THE EFFICACY OF INTRANASAL CORTICOSTEROID THERAPY ON THE ADENOID HYPERTROPHY

Muaid I Aziz * and Sarwar A Abdulla **

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ABSTRACT

Background

Adenoid hypertrophy is associated with high morbidity rate in children. Although surgical treatment is indicated in severe cases, however there are evidences that some medical treatments are effective in improving symptoms and signs of patients with adenoid hypertrophy.

Objectives

To evaluate the effect of intranasal corticosteroid in improving the symptoms and signs that caused by adenoid hypertrophy.

Patients and Methods

One hundred and thirteen patients with symptoms and signs of adenoid hypertrophy were included in this study with an age range from 3-12 years, using intranasal corticosteroid (Betamethasone 0.1% nasal drops) for of 8 weeks were evaluated pre and post treatment depending on clinical presentation and lateral neck radiography.

Results

Clinical features of adenoid hypertrophy significantly less frequent after using intranasal corticosteroid. P value <0.05 was significant for nasal obstruction, snoring, mouth breathing, sleep disturbance, nasal discharge and postnasal drip while not significant >0.05 % for hyponasal speech. The radiographic findings revealed that adenoid size after treatment with intranasal corticosteroid drop was significantly decreased and airway diameter was significantly more than before treatment.

Conclusion

According to our study, intranasal Betamethasone improved the symptoms and sings of adenoid hypertrophy and can be considered an alternative effective non-surgical treatment for mild and moderate adenoid hypertrophy and some symptomatic relieve of severe adenoid hypertrophy.

***Keywords*:** *Adenoid hypertrophy, Intranasal corticosteroid, Betamethasone nasal drops, Nasal Obstruction*

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* Department of Surgery, School of Medicine, Faculty of Medical Sciences, University of Sulaimani. Correspondence: muaident@gmail.com

** Department of Otolaryngology/ Head and Neck Surgery, Sulaimani Teaching Hospital. Sulaimani Directorate of Health

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INTRODUCTION

The adenoid tissue forms part of waldyers ring of the lymphoid tissue at the portal of the upper respiratory tract [(1)]. Adenoid are present at birth continue throughout childhood and atrophy at puberty although persistence into adult life is not uncommon. Patients with adenoid hypertrophy usually presented with nasal airway obstruction that lead to mouth breathing, snoring, difficulty in eating, drooling and toneless voice, later on true adenoid face may develop and eustachian tube obstruction may lead to otitis media with effusion [(2)]. Clinical and radiological assessment are necessary in patients with features of adenoid hypertrophy and there are many radiological assessment methods have been reported to assess the adenoid size including Cohen and Konak's method, Fujioka's method and Johanneson's method [(3)].

In ***Cohen and Konak's method***, the soft palate thickness (one cm below the hard palate or half cm in children younger than 3 years) and the air column width between the palate and the highest point of convexity of the adenoid are compared. Its considered small (mild) when the air column is not narrower than the soft palate thickness; medium (moderate), when air column is narrower, but wider than half of the soft palate thickness ; large(severe) when the air column is narrower than half of soft palate thickness [(4)] as shown in figure 1 .

Fujioka's method: the ratio between the maximal thickness of the adenoidal shadow and the distance measured along a line from the superior/posterior edge of the hard palate to spheno-occipital synchrondrosis on the skull base, normal (adenoid to nasopharyngeal ratio <0.50), mild (adenoid to nasopharyngeal ratio=0.50-0.62), moderate (adenoid to nasopharyngeal ratio=0.63-0.75), severe (adenoid to nasopharyngeal ratio=0.76-0.88) [(5)] as shown in figure 2.

Johanneson's method: percentage of airway occlusion, measured as the ratio of adenoid thickness and the distance from the pharyngeal tubercle to the superior surface of the soft palate; (mild 25-50%, moderate 50-75%, severe >75%) [(3)] as shown in figure 3. Of these methods, Cohen and Knoak's show the best correlation with endoscopic findings and clinical symptoms [(6, 7)].

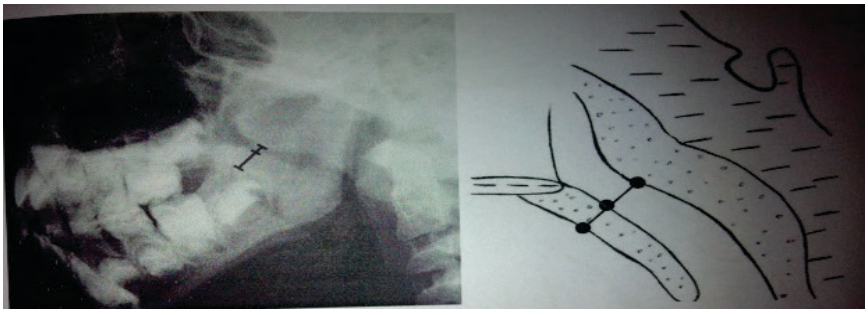

Figure 1. Cohen & Knoak's method.

