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The effects of sinusitis treatment on people with asthma

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Abstract
Background: Common symptoms of sinusitis, bronchitis, and rhinitis all occur together. Because of gaps in asthma classification and the etiopathogenesis of airway disease, understanding the function of sinus disease in an asthmatic patient is usually incomplete. The connection between sinusitis and asthma is now clear.
Methods: 40 patients hospitalized to Department of TB &CD, Dhanalakshmi Srinivasan Medical College, Trichy, India with provided the clinical data for this study. Consent to participate in the study was acquired after patients were given information about it. This study was performed from January 2019 to November 2019.
Results: It has been shown that the upper and lower respiratory tracts react similarly to stimuli, and that alterations in the lower airway can be triggered by stimulation of the upper airway. Treatment of the upper airway in addition to the pulmonary component of asthma ensures comprehensive disease management, whereas pulmonary treatment alone provides only temporary improvement in the patient's health.
Conclusion: A better quality of life is achieved for asthma patients, and overall healthcare costs are reduced, when asthma episodes are less severe, fewer medications are required, and fewer hospitalizations are required due to unexpected complications. This study also provides evidence that medicinal treatment is preferable than surgical intervention.

Keywords: Sinusitis treatment, asthma, upper and lower respiratory, upper airway

Introduction
Sometimes people will experience symptoms of sinusitis, bronchitis, and rhinitis all at the same time. Yet, due to information gaps in asthma classification and the etiopathogenesis of airway disease, it is frequently impossible to determine the role that sinus disease plays in an asthmatic patient's condition [1]. A relationship between the upper and lower airways, which will be referred to as united airway sickness, will be demonstrated with the help of future clinical research on sinus inflammation and airway remodeling. Asthma and sinusitis have been related, which is something that has been suspected for a long time [2, 3].
The fact that treatment for sinusitis, whether medical or surgical, has been shown to reduce asthma symptoms lends credence to the epidemiological hypothesis that there is a relationship between the two conditions [4, 5]. Histologist Hun-Jong Dhong made the discovery in 2004 that chronic sinusitis with bronchial asthma exhibited a marked chronic inflammatory reaction, and that eosinophil infiltration was an essential component of this reaction. It has been demonstrated that the condition of the lower airways deteriorates more frequently in those who suffer from sinusitis. Sinusitis is reported to be the complication of asthma that occurs the majority of the time, as stated by the Vermont Lung Centre. Sinusitis and asthma appear to be caused by the same underlying disease process due to their similar symptoms and inflammatory response pathways [5-7].
A statistically significant sample of Europeans participated in a study that was carried out in 2011 by the Global Allergy and Asthma network of Excellence to investigate the prevalence of asthma and sinusitis. According to a hypothesis that was put up in 2012 by Feng and Charles, chronic rhinitis and asthma, which may appear to be two distinct diseases, are in fact the same atopic entity that affects the same airway [8, 9]. The purpose of this article is to address a number of significant scientific questions pertaining to the treatment of rhinosinusitis, more notably those questions concerning the effect that treatment has on mucociliary clearance, the pathophysiology of illness, and the persistence of disease [10].

The researchers wanted to investigate whether or not there is a link between sinusitis and asthma, so they designed this study to do just that. The primary objective of this research project is to assess how well sinusitis may be treated, both medically and surgically, in patients who also suffer from asthma. The effect of treating sinusitis in asthma patients on pulmonary function tests and how these results should be interpreted.

Materials and Methods

40 patients hospitalized to Department of TB &CD, Dhanalakshmi Srinivasan Medical College, Trichy, India with provided the clinical data for this study. Consent to participate in the study was acquired after patients were given information about it. This study was performed from January 2019 to November 2019.

Inclusion criteria

1. Bronchial asthma history.
2. A history of asthma symptoms that persisted despite receiving COPD treatment for at least six weeks.
3. the 18 to 55 age bracket
4. Asthmatic individuals with a history that may indicate chronic sinusitis

Exclusion criteria

1. Individuals with
2. H/o long-term smoking
3. Systemic disease
4. Pregnancy 5. Mothers who are nursing
5. Antibiotic allergy without h/o

According to National Heart, Lung, and Blood Institute recommendations for diagnosis and management of asthma, patients with asthma typically exhibit symptoms of shortness of breath, wheeze, cough, and chest tightness. The National Asthma Education and Prevention Programme was used to grade the patients. Peak expiratory flow measurement is useful for assessing and monitoring asthma patients. Here, the Wright peak flow meter has been employed. That is the maximum flow following a full inspiration with the greatest force. Peak expiratory flow rate varies throughout the day, with morning values being the lowest and afternoon values being the greatest. Before using bronchodilators, each measurement should be the greatest value of three consecutive maneuvers. Peak expiratory flow rate offers unbiased data for tracking and overseeing therapy.

