



ROLE OF MONTELUKAST AS MONOTHERAPY IN IMPROVING QUALITY OF LIFE OF AN ASTHMATIC PATIENT

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Abstract

Background: Inadequately treated and uncontrolled asthma significantly lowers Quality of Life and increases the risk of death.

Objective: the aim of this study was to explore the role of montelukast as monotherapy in improving quality of life of an asthmatic patient.

Methodology: The current study was conducted at the department of Pulmonology Hayatabad Medical Complex Peshawar from January 2024 to May 2024 after taking approval from the ethical committee of the institute. The 32 items of the QLQ-S evaluate four domains. Symptoms, activity, emotions, and environment control. Higher scores correspond to higher life quality. SPSS version 23.0 was used to process and analyze the data.

Results: A total of 138 individuals completed this research out of which 68 (49.27%) were female and 70 (50.72%) were male participants, with a mean age of 22 ± 8 years. The most prevalent symptoms detected were severe cough 106(76.81%), wheezing 100(72.4%), shortness of breath 98(71.0%) and Tightness of chest 89 (64.4%) respectively. In comparison to day 0, participants' scores according to the Asthma Quality of Life Questionnaire-Standard were higher on day 28 overall and in every sub-domain.

Conclusion: It was concluded from the current study that Montelukast effectively controls asthma and enhances the quality of life.

Key words: Montelukast; Monotherapy; Quality of life

Introduction

Asthma is a complicated immune-mediated respiratory tract disorder that is characterized by inflammation in the air ways which can swell or block the respiratory tract. Chest tightness, coughing with or without wheezing, and gradually increasing dyspnea are the hallmarks of acute asthmatic exacerbations. Since factors in the environment and underlying complicated genetic activities interact intricately, asthma is a multifactorial condition with a wide range of different phenotypes and symptoms.¹ An inflammatory reaction is set off when the mucosa of the respiratory tract is exposed to an allergen (Microbe or environmental element). The macrophage engulf the allergen first, process it, and present it to naïve T cells. These Antigen presenting cell then trigger the release of inflammatory mediators from the respiratory epithelium, which draws leukocytes and dendritic cells. Interleukin 4 (IL-4) and IL-13 stimulation causes T cells to develop into Th2- and Th17 cells. Th2 cells generate IL-5, which raises eosinophil counts and causes the release of inflammatory mediators.

Together with those secreted by neutrophils, macrophages, and T cells, these substances harm the airway, shrink smooth muscle, and results breathing problems Th2 cells further cause creation of the antibody immunoglobulin (IgE), which attaches to basophils and mast cells and releases Histamine, CysLTs (cysteinylukotrienes) and other mediators.² Studies show that the number of individuals affected by asthma is expected to increase by 100 million by 2025, with the disease already affecting 339 million people worldwide.³ It is changeable when comparing demographic and geographic data. According to studies, the number of persons with asthma worldwide appears to be higher in countries with high incomes than in ordinary or low-income nations.⁴ According to the data on the worldwide burden of asthma, Pakistan has a 4.3% prevalence of the condition.⁵ Even though it is rather prevalent, poor management of it results in poor quality of life (QOL) and early mortality. The sixteenth cause of Disability Adjusted Life Years (DALYs) is asthma. it ranks 28th among other causes, which contributes to an elevated burden of disease.³ It's critical to manage asthma. While inhaled corticosteroids (ICS) show promise, leukotriene receptor antagonists (LTRAs) are gaining popularity these days since they are more practical to utilize. Unlike ICS, LTRAs do not put the patient at risk for long-term negative consequences.⁶ The Global Initiative for Asthma (GINA) recommendations support using LTRAs as a stand-alone treatment for asthma. They can also be used as an adjuvant or replacement for ICS at higher dosages, or as a long-acting β 2-agonist. ⁶Much fewer studies has been done in Pakistan on the use of Montelukast in therapy of asthma. Therefore the current study was conducted to explore the Role of Montelukast as Monotherapy in Improving Quality of Life of an Asthmatic Patient

