DOES INTRANASAL STEROIDS REDUCE THE NEED OF ADENOIDECTOMY IN ADENOID HYPERTROPHY

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ABSTRACT

BACKGROUND

Adenoidal hypertrophy is one of the common pathological condition in the paediatric population. Adenoid hypertrophy manifests as bilateral nasal obstruction, rhinorrhea, cough, snoring, hyponasal speech and sleep apnoea. At present, complications and sequelae of adenoidectomy (i.e., alteration of the immunological system, postoperative bleeding and recurrence of adenoids) are object of criticism. For this reason, research was conducted to test the efficacy of topical nasal steroids in decreasing the severity of nasal symptoms and adenoidal mass.

MATERIALS AND METHODS

This prospective, controlled study includes 60 children between the ages of 3-12 yrs. who presented with symptoms of adenoid hypertrophy. The study group (33 subjects) underwent course of antibiotic therapy (amoxicillin and potassium clavulanate/cefpodoxime proxetil/cefuroxime axetil) along with mometasone furoate nasal spray 50 mcg in each nostril (100 mcg/day) once daily for 6 weeks, whereas the control group (27 subjects) treated symptomatically with course of antibiotic therapy and saline nasal drops. We assessed the effectiveness of intranasal corticosteroids for improving nasal airway obstruction, thus reducing the need for adenoidectomy.

RESULTS

We tested the efficacy of Mometasone Furoate (MF) monohydrate to improve the symptom scores of patients with adenoid hypertrophy. 60 children (3-12 years old) were enrolled in a prospective, controlled, clinical study. At the end of the trial, symptom scores improved significantly in the steroid group, while no significant improvements were observed in control patients.

CONCLUSION

Usage of nasal steroid spray is safe and well tolerated in children. Intranasal steroid therapy can be considered as a treatment option in children with adenoid hypertrophy and in patients who are not willing to undergo or are contraindicated for surgery. In case of failure of intranasal steroidal therapy, adenoidectomy remains the procedure of choice.

KEYWORDS

Adenoidal Hypertrophy, Adenoidectomy, Intranasal Steroids.

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BACKGROUND

The adenoids also known as pharyngeal tonsils are a single, pyramid-shaped aggregation of lymphoid tissue situated at the junction between the roof and posterior wall of the nasopharynx.[1,2] Adenoids are arranged in vertical ridges of lymphoid tissue and separated by deep clefts. This lymphoid tissue usually shows increase in size during the first 7-8 years of life and then decreases in size until it completely disappears in adulthood.[1,3] The adenoids, palatine tonsils, along with lingual and tubal tonsils and the lateral pharyngeal bands are the important components of the Waldeyer's ring. They are the part of the MALT (mucosa-associated lymphoid tissue), which are responsible for immune activity in the age group of 4 to 10 years. Adenoidal Hypertrophy (AH) is a very common disease in a paediatric age group and probably maybe the most common indication for surgery in children.[4] When enlarged, adenoids can obstruct the nasopharyngeal airway and cause several

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symptoms such as mouth breathing, bilateral nasal obstruction, snoring, nasal discharge, hyponasal voice and cough, etc.

The possible causes of nasal obstruction other than adenoidal hypertrophy are rhinitis, nasal polyposis and deviated nasal septum. Diagnosis of adenoid hypertrophy is made by history of nasal obstruction, snoring and mouth breathing and nasopharyngeal examination with posterior rhinoscopy mirror, radiograph (soft tissue x-ray of nasopharynx lateral view)[4] or by direct palpation. Rigid or flexible fiberoptic nasal endoscopy remains the gold standard diagnostic tool for adenoid hypertrophy, which allows direct examination of the nasal cavity and nasopharynx, which can detect all causes for nasal airway obstruction.[5] It appears that the ratio of the relative size of the adenoid to nasopharyngeal cavity measurements is more important than the size of the adenoid in causing nasal obstruction in adenoidal hypertrophy.[6]

