Efficacy and cardiological safety of long-acting β_2-agonist use in patients with chronic obstructive pulmonary disease and arterial hypertension

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Conflict of interest: none

BACKGROUND. Chronic obstructive pulmonary disease (COPD) is often combined with arterial hypertension (AH), complicating the course and choice of optimal therapy. The use of long-acting β_2-agonists (LABA) is a key component of current COPD treatment guidelines; however, their potential cardiovascular effects require careful evaluation, especially in patients with comorbid AH.

DOI: 10.32902/2663-0338-8-2025-3-37-43

OBJECTIVE. To assess the efficacy and cardiovascular safety of LABA, particularly their impact on blood pressure (BP), in COPD patients receiving long-acting muscarinic antagonist monotherapy and having concomitant AH.

MATERIALS AND METHODS. The study was conducted in 2018-2021 in two stages. At the first stage, 126 COPD patients were examined. At the second stage, according to the selection criteria, 63 patients with GOLD stage II-III airflow limitation and stable stage II AH were included. After ambulatory BP monitoring (ABPM), 24 patients (18 men (75.0 %), 6 women (25.0 %), mean age 60 (56; 62) years) with target BP levels both during the day and night were selected. Patients were divided into two subgroups: 1st subgroup – 14 patients with stage II airflow limitation; 2nd subgroup – 10 patients with stage III airflow limitation. All patients received a fixed-dose combination bronchodilator (tiotropium bromide 2.5 μg / olodaterol 2.5 μg), 2 inhalations once daily, for 3 months.

RESULTS AND DISCUSSION. In the first treatment week, 3 patients experienced a sharp increase in systolic BP (>180 mmHg) with headache and palpitations, leading to drug withdrawal and exclusion from further analysis. Thus, the final analysis included 21 patients: 11 in subgroup 1 and 10 in subgroup 2. After 1 month, subgroup 1 showed a significant decrease in dyspnea (mMRC: -0.5±0.3 points, $p<0.05$) and COPD symptoms (CAT: -2.2±0.7 points, $p<0.05$). Quality of life (QoL) improved in the "symptoms" domain of the SGRQ by 8.2±6.4 points ($p<0.05$). In subgroup 2, after 1 month CAT scores decreased (-4.1±1.4 points, $p<0.05$), and improvements were noted in the "symptoms" and "activity" domains of the SGRQ ($p<0.05$). After 3 months, subgroup 1 showed a total CAT reduction of -5.0±0.9 points ($p<0.05$), improved QoL in the "symptoms," "activity," and "total" SGRQ domains ($p<0.05$), and a forced expiratory volume in 1 second (FEV_1) increase of 3.4±1.2 % predicted. In subgroup 2, dyspnea decreased by -0.6±0.3 points (mMRC, $p<0.05$), CAT score dropped by -6.8±2.1 points ($p<0.05$), QoL significantly improved, and FEV_1 increased by 4.1±1.3 % predicted. Office BP measurements in both subgroups remained within target levels (<140/90 mmHg, $p>0.05$). According to ABPM, no pathological deviations in mean daily BP values were detected, though both subgroups showed an increase in systolic BP time index by 3.0-3.4 % ($p<0.05$).

CONCLUSIONS. LABA administration in COPD patients with stable AH requires close monitoring of clinical status and BP in the first days to ensure timely discontinuation in case of adverse events. Absence of BP elevation during this period predicts likely subsequent stability. Adding LABA to treatment regimens in patients with GOLD stage II-III airflow limitation and concomitant stage II AH is effective and demonstrates overall high cardiovascular safety.

KEY WORDS: chronic obstructive pulmonary disease, airflow limitation, arterial hypertension, blood pressure, ambulatory blood pressure monitoring, inhalation therapy, long-acting β_2-agonist (LABA).