Methodology

The current study was conducted at the department of Pulmonology, Hayatabad Medical Complex Peshawar from January 2024 to May 2024 after taking approval from the ethical committee of the institute. Asthmatic Individuals of both genders whose age range from 15 years or above were included in this study while those who had used montelukast in the past or who had acute exacerbations of their asthma were excluded. Montelukast (10 milligrams once a day) had been given to each patient. Patients who used montelukast for at least twenty-one days were considered compliant. To guarantee compliance, the patients were told to take their strips to the follow-up consultation. A total of 160 individuals were enrolled in the study and kept under observation for one month and the study excluded patients who were not followed up on. The age, gender, length of asthma attack, and symptoms of the individual were recorded using a self-structured questionnaire. On days 0 and 60, the Asthma Quality of Life Questionnaire-Standard (AQLQ-S) was used to assess quality of life. The 32 items of the AQLQ-S evaluate four domains. Symptoms, activity, emotions, and environment control. Higher scores correspond to higher life quality.

Analysis of data

SPSS version 23.0 was used to process and analyze the data. Age and other continuous variables were given a AQLQ-S mean as well as a standard deviation. The study computed frequency and percentage for categorical variables, such as gender, age, asthma duration, and symptoms. Using the dependent T-test, a comparison of the AQLQ-S scores on days zero and 60 was conducted. P-values less than 0.05 indicated that the null assumption is false and that there is a variance between the AQLQ-S score between day 0, and day 60.

Results

There were 160 asthmatic patients enrolled at the beginning of the study. 1 participant (0.62%) discontinued taking montelukast during the assessment as a result of an adverse event, and 21(13.1%) subjects were not followed up so a total of 138 individuals completed this research. The study group contained 68 (49.27%) female individuals and 70 (50.72%) male participants, with a mean age of 22 \pm 8 years. Major features of the study population has shown in **table 1**. Majority of the participants had asthma from 1 to 3 years 48(34.7%), followed by 3 to 6 years 39(28.2%) correspondingly. The most prevalent symptoms detected were severe cough 106(76.81%), wheezing 100(72.4%), shortness

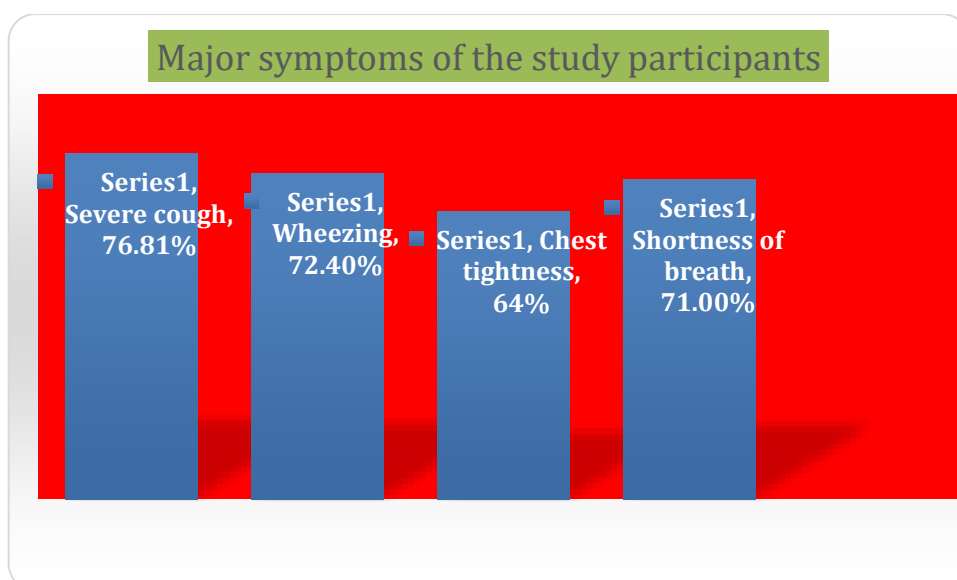
of breath 98(71.0%) and Tightness of chest 89 (64.4%) respectively as shown in **figure 1**. In comparison to day 0, participants' scores according to the Asthma Quality of Life Questionnaire-Standard were higher on day 28 overall and in every sub-domain. Overall, there was significant improvement, as were the subcategories of symptoms, activity restrictions, and environmental cues. (Table 2)