When AH is associated with palatine tonsillar hypertrophy, more severe clinical symptoms may manifest, and Obstructive Sleep Apnoea Syndrome (OSAS) is a typical disorder observed in such a situation. The prevalence of OSAS in the paediatric population has been estimated to be about 1-2% from 2 to 6 years of age.[1] Chronic sleep related airway obstruction results in frequent hypoxaemia and sleep disturbance that can cause neurocognitive disturbances, enuresis, growth failure and in extreme cases OSAS may lead to cor pulmonale. Adenoid facies and craniofacial growth abnormalities are other pathological anomalies that can manifest in children affected by AH. AH results in recurrent acute otitis media, conductive hearing loss, serous otitis media as well as recurrent and chronic rhinosinusitis.[1]

The choice of management in adenoid hypertrophy causing nasal obstruction in paediatric age group is dependent on the clinical presentations of any associated coexisting morbidities. In cases presenting with OSA, adenoid hypertrophy and tonsillar enlargement are usually implicated and an adenotonsillectomy is usually indicated. The efficacy of adenoidectomy in paediatric age group with OSA has not yet been investigated by randomised-controlled trials.[7] In the absence of OSA, the risk-benefit ratio of surgical intervention for the individual cases needs to be carefully assessed in view of possible potential anaesthesia and postoperative complications like primary and secondary haemorrhage, acute airway obstruction due to oedema, eustachian tube dysfunction and velopharyngeal insufficiency. In mild cases, nonsurgical treatment may be considered, but only very few medical alternatives are presently available.

Medical management hence is commonly limited to treatment of existing infection or sequelae of adenoid hypertrophy.[8] Interest has increased in the potential benefit of treating children with adenoid hypertrophy with intranasal corticosteroids. The possible mechanism by which steroids could reduce adenoid hypertrophy is by a reduction in size of adenoids by lympholytic action of steroids; a reduction in inflammation of adenoid and nasopharyngeal mucosa by the anti-inflammatory property of steroids or a reduction in the role of the adenoids as a source of infection.[9] Although, precise mechanism of action is still uncertain, the establishment of beneficial effect of intranasal corticosteroids in children with adenoidal hypertrophy will have profound clinical implications. Nasal steroids are usually considered safe in the paediatric age group. The possible potential side effects include epistaxis, irritation of nasal mucosa, perforation of nasal septum, adrenal suppression and linear growth retardation.[10]

Objectives

To assess the usefulness of intranasal corticosteroids for improving nasal airway obstruction in children with moderate-to-severe adenoidal hypertrophy and thus reducing the need for adenoidectomy.

MATERIALS AND METHODS

This prospective, controlled study includes 60 children between the ages of 3-12 yrs. presented to ENT Outpatient Department of Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, from February 2015 to January 2016 with symptoms of adenoid hypertrophy. Informed consent was obtained from the parents of study participants. The study was approved by the Ethical Committee of Chalmeda Anand Rao Institute of Medical Sciences. The relief of nasal obstruction was assessed subjectively by follow up of children and parents. Patients were advised for follow up every month (for 6 months).

Inclusion Criteria

Adenoid tissue occluding 50-75% of nasopharynx seen on x-ray nasopharynx lateral view for soft tissues. Symptoms consistent with adenoid hypertrophy lasting 6 months or more and no previous history of adenoidectomy.

Exclusion Criteria

Upper respiratory tract infection within the past 2 weeks, anatomical anomalies of nose, sinonasal diseases, craniofacial malformations, neurological disorders, cardiovascular diseases, immunodeficiency, intranasal or topical or systemic steroid treatment within the past 4 weeks.

The patients had history of mouth breathing, nasal discharge and snoring were registered for study. A lateral nasopharyngeal soft tissue x-ray was taken to evaluate the size of adenoids, all children had considerably enlarged adenoids. Adenoid facies, craniofacial abnormalities and voice was evaluated. The ear was examined for otitis media with effusion or acute or chronic otitis media. X-ray Paranasal Sinuses (PNS) was taken to rule out associated sinus infection. Nasal endoscopy was done if required to rule out other causes like polyps. Complete examination of ear, nose and throat has been done. Laboratory investigations like CBP, CUE, clotting time and bleeding time were done.