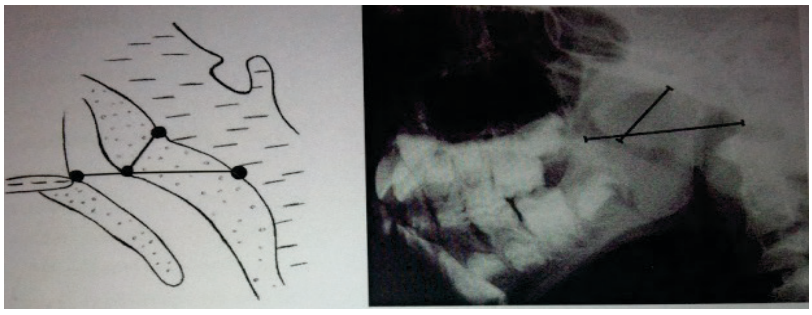

Figure 2. Fujioka's method

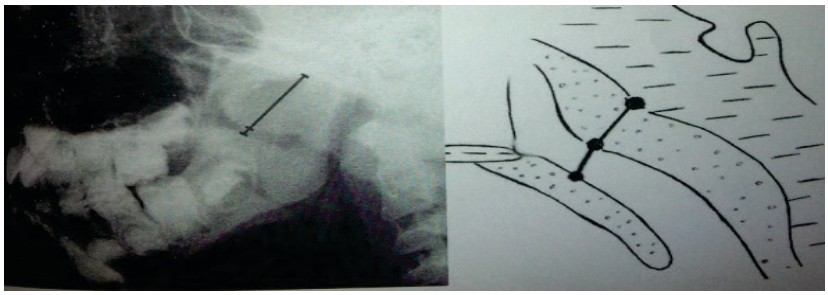

Figure 3. Johanneson' method.

Adenoidectomy has been the definitive treatment for relief of the upper air way obstruction and diseases complicated by or attributable to adenoid hypertrophy. Nevertheless, significant risks and problems associated with this operation like adverse anesthetic events, bleeding, upper airway edema, dental trauma, velopharyngeal dysfunction, cervical spine injury and re-growth of the adenoid may occur [8]. Non-surgical alternatives for adenoid hypertrophy are limited to treatment of co-existing upper airway infections. Recent trails demonstrated that intranasal corticosteroids reduced adenoid hypertrophy.

The rationale for using topical steroids is that they have limited or absent side effects and exert their anti-inflammatory activity locally on the upper airways and could represent for some children an effective means of avoiding adenoidectomy [9-11].

Betamethasone which is used in this study is a synthetic glucocorticoid that exhibits anti-inflammatory, desensitizing and anti-allergic action, immune depressants and also possess anti-shock and anti-toxic effect. The systemic bioavailability of intranasal corticosteroids (INC) reflects the sum of nasal and intestinal absorption, as well as clearance by first-pass hepatic metabolism .The second-generation INC agents currently in use (mometasone furoate nasal spray [MFNS], fluticasone propionate [FP], have pharmacokinetic characteristics that minimize their systemic bioavailability (<1%) compared with both older INCs (e.g, triamcinolone acetonide, flunisolide, beclomethasone, dexamethasone) and oral agents, thereby minimizing the risk of systemic adverse events [12].

In our study we chose Betamethasone nasal drops as it is available more than other types in the markets. It is the cheapest one and is easy, more tolerable to use and in general has minimal side effect.

The objectives of this study was to evaluate the effect of the intranasal Betamethasone in improving the symptoms and signs that caused by adenoid hypertrophy.

PATIENTS AND METHODS

This prospective study included 113 patients, 59 males and 54 females, their ages from 3-12 years, presented with clinical features of nasal obstruction due to adenoid hypertrophy, were other cases that presented with nasal obstruction due to other than adenoid hypertrophy like septal deviation, allergic rhinitis, nasal ploypposis and hypertrophy of inferior turbinate and those cases with obvious chronic adenotonsillar hypertrophy (kissing tonsil and complete impaction of nasopharynx by adenoid) are excluded from this study. This study was done in Sulaimani Teaching Hospital in Department of Otolaryngology over a period from February 2010 – October 2010.

A careful history was taken from the parents or patient himself, symptoms and signs assessed, then an otorhinolaryngeal examination was done. Endoscopic examination of the nose is not tolerated by most patients because of their young ages, so was not included in our study. After taking a consent from the parents of the patients, adenoid hypertrophy assessed on plain lateral postnasal space x-ray and the degree of obstruction reported for each patient, then an intranasal corticosteroid (Betamethasone 0.1% nasal drops) two drops for each nostril two times daily for eight weeks prescribed for all patients, then all patient were evaluated after eight weeks by clinical features assessment such as(snoring, mouth breath, sleep disturbance, hyponasal speech, nasal discharge and postnasal drip) and radiological assessment and interpretation was

based on Cohen and Konak's method as it shows the best correlation with endoscopic examination and clinical symptoms as reported in previous literatures, and these are our parameters for clinical improvement of our patients and changed their conditions from severe to moderate and to mild hypertrophy. Data analysis was done through SPSS (version 16). P value <0.05 was considered to be significant.