Results and Observation

Forty patients with asthma who initially reported with sinusitis were evaluated using a nasal endoscope, a plain X-ray of the paranasal sinuses, and, if necessary, a CT scan of the paranasal sinuses, all according to Task force guidelines. To serve as a comparison group, eight patients were randomly chosen from the original pool of forty. For three weeks, the remaining 40 patients were given medical treatment consisting of antibiotics, antihistamines, and nasal decongestant drops. Their peak expiratory flow rates were measured before any medical treatment was administered. However, only 25 of these individuals responded favorably to medical care, while the remaining 17 were unresponsive. When individuals who had been receiving medical treatment stopped receiving that care, their peak expiratory flow rate was measured. Six weeks following functional endoscopic sinus surgery, peak expiratory flow rate was measured in 17 patients who had not responded to medication therapy.

Age distribution chart

The ages of all of the patients ranged from 18 to 55, with the breakdown looking like this:

Table 1: Age wise Distribution

Age	Total	Female	Male
15-20	3	1	2
21-25	12	1	8
26-30	8	2	5
31-35	11	4	5
36-40	3	2	0
41-45	5	1	2
46-50	2	1	0
51-55	6	5	0
Total	40	20	20

Drug consumption chart

Drug consumption was measured before the start of the trial and again at the end of the first six weeks of treatment.

Table 2: At start of study

Drug	Medically managed patients	Surgically managed patients	Control group
Prednisolone	20	18	3
Salbutamol	6	12	1
Theophylline	4	5	2
Inhaler	5	4	1
Nebulization	6	1	1

All 20 patients who were medicated were given steroids; 6 were given salbutamol; 6 were given theophylline; 4 were instructed to use an inhaler or rotacap; and 1 needed nebulization in addition to the other meds. All 18 patients who had surgical management were prescribed steroids, with a further 4 patients needing theophylline, 4 needing inhalers, and 2 requiring nebulization. All three subjects in the placebo group need to take steroids, while two are using salbutamol, one is using theophylline, and the third uses an inhaler and nebulization.

In medically managed patient

The readings of the PEFR that were taken before and after the drug was given are compared in the accompanying graph.

Table 3: Medically managed patient

Age/sex	Height in CMS	Expected value (l/min)	Before medication (l/min)	After medication (l/min)
19/F	137	280	185	226
21/F	141	301	251	281
24/F	136	266	207	242
28/F	151	337	251	313
31/F	156	361	297	314
31/F	162	382	214	325
33/F	149	321	254	294
36/F	151	348	276	324
37/F	153	357	251	321
39/F	166	421	287	363
44/F	154	344	290	314
48/F	152	339	252	305
52/F	142	327	281	300
53/F	152	321	221	271
55/F	160	316	205	272
55/F	146	317	265	281
20/M	144	456	300	372
21/M	157	484	352	436
22/M	135	425	331	390
24/M	151	471	382	412
25/M	162	490	384	424
26/M	161	506	321	448
29/M	172	518	444	481
29/M	154	472	331	426
31/M	149	460	311	398

Table 4: Gender Sample

Gender	Medically treated	Surgically treated	Control	Total
Male	9	4	7	20
Female	12	7	1	20

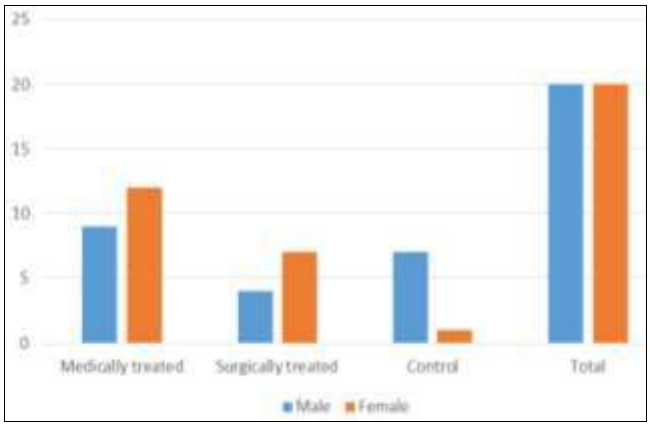

Fig 1: Gender Sample

Discussion

It has been demonstrated that the upper and lower respiratory tracts react in a comparable manner to stimuli, and that changes in the lower airway can be caused by stimulation of the upper airway. In order to achieve total disease control, it is necessary to treat both the pulmonary and the upper airway components of asthma [10, 12].