RESULTS

We studied the effect of mometasone furoate nasal spray in the treatment of patients with adenoid hypertrophy. 60 children (3-12 years old) were enrolled in a prospective,

controlled, clinical study. The study group (33 subjects) underwent a course of antibiotic therapy (amoxicillin and potassium clavulanate/cefpodoxime proxetil/cefuroxime axetil) along with mometasone furoate nasal spray 50 mcg in each nostril (100 mcg/day) once daily for 6 weeks, whereas the control group (27 subjects) treated symptomatically with course of antibiotic therapy and saline nasal drops. All the patients had history of mouth breathing, snoring and rhinorrhea. All children presented chronic nasal obstruction symptoms lasting more than 6 months and an adenoid tissue occluding 50-75% of the nasopharynx as seen on x-ray nasopharynx lateral view for soft tissues.

All patients were assessed with a symptom questionnaire, inquiring nasal obstruction, nasal discharge, snoring, mouth breathing (Table 1) and clinical examination was done to look for adenoid facies and nasal discharge. Nasal endoscopic evaluation was performed if required at beginning of study and at 6 weeks after treatment.

Symptoms	Number of Patients	%
Nasal obstruction	60	100
Mouth breathing	54	90
Snoring	48	80
Rhinorrhea	12	20

Table 1. Symptoms Before Treatment

At the end of 6 weeks, symptom scores improved significantly in the study group patients. 21 (63%) children of the study group showed a significant decrease in symptoms and adenoid size as determined by x-ray nasopharynx lateral view for soft tissues and nasal endoscopic examination if required in cooperative children, while no significant improvements were observed in control group patients compared to the study group at 6 weeks. Only 5 (18%) children in control group showed positive response in symptoms as well as decrease in adenoid size on x-ray nasopharynx lateral view (Table 2).

Group	Total Number of Patients	Number of Patients with Improvement	Percentage of Improvement
Study Group	33	21	63%
Control Group	27	5	18%

Table 2. Showing the Results After 6 Weeks in Both Groups

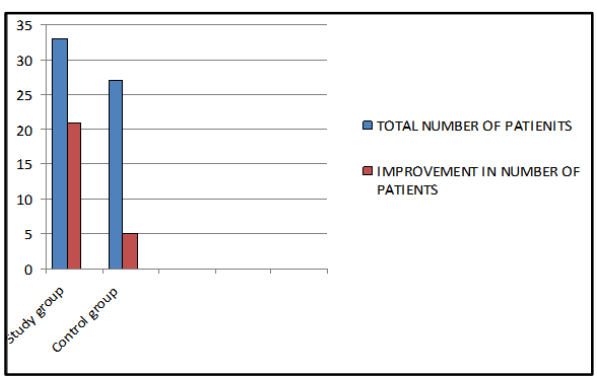

Figure 1. Showing the Results

DISCUSSION

It has been demonstrated in children with adenoid hypertrophy (from obstructive sleep apnoea or recurrent tonsillitis) that the adenoid tissue has abundant glucocorticoid receptors and mRNA,[11] which suggests that probably these children will respond favourably to intranasal steroid spray. The possible mechanism of action of intranasal steroids in reducing adenoidal hypertrophy proposed are a lympholytic action on adenoids of steroids that can cause a direct reduction in size; by the anti-inflammatory property of steroids leading to reduction in adenoidal and nasopharyngeal inflammation; or reduction in the role of the adenoids as a reservoir for infection.

A possible correlation between the nasal symptom score and ratio of adenoid-to-choanae was established in the two studies.[12] This finding along with the findings of both nasal obstruction and adenoid size being reduced in five of the six randomised controlled studies lead to the conclusion that the relief of nasal obstruction maybe as a result of intranasal corticosteroidal spray reducing the size of the adenoid.