RESULTS

Among the patients enrolled in this study, 113 patients completed the 8 week treatment using (intranasal Betamethasone 0.1% nasal drops) were associated with a significant (P<0.05) improvement in the clinical symptoms including nasal obstruction, snoring, mouth breathing, nasal discharge, sleep disturbance while non-significant in hyponasal speech with no any noted or mentioned side effect reported by their parents as dryness of mouth, epistaxis as in table 1.

According to the radiological assessment by lateral neck (post nasal space) X-ray, showed that the number of cases with mild adenoid hypertrophy increasing from 9 to 74 cases and decreasing in the number of the cases with moderate and severe adenoid hypertrophy from 72 and 32 to 30 and 9 cases consequently as shown below in table 2 and this is association between using intranasal corticosteroid and the size of the adenoid is statistically significant (P<0.05).

Table 1. The result of clinical features before and after using intranasal corticosteroid.

Sign and Symptoms	Pre-corticosteroid use N (%)	Post-corticosteroid use N (%)	Improvement N (%)	P value
Nasal obstruction	113(100)	31 (27.4)	82 (72.5)	0.000
Snoring	86 (76.1)	32 (28.3)	54(62.7)	0.000
Mouth breathing	83 (73.5)	49 (43.4)	34 (40.9)	0.000
Nasal discharge	63 (55.8)	13 (11.5)	50 (79.3)	0.000
Sleep disturbance	50 (44.2)	13 (11.5)	37 (74)	0.000
Hyponasal speech	39 (34.5)	36 (31.9)	3 (7.6)	0.627

Table 2. Table showing the correlation between the using intranasal corticosteroid and size of the adenoid hypertrophy depending on lateral neck postnasal space X-ray.

X-ray	Pre-corticosteroid use N (%)	Post-corticosteroid use N (%)	P Value
Mild	9(8)	74 (65.4)	0
Moderate	72 (63.7)	30 (26.5)	0
severe	32 (28.3)	9 (8)	0

DISCUSSION

Adenoidal hypertrophy which obstructs the nasal airway in children is associated with numerous symptoms including snoring, nasal obstruction, oral breathing and sleep disturbance. Adenoidal hypertrophy is also the most common cause of obstructive sleep apnea and the cardiopulmonary syndrome, with severe complications. Moreover, it plays a major role in the pediatric syndromes of chronic rhinosinusitis and chronic otitis media.

Adenoidectomy is the definitive treatment for relieving upper airway obstruction and diseases that complicated by adenoid hypertrophy [(13)]. In the past decade, several authors have proposed the use of the topical nasal steroids to decrease adenoid hypertrophy, with the intent to preserve immunologically active tissue and to avoid the anesthetic and surgical risks of adenoidectomy. In our study the clinical features of adenoid hypertrophy were significantly improved and its compatible with other studies done by Brouillette *et al.* in 2001 and Demirhan in 2010 were both of them used fluticasone for 8 weeks [(14, 15)]. Berjis N. and Okhovat A. in 2008 had the same results by using Beclomethasone intranasally for 8 weeks as there was improvement in the clinical presentation and decrease the size of the adenoid hypertrophy [(16)]. According to Cohen and Konak's method radiographic findings revealed that adenoid size after treatment was significantly less than its size before treatment and airway diameter was significantly more than before treatment. Number of mild cases before treatment was 9 cases and after treatment increased to 74 cases ((this value is a sum of (9 mild) + 60 moderate+5 severe cases became mild)). Number of moderate cases before treatment was 72 cases and became 30 cases after treatment (this value is a sum of 12 moderate cases which are not changed +18 severe cases which became moderate) and 60 moderate cases becames mild. These results are compatible with other studies like Demain in 1995 using Beclomethasone showed significant improvement in adenoid hypertrophy symptoms and reduction in mean adenoid /choana ratio were observed [(9)]. Cengel and Akyol in 2005 using mometasone furoate for 6 weeks showed a significant decrease of the adenoid size [(17)].

The mechanism by which intranasal corticosteroids reduce nasal airway is unclear, however the following mechanism have been suggested (Demain 1995):

1. Direct reduction of adenoidal size by lympholytic action of steroids on adenoidal tissues.
2. Reduction in adenoidal and nasopharyngeal inflammation by anti-inflammatory effects of steroids.
3. Reduction in the significance of the adenoids as a reservoir for infection.

In conclusion, this study demonstrates that an 8 weeks treatment with intranasal betamethasone is significantly associated with reduction of adenoid hypertrophy, thus improving signs and symptoms in large number of the cases and its safe, but needs further follow up of those patients that they got benefit from medical treatment whether they need further medical or surgical treatment.

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