The fact that men made up 52% of the research sample and women made up 48% adds credibility to the concept that allergic components and environmental factors have a disproportionately large degree of influence. In asthmatic patients, the treatment of sinusitis was related with a considerable reduction in eosinophil levels. This was able to be detected and determined through monitoring. After six weeks of treatment, the average number of eosinophils in patients who were undergoing medicinal management dropped from 646 at the beginning of the research to 280. This represents a decrease of 56%. There is a statistically significant difference between the mean value before surgery, which was 615 for the patients who were going to have surgery, and the value after surgery, which was 297. In the control group, there was no discernible change in the mean eosinophil count. As a result of the treatment for the sinusitis, the total mean eosinophil count dropped from 642 to 350. When sinusitis is treated at the same time as asthma, there is evidence that the pathogenesis of asthma can be controlled. This is evidenced by a reduction in the eosinophil count, which is the major effector cell in the release of cytokines in both the acute and late phase reactions of asthma. This triggers the mast cells, which in turn causes bronchoconstriction. There is a discernible reduction in the stimulation of the airways following treatment for sinusitis [13-15].

As a direct result of the drug monitoring being performed on the patients, it was discovered that fewer patients were making use of steroids, salbutamol, theophylline, inhalers, and nebulizers. At the beginning of the study, all of the participants were administering steroid treatment. Fifty percent of the patients were assigned to the medically managed group, 34 percent were assigned to the surgically treated group, and 16 percent were assigned to the control group [16]. As the underlying sinusitis was addressed, the number of patients who required steroid therapy for asthma dropped to 64 percent from the original number of all 25 patients who required medical management for their asthma. As a result of the treatment for sinusitis, the percentage of patients who were taking salbutamol decreased from 32 percent to 16 percent. Because of the treatment for sinusitis, 48% of patients were able to reduce their theophylline consumption to 20%, and 16% of patients were able to cease using their inhaler entirely [17, 18]. Following sinus surgery, the average amount of steroid medication taken by the 17 patients who had been diagnosed with this illness dropped

dramatically, landing at 45%. In the instance of the use of salbutamol, the percentage of patients who took it prior to surgery decreased from 35% to 20% after the procedure was completed. After the operation, twenty-five percent of those who had been given theophylline experienced a reduction to ten percent. Following surgical intervention, the number of patients who required the use of an inhaler decreased from 20% to 10%. In the control group, there was no noticeable change in the amount of medication that was required between the first and sixth weeks of the study. Overall, sinus therapy for asthma reduced the number of patients who used steroids by 64 percent, patients who used two-agonist drugs by 57 percent, and patients who used nebulization by almost 100 percent [19, 20].

Patient-reported exercise capacity, also known as PEFR, was utilized both before and after the research was begun in order to evaluate the success of treatment for sinusitis in asthmatic patients. In patients who were receiving medical therapy, the average PEFR value before treatment was 289. The initial flow rate of 96 l/min increased to 342.80 l/min six weeks after treatment was initiated, indicating a considerable improvement. Both before and after the experiment, the patients who had undergone surgical treatment had PEFR values of 278.76 and 345.71 l/min, respectively. In the control group, there was no change in the PEFR readings. All of these were subjected to statistical analysis, and the results of the paired sample t-test revealed that they were considerably higher in the groups that were medically managed and surgically treated compared to the group that served as the control [21, 22].

When Slavin treated sinusitis and asthma together in 1982, he noticed similar results: the asthmatics required fewer corticosteroids than before. A study that was conducted in 1986 at the Government medical college of Aurangabad looked at the fluctuations in PEFR value that occurred in asthmatic patients who were being treated for sinusitis with antibiotics, antihistamines, and nasal decongestants. The mean peak expiratory flow rate (PEFR) increased from its pretreatment value of 197.2 l/min to 250.4 l/min after sinusitis therapy [23]. After receiving therapy for sinusitis, the patient's need for asthma medication dropped by 60 percent. Researchers at the Royal National Throat, Nose, and Ear Hospital 131 in London made the discovery in 2005 that treating sinusitis with medication and functional endoscopic sinus surgery improved asthma symptoms and reduced the requirement for asthmatic drugs [24, 26].

Because they reduce the microbiological load, lower the amount of leukocytes, and dampen the production of inflammatory cytokines and mediators in the upper airway, medicines such as antibiotics, antihistamines, and nasal decongestants work well together to make medical treatment more successful. Those who underwent surgical therapy exhibited considerable improvements in both subjective and objective measurements of the lower airway.

Conclusion

It's possible for sinusitis and asthma to coexist, with each potentially influencing the other's etiology. The correct history, physical examination, investigation, and imaging can help identify asthmatic patients with sinusitis. The results of this study show that the lung function, allergic reaction, and PEFR value of asthmatic patients all improve after sinusitis is properly treated medically and surgically. The quality of life for asthma patients increases as their asthma attacks become less severe, they use less medication, they require fewer rescue inpatient stays, and they avoid more costly emergency room visits. Also, the study proved that medical treatment was more effective than surgical intervention.

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Conflict of interest
Nil

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