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The efficacy and prevalence of montelukast therapy in patients with allergic rhinitis

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Abstract---Allergic rhinitis is the most common atopic disorder seen in the outpatient clinic. Montelukast, is a novel medication, is an antagonist to the leukotriene receptor. The aim of this work was to identify the improvement in the severity of symptoms of child with AR treated with Montelukast. A cross-sectional study was conducted among fifty-patients with a chronic cough and (sneezing, nasal congestion, rhinorrhea, and postnasal drip) at least eight weeks using Montelukast between the periods of January 2019 to March 2019. By using the symptom severity score for AR, that calculated. Data including (age, gender, associated disease, exacerbation factors, and classical therapy). The dose of 10-mg Montelukast once daily was prescribed. On follow-up, after four-weeks, compliance was ensured and then the symptom severity score was recorded again. Most of patients aged above 40 years. Males to females ratio was 1:1.5. Most of patients (40, 80%) lived in urban regions. There was a reduction of the symptoms associated with RA after treatment with Montelukast. Exacerbation factors was as following, dust was found in 80%, food 40%, exercise 64%, psychological 50%, and smoking 48%. SSS was declined after therapy significantly (P=0.05). Patients using showed improvement of symptoms, pain was relieved from 82%, exhaustion 80%, vomiting 92%, sleep disturbance in 80%, affecting daily life in 88%, and syncope 96%. In conclusion, the common symptoms of AR are improvement in response to Montelukast. The improvement in the symptom severity score was maximum in sneezing-nasal congestion-rhinorrhea and least in postnasal drip.

Keywords---allergic rhinitis, montelukast, chronic cough, sneezing, nasal congestion, rhinorrhea.

Introduction

Allergic rhinitis is the most common atopic disorder seen in the outpatient clinic setting diagnosed by history, physical exam and objective testing. It is classified by chronicity (intermittent or persistent), and severity which is based on symptoms and quality of life (mild, or moderate/ severe) (Supplementary I) [1]. It is defined as common respiratory disorder presented as an inflammation of nasal mucosa. It is the most common form of chronic rhinitis characterized by one or more symptoms including sneezing, nasal itching, nasal congestion, postnasal drip, and rhinorrhea [2]. It is affecting the nose and nasal passages, and may also represent a component of a systemic disease reach frequently the lower respiratory tract as well [3]. In general, rhinitis and asthma frequently coexist [4]. Allergen should be avoided and implemented, particularly in child age, to decrease level of exposure; unfortunately efforts are often not adequately performed. Montelukast, is a novel medication, is an antagonist to the leukotriene receptor. It is non-sedating, dosed once daily, and has a safety profile same as in adults and children with approval down to 6 months of age [1]. Its benefit is equivalent to antihistamines when used as monotherapy, but less than intranasal corticosteroids [2]. The aim of this work was to identify the improvement in the severity of symptoms of child with AR treated with Montelukast.

Supplementary I. Classification of allergic rhinitis [1]

1- "Intermittent" means that the symptoms are present:

- Less than 4 days a week,
- Or for less than 4 weeks.

2- "Persistent" means that the symptoms are present:

- More than 4 days a week,
- And for more than 4 weeks.

3- "Mild" means that none of the following items are present:

- Sleep disturbance,
- Impairment of daily activities, leisure and/or sport,
- Impairment of school or work,
- Troublesome symptoms.

4- "Moderate-severe" means that one or more of the following items are present:

- Sleep disturbance,
- Impairment of daily activities, leisure and/or sport,
- Impairment of school or work,
- Troublesome symptoms.

Method

Study design and setting

A cross-sectional study was conducted among fifty-patients with a chronic cough and (sneezing, nasal congestion, rhinorrhea, and postnasal drip) at least eight weeks using Montelukast between the periods of January 2019 to March 2019. By using the symptom severity score for AR, that calculated by asking the patient to evaluate the severity of individual symptoms against the 4-point scoring scale over the last day (Supplementary II).

Supplementary II. The symptom severity score for AR [2]

Score	Severity	Description
0	None	No symptoms
1	Mild	Symptoms occur once or twice in the last 24 hours
2	Moderate	Symptoms occur once or twice every 2 to 3 hours in a day
3	Severe	Symptoms occur every hour in a day

Inclusion criteria

- Age 18 to 60 years
- Symptom severity score of 6 to 12.

Exclusion criteria

- Nasal polyps
- Displaced or deviated septum
- Chronic anti-asthma medications utilize
- Systemic corticosteroids therapy
- Renal, hepatic, or cardiovascular problems
- Pregnancy or lactating mothers

Patient consent

Informed verbal consent from each patient was taken.

Data collection

A printed proforma was used to register the name, age, gender, occupation, and address. After explaining the scoring system to the patient, the proforma was filled before starting the treatment. Data including (age, gender, associated disease, exacerbation factors, and classical therapy).

Interventional therapy

The dose of 10-mg Montelukast once daily was prescribed. On follow-up, after four-weeks, compliance was ensured and then the symptom severity score was recorded again.

Statistical analysis

The collected data was analyzed using SPSS version 20 (Statistical Package for Social Sciences, version 20.0, SPSS Inc., Chicago, IL). Descriptive statistics consist of numbers and percentages were measured. Chi-square test also calculated. A two-sided *P* value of less than 0.05 was considered statistically significant.

