

# Treating Coexisting Sinusitis: Is It Beneficial in Treating Childhood Asthma?

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## ABSTRACT

**Background:** Asthma frequently co-exists with other conditions like sinusitis, otitis media, allergic rhinitis and conjunctivitis. Sinusitis frequently triggers and affects the severity of asthma. Hence, it is necessary to diagnose and treat co morbid conditions like sinusitis.

**Aim and objective:** To determine the effect of the treatment of sinusitis on childhood asthma (with regard to its severity) and to measure the changes in the peak expiratory flow rate (PEFR) values as an objective evidence for the improvement of the disease.

**Materials and methods:** Two hundred and thirteen asthmatic children with symptoms which were suggestive of sinusitis, of the age group of 5-12 years were recruited for the study. They were graded for the severity of asthma on the basis of their clinical

symptoms and their PEFR values. Sixty four children were diagnosed to have co-existing sinusitis, based on their clinical symptoms and on the findings of nasal scopy and radio imaging. These sixty four children were started on the treatment for sinusitis, along with asthma medication for three weeks. In the fourth week, again these children were evaluated for the severity of asthma, based on their clinical features and their PEFR values .

**Results:** After one month, the case load in grade II and grade I increased, while there was a decrease in the case load in grade III and grade IV, since the children with higher severity had shown improvement and as they had moved down to the lower grades of severity. As compared to the basal values, the mean PEFR, at 1 month, showed a statistically significant increase, thus providing an objective evidence for improvement.

**Key Words:** Childhood asthma, Co -existing sinusitis, PEFR.

## INTRODUCTION

Childhood asthma has emerged as a chronic medical problem which is being treated by paediatricians all over the world. It poses a major problem in children, thus affecting their lifestyle and day to day activities, which include their schooling, sports and recreation. Despite the recent advances in the diagnosis and treatment of asthma, the disease per se and the treatment which is being offered for the disease in the form of bronchodilators and inhaled steroids, affects the psychological well being index of the sufferer as well as the care taker.

Studies which were done on both children and adults have reported rhino sinusitis and asthma as the manifestations of a common inflammatory process [1]. In a review which was done by Jani et al, they have described asthma and rhino sinusitis as two compartmental expressions of a common mucosal susceptibility to exogenous stimuli. In addition, it has also stated that there is evidence that these two compartmental processes can affect and amplify each other [2]. Hence, it becomes necessary to diagnose and treat the coexisting sinusitis. Though studies have shown that rhino sinusitis worsens asthma, controversies exist as to whether treating sinusitis is effective in reducing the severity of childhood asthma. Hence, the aim of our study was to evaluate the effect of the treatment of coexisting sinusitis on the degree of severity of childhood asthma.

## MATERIALS AND METHODS:

Two hundred and thirteen asthmatic children who received an optimum therapy for asthma (in the form of salmeterol xinafoate

25 mcg with fluticasone propionate 50 mcg, two puffs twice a day, with a spacer and baby mask), who were in the age group of 5-12 years, of both the genders (males-97 and females -116), with the symptoms of sinusitis of more than 10 days duration, either during the first episode or recurrent episodes, were included in the study. A written informed consent was obtained from the parents of the children. The peak expiratory flow rate was determined by using Wright's peak flow meter. The grading of the asthma as mild intermittent (grade-I) , mild persistent (grade II) , moderate persistent (grade III) and severe persistent (grade IV) was done on the basis of the symptoms and the PEFR values [3] in the children. The children with coexisting sinusitis were identified on the basis of their symptoms and the objective findings of nasal scopy such as inflammation of the nasal mucosa , discharge from the sinus opening, blockage of the nasal passage, scarring, crusting and the presence of polyps [4]. In those children with coexisting sinusitis, antihistamines, decongestants and antibiotics were started in addition to the asthma medication. This therapy was continued for three weeks. No adjustment in the dosage of the asthma medication was done during the course of the study. At the end of the fourth week, they were assessed for the severity of asthma, based on their symptoms and the PEFR values which were measured before they took the morning dose of the inhaler. The PEFR values which were obtained before and after treating the coexisting sinusitis were analyzed by using the paired t-test and the SPSS software, version 11. This study was approved by the institutional ethical committee.

