.3%)** |
| **Familial history of allergy** | 16 | 16 | **32** |
| | (44.4%) | (76%) | **(71.1%)** |
| **History of Atopy and positive prick test** | **20** | **19** | **39** |
| | **(83%)** | **(90%)** | **(86.7%)** |

**Table 2.** Response to treatment in frequencies

| Symptom | Total (Number of patients) | Positive responder | Negative responders | *P*-value |
|---|---|---|---|---|
| **Snoring** | 38 | 34 (89.5%) | 4 | **0.000** |
| **Sleep Apnea** | 20 | 17 (85%) | 3 | **0.000** |
| **Nasal Congestion** | 18 | 15 (83.3%) | 3 | **0.000** |
| **Mouth Breathing** | **10** | **8 (80%)** | **2** | **0.000** |

## Discussion

The complications of Adenoid hypertrophy are mouth breathing, nasal congestion, nasal speech, snoring, obstructive sleep apnea, and recurrent otitis media (11). Adenoidectomy is a definitive treatment in children with severe symptoms of AH (12). On the other hand, adenoidectomy is associated with several side effects including anesthesia events, dehydration, hemorrhages and respiratory complications. The incidence of these complications has been reported from 16-27% (13). In addition, adenoid regrowth may occur in children after adenoidectomy in 10-20% of cases, which can cause recurrence of clinical manifestations and symptoms in patients (1). Corticosteroids are thought to reduce the size of the adenoids by their lympholytic or anti-inflammatory mechanisms (14). Several studies have shown that the use of intranasal corticosteroids to treat AH can reduce the size of adenoids, improve symptoms and prevent the side effects of anesthesia and surgery (9,15,16).

In our study, 45 children aged 2 to14 years old were enrolled. Their AH was confirmed by lateral neck X- Ray. All patients had an 8-week course of intranasal corticosteroid therapy and questionnaires were also filled out before and after treatment to compare the patients' symptoms.

In 2010, Demirhan et al. prescribed nasal drop of fluticasone propionate 400 µg/day for 8 weeks for the treatment of AH in children and compared with the control group who were treated with normal saline. All of them underwent surgery. Finally, patients who had received nasal fluticasone propionate showed significant improvement in all symptoms of AH. They concluded that nasal fluticasone was a good alternative to surgery in AH treatment (17). In the same year, a systematic review reported that intra nasal corticosteroid (often beclomethasone) led to decrease in adenoid size and improved chronic obstructive symptoms in children with AH (18). In 2017, Vikram et al. evaluated the use of nasal corticosteroid for the treatment of AH and chronic symptoms that required surgery. The results showed nasal corticosteroid could be used when surgery was contraindicated or there was no consent to surgery (19). Alisha chohan et al. reported that treatment with mometasone nasal spray resulted in the improvement of nasal obstruction and total nasal symptoms and reduction of adenoid size (10,20). Yasser M. assessed the efficacy of intra nasal corticosteroids in treatment of AH versus normal saline nasal spray and concluded that these drugs could improve the associated symptoms and reduce the adenoid size which was confirmed by nasopharyngoscopy or later neck radiography (21). Allergy, atopy or family history of allergy have not been considered in similar studies. In our study, 86.7% of Patients with AH were atopic and 61.5% of them had positive familial history of allergy and also 8 weeks' intranasal corticosteroid therapy can reduce symptoms of adenoid hypertrophy in atopic patients more effectively compared with non-atopic patients. Generally, in our study, 39 of the patients (87%) showed decreased clinical symptoms after treatment with nasal corticosteroid.

## Conclusion

In conclusion, based on our study, the use of in-

tranasal corticosteroid for 8 weeks was associated with decrease of adenoid size and it can prevent adenoidectomy. A strong relationship was seen between atopy and AH. It is also recommended that atopic children affected by AH had better response to treatment compared to non-atopic ones.

## Ethical approval

This study was approved by the ethics committee of Tabriz University of Medical Sciences, Iran (IR. TBZMED .REC.90/1-9/20) and It is registered at Iranian Registry of clinical trial(IRCT:201303069429N2).

## Conflict of interest

The authors declare no Conflict of interest.

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Sadeghi-Shabestari *et al.*: Intranasal Corticosteroid on Pediatric AH