Results

Table 1 showed the demographic characteristic of fifty-patients with AR. Most of patients aged above 40 years. Males to females ratio was 1:1.5. Most of patients (40, 80%) lived in urban regions. Dust was the most prevalent exacerbation factor among other factors, as showed in Table 2. Table 3 showed the SSS before and after treatment. Table 4 showed symptoms after therapy.

Table 1
Demographic characteristics

Variables	No. (%)	
Age	18-40	20 (40)
	41-60	30 (60)
Gender	Male	20 (40)
	Female	30 (60)
Occupation	Yes	15 (30)
	No	35 (70)
Residence	Rural	10 (20)
	Urban	40 (80)

Table 2
Exacerbation factors

	No. (%)	
Dust	Yes	40 (80)
	No	10 (20)
Food materials	Yes	20 (40)
	No	30 (60)
Exercise	Yes	32 (64)
	No	18 (36)
Psychological	Yes	25 (50)
	No	25 (50)
Smoking habits	Yes	24 (48)
	No	26 (52)

Table 3
Severity symptom score (SSS) before and after therapy

SSS	Pre-treatment	Post-treatment	P value
Sneezing	4	<1	0.05
Nasal congestion	4	<1	0.05
Rhinorrhea	4	<1	0.05
Postnasal drip	3	<1	0.05

Table 4
Post Montelukast therapy

		No. (%)
Pain	Yes	9 (18)
	No	41 (82)
Exhaustion	Yes	10 (20)
	No	40 (80)
Vomiting	Yes	4 (8)
	No	46 (92)
Sleep disturbance	Yes	10 (20)
	No	40 (80)
Effect on daily life	Yes	6 (12)
	No	44 (88)
Syncope	Yes	2 (4)
	No	48 (96)

Discussion

The most patients were living in urban areas, those areas are known to have more industrialization and pollution and this agrees with a study done by Hirshon et al., in which Maryland showed the highest rates of emergency department visits for a chronic cough in urban areas [5]. A study performed by Sole et al., showed that the international prevalence of a chronic cough related symptoms was higher among those adolescents living in the urban centers in comparison to the rural ones in Brazil [6]. The dust was an exacerbation factor that 80% of patients were complaining from, this agrees with a study done by Hedlund et al., suggested that dust exposure can have long-lasting effects on respiratory symptoms in chronic dry cough, these data support the role of occupational exposures in the etiology of respiratory illness in a population-based cohort in Singapore with a low prevalence of atopic illness [7].

About 64% of patients had exercise to be a triggering exacerbation factor. Patients were suffering from this condition and based on Sun et al., stated that Montelukast usage as a therapy offers significantly greater protection against exercise-induced bronchoconstriction, and just after two-months of the administration of Montelukast show a better control of their state without the need of B-agonist during or after exercise challenge [8]. Also, smoking habits was an exacerbation factor in a number of the study patients, in a review conducted by Stapleton et al., smoker individuals have poor control than in allergic

rhinitistic non-smokers. Airway mucosal permeability is increased in smokers, which could lead to increased clearance of inhaled corticosteroids from the airways [9]. Another exacerbation factor was found to be a psychological issue. Patient may develop a persistent cough associated with the respiratory system, but it occur alongside with anxiety and stress, which is supported by Wright and Balfour-Lynn study, found that 18% of the chronic cough patients were actually suffering from behavioral/ a psychiatric cough [10].

Leukotrienes act as lipid mediators and are produced by cells of inflammation, like mast cells and basophils. C4, D4, and E4 are cysteinyl leukotrienes are play a role in the development of allergic reactions in the upper and lower airways. Patients with symptomatic AR have raised levels of cysteinyl leukotrienes [11, 12]. The effects of Montelukast are on the function of cysteinyl leukotriene receptor 1, which is located in inflammatory cells including smooth muscle cells, and endothelial cells in the mucosa of both the upper and the lower respiratory tracts [2]. Young adults are commonly affected by AR [2], while in this study most patients above age of 40 years. A randomized, placebo-controlled, 32-week study on patients with AR without the associated respiratory disease compared antihistamine treatment alone or in combination with Montelukast. The results showed a gradual increase in nasal symptom improvement within six weeks of therapy with Montelukast alone or in combination with an antihistamine in patients with AR [13, 14].

All symptoms were significantly lower after therapy. In conclusion by Al-Hamdani, both Ketotifen and Montelukast sodium showed significant changes in allergic rhinitis symptoms and PFT after one month of treatment, but the changes were more significant with Montelukast group (2nd group) compared with Ketotifen group (1st group) and this indicate that Montelukast was more effective than Ketotifen in the treatment of allergic rhinitistic patients [15]. Sleep disturbance or sleep apnea is a symptom that some patients suffered from, and improved after Montelukast administer. According the Canadian agency Drugs and technologies in health, oral Montelukast appears to be effective at improving respiratory disturbances in children with mild to moderate obstructive sleep apnea (OSA) as determined via improvements in Apnea-Hypopnea Index (AHI) and Obstructive Apnea Index (OAI) scores [16].

Conclusions

The common symptoms of AR are improvement in response to Montelukast. The improvement in the symptom severity score was maximum in sneezing-nasal congestion-rhinorrhea and least in postnasal drip.

Conflict of interesting

None

Founding

None

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