The question of which steroid in what dose is not specifically addressed in the reviewed studies as different medications were used in different studies, although some inference can be arrived from comparing them. Three trials used nasal beclomethasone and two of these showed significant improvement in nasal obstruction and reduction in adenoid size after a two-week treatment period with initial daily doses of 336 and 400 micrograms.[13] Some studies then moved the responding patients onto a maintenance therapy of lower dosage (168 and 200 micrograms/day) and the benefits persisted. Lepcha A, Kurien M, Job A, et al reported that there was no statistical benefit with the usage of beclomethasone at a lower dosage (200 micrograms/day) for period of eight weeks.[14] They suggested that to treat effectively adenoid hypertrophy a higher initial dose of intranasal beclomethasone is needed followed by a reduced maintenance dose. In the two RCT studies that used mometasone intranasally, they administered a dose of 50 micrograms/day for 40 days and 100 micrograms/day for 42 days.[3] In the study that used 50 micrograms/day for 40 days, then changed the patients on to a 12 weeks of maintenance second stage with 50 micrograms on alternate days or daily for the first two weeks followed for medication free period of two weeks. Both of these studies reported marked improvement in the symptoms and decrease in the adenoid size after the treatment regimens. In the follow-up cohort study in the cases in which a low-dose mometasone (25 to 50 micrograms/day for 2 weeks per month) for a further 15 to 31 months (mean, 23 months) showed further improvement in symptoms in children.[3] All these studies suggest that mometasone intranasal spray at an initial dose of 50 to 100 micrograms/day will be effective and this can be followed by a lower maintenance dose (25 to 50 micrograms/day for 2 weeks per month) to give long-term symptom-free periods.

The usage of nasal steroids in children is very well-established, particularly for allergic rhinitis and safety is also widely recognised.[15] Side effects were reported in two of the

included studies. In two studies, epistaxis was reported[3] and in one study stinging and sneezing was reported. None of these complications resulted in a withdrawal from therapy and they were recognised to be rare. As from the above discussion, it appears that long-term low-dose mometasone may be necessary for maintenance of long-term efficacy in some patients, but the safety of intranasal steroid usage for long-term in children needs to be evaluated.

Several trials exploring the possibility of Hypothalamic-Pituitary-Adrenal (HPA) axis suppression, bone density effects, linear growth retardation, posterior subcapsular cataract formation and glaucoma in children suggest that nasal steroids with a lower bioavailability such as mometasone and fluticasone do not cause any adverse effects, whereas those with a higher bioavailability (i.e. beclomethasone) may have a possible growth-suppressive effect.[16]

Indications for adenoidectomy are AH causing obstructive sleep apnoea, recurrent rhinosinusitis and otitis media with effusion. Adenoiditis may act as a source of infection, supporting bacteria in a biofilm with resultant inflammatory changes in the mucosa of nose, nasopharynx, PNS and middle ear cleft.[17]

Surgery is recommended by American Association of Otolaryngology-Head and Neck Surgery (AAO-HNS) in infective causes including adenoiditis where two times antibiotics have failed and for recurrent rhinorrhea on 4 different occasions. Adenoidectomy is useful as a part of treatment of Obstructive Sleep Apnoea Syndrome (OSAS) and Sleep Disordered Breathing (SDB), but cross-sectional studies support the benefit of adenoidectomy and tonsillectomy performed together for OSAS and SDB.[18] When tonsillar hypertrophy is also coexistant with AH, obstructive sleep apnoea syndrome is more likely to manifest. Patients presenting with adenoidal hypertrophy not associated with tonsillar hypertrophy, they should be considered for intranasal steroidal spray (mometasone) trail before planning for surgery.[19]

CONCLUSION

Nowadays, adenoid hypertrophy is common in children. After analysis of the results of the study, we could conclude that intranasal steroid spray for 6 weeks if used as a first choice of treatment along with antibiotics has shown to decrease the size of adenoids and has a marked improvement in the symptoms and has reduced the need for adenoidectomy in some of the cases.

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