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ASSOCIATION BETWEEN WEIGHT LOSS AND CHANGES IN FEV1 AMONG PATIENTS WITH BRONCHIAL ASTHMA AND OBESITY FOLLOWING DIETARY THERAPY

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Abstract

Background

Bronchial asthma and obesity are increasingly prevalent chronic diseases worldwide. Obesity is associated with impaired pulmonary function, poor asthma control, increased symptom burden, and reduced responsiveness to standard anti-asthmatic therapy. Weight reduction has been proposed as an effective non-pharmacological strategy for improving asthma outcomes; however, the relationship between dietary-induced weight loss and pulmonary function remains insufficiently investigated.

Objective

To evaluate the association between weight loss achieved through dietary therapy and changes in forced expiratory volume in one second (FEV1) among patients with bronchial asthma and obesity.

Methods

A prospective observational study was conducted among 160 adult patients with bronchial asthma and obesity. The study population consisted of 70 men and 90 women with a mean age of 45 years. Participants underwent a structured dietary intervention and were followed for six months. Body weight, body mass index (BMI), Asthma Control Test (ACT) scores, and spirometric parameters were assessed before and after the intervention.

Results

After six months of dietary therapy, mean body weight decreased from 89 kg to 72 kg, while BMI decreased from 31 kg/m² to 27 kg/m² (p=0.01). Mean FEV1 improved from 35% predicted to 62% predicted (p=0.01). Mean ACT score increased from 14 to 21 points (p=0.01). These findings indicate that dietary-induced weight loss was associated with substantial improvements in pulmonary function and asthma control.

Conclusions

Dietary therapy resulting in significant weight reduction was associated with improved FEV1 and better asthma control among patients with bronchial asthma and obesity. Weight management should be integrated into routine asthma care.

Keywords: Bronchial asthma, obesity, dietary therapy, weight loss, FEV1, asthma control, pulmonary function.

Introduction

Bronchial asthma is a chronic inflammatory disease of the airways characterized by reversible airflow limitation, bronchial hyperresponsiveness, and respiratory symptoms including wheezing, cough, chest tightness, and dyspnea. Despite advances in treatment, asthma remains a major public health challenge affecting hundreds of millions of individuals worldwide.

Obesity has emerged as one of the most important comorbid conditions associated with asthma. Epidemiological studies have consistently demonstrated that obesity increases both the incidence and severity of asthma. Obese patients frequently experience poorer disease control, increased exacerbation rates, reduced quality of life, and diminished response to inhaled corticosteroids.

The mechanisms linking obesity and asthma are multifactorial. Mechanical effects include reduced lung volumes, decreased chest wall compliance, impaired diaphragmatic mobility, and airway narrowing. In addition, adipose tissue functions as an active endocrine organ capable of producing numerous pro-inflammatory mediators such as leptin, TNF-α, and IL-6, which may contribute to airway inflammation.

Previous investigations have demonstrated that weight reduction may improve asthma symptoms and pulmonary function. However, data regarding dietary-induced weight loss remain limited, particularly in populations from Central Asia. Therefore, evaluation of dietary interventions represents an important area of clinical research.

The objective of the present study was to investigate the association between dietary-induced weight loss and changes in FEV1 among patients with bronchial asthma and obesity.

Materials and Methods

Study Design

A prospective observational study was conducted over a period of six months.

Participants

A total of 160 patients diagnosed with bronchial asthma and obesity were enrolled.

Inclusion Criteria

- Age between 18 and 60 years;
- Physician-confirmed diagnosis of bronchial asthma;
- BMI ≥30 kg/m²;
- Stable anti-asthmatic therapy for at least three months.

Exclusion Criteria

- Chronic obstructive pulmonary disease;
- Pregnancy;
- Severe cardiovascular disease;
- Active smoking;
- Recent respiratory infection.

Dietary Intervention

All participants received individualized dietary counseling aimed at reducing caloric intake and promoting gradual weight loss. Recommendations included restriction of refined carbohydrates, reduction of saturated fat intake, increased consumption of vegetables and dietary fiber, and maintenance of adequate hydration.

Assessments

The following parameters were measured at baseline and after six months:

- Body weight (kg);

- Body mass index (BMI);
- Asthma Control Test (ACT);
- Spirometry (FEV1).

Statistical Analysis

Statistical analyses were performed using standard methods. A p-value of ≤0.01 was considered statistically significant.

Results

Baseline Characteristics

The study included 160 patients, comprising 70 men (43.8%) and 90 women (56.2%). The mean age was 45 years.

Table 1. Baseline Characteristics

Variable	Value
Patients (n)	160
Men	70
Women	90
Mean age (years)	45
Baseline BMI (kg/m²)	31
Baseline body weight (kg)	89
Baseline ACT score	14
Baseline FEV1 (% predicted)	35

Anthropometric Changes

After six months of dietary therapy, significant reductions in body weight and BMI were observed.

Parameter	Baseline	6 months	p-value
Body weight (kg)	89	72	0.01
BMI (kg/m²)	31	27	0.01

The average weight loss was 17 kg.

Changes in Pulmonary Function

FEV1 improved substantially following dietary intervention.

Parameter	Baseline	6 months	p-value
FEV1 (% predicted)	35	62	0.01

The increase represented a 27-percentage-point improvement.

Asthma Control

Parameter	Baseline	6 months	p-value
ACT score	14	21	0.01

Patients demonstrated marked improvement in asthma control, transitioning from poorly controlled asthma to well-controlled disease.

Discussion

The present study demonstrated that dietary-induced weight reduction was associated with significant improvements in pulmonary function and asthma control among obese patients with bronchial asthma.

The average weight reduction of 17 kg was accompanied by substantial improvements in spirometric performance. Several mechanisms may explain these findings. First, reduction of adipose tissue decreases systemic inflammation mediated by leptin, TNF-α, and IL-6. Second, weight loss improves respiratory mechanics through enhanced diaphragmatic movement and

reduced thoracic restriction. Third, decreased abdominal obesity may contribute to improved airway patency and reduced ventilation-perfusion mismatch.

The improvement in ACT scores further supports the clinical importance of weight reduction. Patients experienced fewer symptoms, better disease control, and likely improved quality of life.

Our findings are consistent with previous reports demonstrating beneficial effects of weight reduction on asthma outcomes. The present study emphasizes the role of dietary therapy as a practical and accessible intervention capable of improving respiratory function without additional pharmacological burden.

Limitations

The study was conducted at a single center and did not include a control group. Furthermore, inflammatory biomarkers such as leptin, adiponectin, IL-6, and TNF-α were not evaluated.

Future investigations should include molecular markers and long-term follow-up to better characterize the mechanisms underlying improvement in pulmonary function.

Conclusions

Dietary-induced weight loss was associated with significant improvements in pulmonary function and asthma control among patients with bronchial asthma and obesity.

After six months of intervention:

- Mean body weight decreased from 89 kg to 72 kg;
- BMI decreased from 31 kg/m² to 27 kg/m²;
- FEV1 increased from 35% predicted to 62% predicted;
- ACT score improved from 14 to 21 points.

These findings support the incorporation of structured weight-management programs into routine asthma care.

Funding

No external funding was received.

Ethics Approval

The study was conducted according to the principles of the Declaration of Helsinki and approved by the local ethics committee of Tashkent State Medical University.

Informed Consent

Written informed consent was obtained from all participants.

Conflict of Interest

The authors declare no conflict of interest.

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