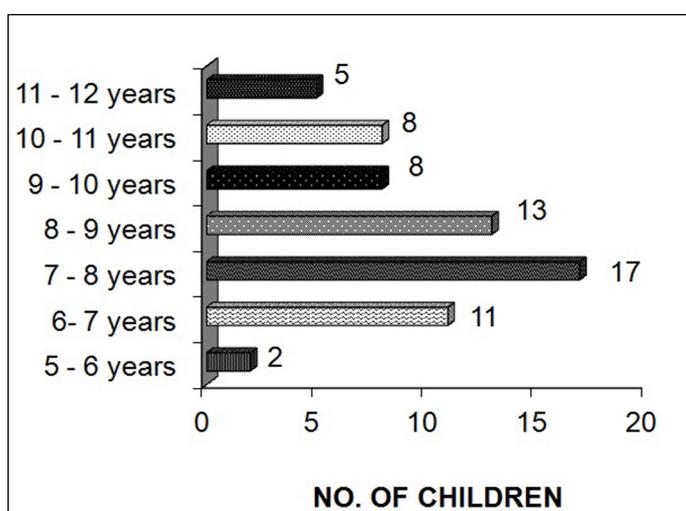
## RESULTS AND STATISTICAL ANALYSIS

### The incidence and the sex distribution of sinusitis

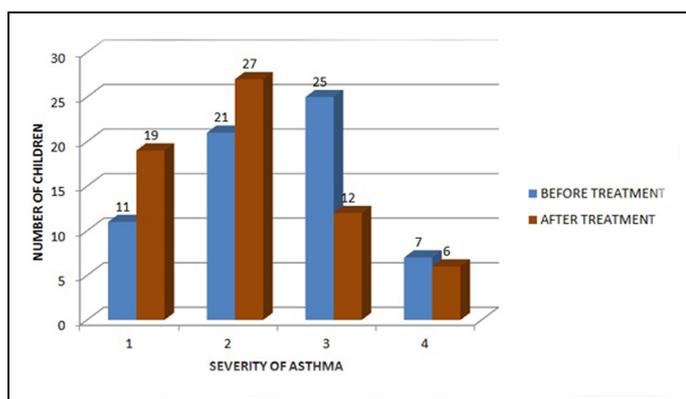
Among the 213 children, sinusitis was present in 64 children (30%) Thirty nine were female (61%) and twenty five were male children (39%).

Of the 64 children with sinusitis, 2 were in the age group of 5 - 6 years, 11 were in the age group of 6 - 7 years, 17 were in the age group of 7 - 8 years, 13 were in the age group of 8 - 9 years, 8 each were in the age groups of 9-10 and 10- 11 years and 5 were in the 11 - 12 years age group.

Of the 64 children with sinusitis and asthma, 11 had grade I asthma, 21 had grade II asthma, 25 had grade III severity and 7 had grade IV asthma. The follow up at one month after treating the children with sinusitis, showed that of the 64 children with sinusitis and asthma, 19 had grade I asthma, 27 had grade II asthma, 12 had grade III asthma and that 6 had grade IV asthma. There was a



[Table/Fig-1]: Age Distribution Of Sinusitis



[Table/Fig-2]: Grading of the severity of asthma before and one month after the treatment of the sinusitis

|                  | PEFR Values In % (Mean±Sd) | Number Of Subjects | 95% Confidence Interval Of The Difference |       | T Value | P Value | Significance       |
|------------------|----------------------------|--------------------|---|-------|---------|---------|--------------------|
| Before treatment | 78.19±14.02                | 64                 | lower                                     | upper | 4.95    | <0.0001 | Highly significant |
| After treatment  | 83.80±12.99                | 64                 | 3.35                                      | 7.87  |         |         |                    |

[Table/Fig-3]: shows the comparison of the mean PEFR value in percentage (compared with the standard nomogram based on height of The child )before treatment for sinusitis with mean PEFR values after 1month of treatment for sinusitis.

decrease in the number of children with grade III asthma.

## DISCUSSION

The purpose of our study was to explore the impact of the sinusitis management on the grades of the severity of asthma and to provide objective evidence for the same by measuring the changes in the PEFR values.

Out of two hundred and thirteen asthmatic children who were included in our study, sixty four had coexisting sinusitis, which was about 30%. This finding was in par with those of the studies which were done by Grupp Phalen et al [5] and Krajewski et al., [6], who observed an incidence of 26% and 37.3% respectively. However, in a study which was done by Businco et al, they reported an incidence of about 68.7% [7].

In our study, the incidence of sinusitis was maximum in grade II and grade III asthma and the maxillary sinus was the most commonly involved sinus. This was in contradiction to the findings of the study which was done by Crater et al, where the C.T. findings in acute asthma revealed a mucosal thickening in the ethmoidal, frontal and the sphenoidal sinuses, but the maxillary sinus was not involved [8].

In our study, we observed a marked change in the children with the grade III severity. The number of subjects in grade III decreased from 25 to 12 after they were treated for three weeks. This observation was similar to that which was made by Huan J et al., [9]and Buscino et al [7] and they had reported a considerable decrease in the severity of asthma after the therapy for sinusitis.

In our study, we also observed a significant increase in the PEFR values after three weeks of treatment for sinusitis. This finding was in par with that of the study which was done by Tosca et al, where they had reported a significant reduction in the asthma symptoms and also a significant improvement in the lung functions after the treatment for sinusitis [10]. However, in a study which was done by Tsao et al., they had reported a significant improvement in the clinical signs of asthma, but no improvement was observed in the FEV1 values [11].

The effect of the treatment of sinusitis on the reduction of the severity of asthma has been a matter of dispute. Some authors consider sinusitis as a triggering factor for asthma, while some of them support the idea of a comorbidity. The reduction in the severity of the grade of asthma and an increase in the PEFR values which we observed are objective evidences of the effect of treating co-existing sinusitis in childhood asthma.

Though the exact mechanism of how the treatment of the sinusitis will reduce the severity of asthma is not clear, in a study which was done by Marney et al, they postulated the possible theories of how sinusitis can worsen asthma. It is possible that the aspiration of an infected sinus secretion may enter the lungs during sleep. The infected sinus may enhance the vagal stimulation, thus

causing a direct bronchospasm. The infected sinus may produce cytokines and bronchoconstrictive mediators, thus worsening the asthma [12]. Treating the sinusitis which coexists with asthma may probably interfere with any one of these mechanisms and thus reduce the severity of the asthma.

Despite the controversies which exist about the role of the sinusitis treatment in the treatment of asthma, studies have made it very clear that sinusitis worsens the symptoms of asthma. Hence, with the observations which were made from our study, we would like to conclude that a prompt diagnosis and treatment of the sinusitis definitely play an important role in the long term management of the asthma, which in turn, can aid in the normalization of the pulmonary functions, improve the peak flow expiratory rate and in particular, reduce the long term use of bronchodilators and corticosteroids, which may decrease the side effects which are caused by these drugs.

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