Table 1. Major features of the study population N=138

Asthma duration	N(%)
Less than one year	16(11.5%)
1 to 3 years	48(34.7%)
3 to 6 years	39(28.2%)
7 years Or above	35(25.36%)
Major symptoms	
Severe cough	106(76.81%)
Wheezing	100(72.4%)
Tightness of chest	89(64.4%)
Shortness of Breath	98(71.0%)

Table 2. Asthma Quality of Life Questionnaire at day 28 and day zero

AQLQ-S	At zero day (Mean ± SD)	At 28 day (Mean ± SD)	Variance	Dependent sample T -test applied(value of P)
Total	4.12 ± 0.62	4.89 ± 0.89	0.77	Less than 0.0001
Major symptoms	3.79 ± 0.75	4.18 ± 0.37	0.39	Less than 0.0001
Activity Limitation	4.41 ± 0.99	5.11 ± 0.93	0.70	Less than 0.0001
Environmental Function	4.59 ± 1.03	5.38 ± 1.21	0.79	Less than 0.0001
Emotional Function	4.42 ± 1.20	4.52 ± 1.13	0.10	0.48



Discussion

Leukotriene receptor antagonists include montelukast. It binds with the cysteinyl leukotriene receptors competitively, lowering the amounts of leukotriene in the respiratory tract. Strong Broncho constrictor L TD4 and inflammatory cell-attracting CysL T1 work together. Since CysL T1 binding to L TD4 typically results in allergic and hypersensitive responses, montelukast is essential for the treatment of individuals with asthma.⁷

The overall Asthma Quality of Life Questionnaire-Standard showed a substantial improvement in this research. With the exception of emotional function, every sub-domain has greatly improved. The outcome is in line with other research. Baig et al. conducted a double-blind experiment whereby montelukast and placebo were compared.⁷ Similar to our study, theirs also revealed a substantial overall increase in quality of life; nevertheless, only the stimuli in the environment sub-domain of the A QLQ-S showed a significant improvement when compared to the placebo. Researchers has shown that adding montelukast to ICS treatment might greatly enhance asthma patients' quality of life.⁸ Similar findings have also been seen in other examinations, most notably one by Virchow and colleagues, who found that using montelukast as an adjuvant to LABA and ICS improved morbidity as shown by mini-A QLQ scores.⁹

Additionally, in a separate study, the same researcher examined the effectiveness of ten milligrams of montelukast in individuals having asthma throughout a phase IV clinical trial that was carried out in several sites and found that the symptomatology of asthma had improved. Approximately 92% of patients expressed satisfaction with montelukast and would consider sticking with it over alternative asthma drugs. Additionally, 85% of asthma patients answered "very good" or "good" on the questionnaire.¹⁰

Researchers administered 20 mg of montelukast twice a day for almost a week to a sample of participants in a study. The outcomes were compared with the individuals receiving a placebo. They said that individuals receiving montelukast had a considerable improvement in the symptoms resulting from leukotrien.¹¹ This study supports the results of another examination by Bozek et al., which found that adding montelukast to a short-acting beta-agonist reduced asthma episodes and recurrence.¹² But there have also been contrasting studies that present the opposite information. When montelukast was administered to older individuals, Columbo demonstrated that there was no discernible improvement in asthma while analyzing Asthma Control test scores & assessing biochemical test at the fourth and eighth week of prescription drugs.¹³

However, a number of studies have shown that montelukast is effective in treating both acute asthma attacks and different degrees of persistent asthma. Montelukast reduces respiratory tract inflammation and enhances the general symptomatology of asthmatic patients. Based on our study on this issue and the numerous statistics available, we can fairly conclude that montelukast should be considered by pulmonologists as an add-on medication for asthma management in along with ICS or the use of LABA to enhance the general illness as well as quality of life for individuals with asthma. Given that ICS has certain long-term negative effects, more research is necessary to determine whether montelukast can truly replace ICS. The impact of montelukast on asthma participants' death needs to be further studied.

Conclusion

Overall scores on the Asthma Quality of Life Questionnaire-Standard significantly improved in this study. Sub-domains with notable improvements included symptoms, activity limits, and environment functions. It is crucial to think about how different asthma treatment options would affect one's quality of life. Our research demonstrates that montelukast is useful in raising people' quality of life, as do several other studies conducted across the world.

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