Clinical Aspects of the Combined Course of Pulmonary Tuberculosis and Type 2 Diabetes Mellitus

Batirova Barchinoy Tadjimukhammedovna

ASMI, Assistant of the Department of Phthisiology and Pulmonology

ABSTRACT

The results of a comparative analysis of 80 cases of patients with chronic obstructive pulmonary disease (COPD) are considered: 40 cases with comorbid pathology (COPD and type 2 diabetes mellitus (DM)) and 40 cases of COPD without type 2 diabetes. The data of questionnaires, tests, clinical laboratory and instrumental indicators were analyzed. The negative role of type 2 diabetes on the course of COPD was demonstrated by such indicators as the frequency of exacerbation of COPD per year, the frequency of calls to ambulance teams, the frequency of hospitalizations due to exacerbation or worsening of the course of COPD, clinical symptoms of COPD, spirometry parameters, and indicators of cytokine and adipocytokine profiles.

Keywords: chronic obstructive pulmonary disease, cytokines, adipocytokines, type 2 diabetes mellitus, quality of life.

Introduction

One of the most important medical and social problems worldwide today is chronic obstructive pulmonary disease (COPD), the most common chronic disease with a tendency to a progressive course, with high disability and mortality [1]. COPD is one of the leading causes of mortality among non-communicable diseases [2, 3]. The Global Strategy for the Diagnosis, Treatment and Prevention of Chronic Obstructive Pulmonary Disease (GOLD, revision 2016) draws attention to the role of comorbid pathology in increasing the severity of COPD, the impact on quality of life (QOL) and reduced survival [4].

Materials And Methods

Recently, more attention has been paid to the study of the mutual negative impact of COPD and diabetes mellitus (DM), which is associated with a high incidence of type 2 DM in patients with COPD compared with the general population: among patients with COPD, DM occurs in 18.7%, while without COPD - in 10.5% of cases [5]. Patients with COPD are at high risk of developing type 2 DM: 20.0% of patients with COPD have disorders of carbohydrate metabolism, cardiovascular diseases, including arterial hypertension, coronary heart disease. Probably, COPD can be considered as one of the risk factors for the development of DM or diseases of the cardiovascular system. It is known that patients with the bronchitis phenotype of COPD have a greater predisposition to develop type 2 DM (10.6%) compared with patients with the emphysematous phenotype (8.2%). This took into account obesity, smoking, the degree of airway obstruction, the severity of COPD, age, gender. At the present stage, much attention is paid to the study of the mechanisms underlying the high incidence of DM in COPD.

Results And Discussion

The study included 130 patients with COPD without exacerbation (the degree of bronchial obstruction corresponded to GOLD 3). All patients gave written informed consent to participate in the study. The study itself was approved by the local ethics committee at the Voronezh Medical University. 2 groups of patients were formed, comparable in terms of a number of social and demographic indicators: group 1 - 40 patients with COPD without type 2 DM (25 men,

15 women; mean age - 46.12±0.75 years) and group 2 - 40 patients with COPD and type 2 DM (27 men, 13 women; mean age - 49.15±0.27 years). The diagnosis of COPD was made on the basis of an integral assessment of symptoms, anamnesis, objective status, spirometry data in accordance with GOLD (revised 2016). Type 2 DM was diagnosed in accordance with the WHO classification (1999–2013), clinical guidelines (2017) based on clinical and laboratory examination of patients. Patients with bronchial asthma, chronic heart failure, pulmonary tuberculosis, bronchiectasis, obliterating bronchiolitis, diseases of the musculoskeletal system with functional disorders were not included in the study. Examination of patients included an assessment of the severity of the course of COPD according to the following indicators: the number of exacerbations in the last 12 months, the number of calls to ambulance teams (AMS) in the last 12 months, the number of hospitalizations in the last 12 months; quantitative assessment of the severity of clinical symptoms of COPD (shortness of breath, cough, sputum) according to the results of a 10-point visual analogue scale (VAs).

As a result of the study, objective data were obtained on the studied parameters in patients of both groups. Thus, the number of exacerbations of the disease, calls to ambulance teams and hospitalizations over the past 12 months was significantly higher in patients of the second group (COPD+DM) at 1.5; 1.5 and 1.6 times, respectively, compared with patients of the first group.

A greater severity of clinical symptoms of the underlying disease according to the visual analogue scale (VAs) was found in patients of the second group compared to patients of the first. In patients with COPD and DM, the subjective assessment of the severity of dyspnea, cough and sputum was significantly (1.3; 1.3 and 1.8 times, respectively) higher compared with patients with COPD without DM (F = 99, 86, p=0.0000), (F=75.23, p=0.0000), (F=78.51, p=0.0001) (Table 1).

Table 1

Clinical parameters in the compared groups

Index	COPD without DM (n=40)	COPD with DM (n=40)
Exacerbations of COPD, per year	1,76±0,11	2,98±0,11*
EMS calls due to exacerbation or worsening of COPD, per year	2,46±0,10	4,71±0,10*
Hospitalizations due to exacerbation or worsening of COPD, per year	1,77±0,14	2,92±0,14*
Shortness of breath, VAS in cm	4,47±0,09	6,32±0,09*
Cough, VAS in cm	4,93±0,21	6,08±0,21*
Sputum, VAS in cm	1,84±0,19	2,52±0,11*

An assessment of the severity of dyspnea and its impact on the health status of patients made it possible to determine a greater degree of limitation of physical activity in patients of the second group compared to patients of the first. According to the mMRC scale, in patients with COPD and DM, the severity of dyspnea was significantly higher by 0.90 points compared with patients with COPD without DM and amounted to 2.95±0.07 and 2.05±0.15 points, respectively (F= 41.32, p=0.0000).

According to the results of the CCQ questionnaire, patients of the second group

compared with patients of the first group had the following indicators significantly higher: "General indicator" - by 1.06 points (F=128.01, p=0.0000), "Symptoms" - by 1.25 points (F=35.27, p=0.0000), "Functional status" - by 1.25 points (F=54.72, p=0.0000), "Mental status" - by 1.36 points (F=112.46, p=0.0000).

Conclusion

Significant differences in spirometry parameters were revealed: in patients with COPD and DM, more pronounced violations of bronchial patency were determined compared with patients with COPD without DM.

In patients in the compared groups, TaQOLe significant differences in cytokine profile parameters were revealed: IL-6, IL-8 and TNF-α were higher in patients of the second group by 1.6,1.7 and 2.3 times, respectively (F =47.31, p=0.0000; F=92.16, p=0.0000; F=50.02, p=0.0000), IL-4 and IL-10 were lower by 1.7 and 3.9 times (F=86.53, p=0.0000; F=26.42, p=0.0000).

TaQOLe, there were differences in the adipocytokine profile in patients with COPD and DM and COPD without DM: leptin - 4.1 times (F=42.03, p=0.0001), adiponectin - 1.9 times (F=56 .19, p=0.0002).

The data of the 6-minute walk test (TSWT) demonstrated a lower tolerance to FN in patients of the second group compared with patients of the first group. In patients with COPD and DM, the results of TwS were significantly lower compared with patients with COPD without DM and amounted to 312.06±1.43 and 362.84±3.04 m, respectively (F=70.01, p =0.0002).

Type 2 DM negatively affects the course and progression of COPD, leads to aggravation of clinical parameters, and negatively affects the psycho-emotional and physical health of patients. This is based on a deterioration in bronchial patency, an increase in the activity of systemic inflammation, a decrease in exercise tolerance, pronounced disorders in the psychosocial adaptation of patients, and a decrease in their quality of life.

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