www.ThePharmaJournal.com

The Pharma Innovation

ISSN: 2277- 7695
TPI 2017; 6(1): 07-09

www.thepharmajournal.com
Received: 03-11-2016
Accepted: 04-12-2016

Iryna Savelikhina
SHEE Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine. Department of Phtisiology and Pulmonology with the Course of Occupational Diseases.

Mykola Ostrovskyy
SHEE Ivano - Frankivsk National Medical University, Ivano-Frankivsk, Ukraine. Department of Phtisiology and Pulmonology with the Course of Occupational Diseases.

Oleksandr Varunkiv
SHEE Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine. Department of Phtisiology and Pulmonology with the Course of Occupational Diseases.

Mariana Kulynych-Miskiv
SHEE Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine. Department of Phtisiology and Pulmonology with the Course of Occupational Diseases.

Kseniia Ostrovska
SHEE Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine. Department of Phtisiology and Pulmonology with the Course of Occupational Diseases.

Correspondence
Iryna Savelikhina
SHEE Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine. Department of Phtisiology and Pulmonology with the Course of Occupational Diseases.

Spirometry changes in stable COPD patients treated with roflumilast

Iryna Savelikhina, Mykola Ostrovskyy, Oleksandr Varunkiv, Mariana Kulynych-Miskiv and Kseniia Ostrovska

Abstract
COPD is a progressive condition involving chronic inflammation and parenchymal destruction with resulting airflow limitation. COPD is associated with worsening airflow limitation over time and increased frequency of COPD exacerbations, leading to increased mortality and morbidity worldwide. The effects of COPD extend beyond the lungs, as multiple comorbidities may occur with COPD, including cardiovascular disease, diabetes mellitus, osteoporosis, depression, and pneumonia.
Roflumilast is a selective inhibitor of the enzyme phosphodiesterase-4 that targets the systemic inflammation associated with COPD. Roflumilast has a variety of anti-inflammatory effects including decreasing inflammatory mediators and the expression of cell surface markers and inhibition of apoptosis.

Keywords: Chronic obstructive pulmonary disease, spirometry, roflumilast

1. Introduction
Pulmonary function tests are the basic instrumental methods of lung diseases. Spirometers are noninvasive diagnostic instruments for screening and basic testing of pulmonary function.
Without the spirometry it is impossible to verify the diagnosis of bronchial asthma (BA), chronic obstructive pulmonary disease (COPD), to monitor the disease and response to treatment, differential diagnosis of certain pulmonary diseases [6-7].
Spirometry is widely used in pulmonology practice because it allows:

- Objective assess of symptoms, signs and abnormal results of laboratory tests;
- To assess the impact of the disease on lung function;
- identify which individuals are at sufficiently high risk of the disease*;*
- assessing preoperative risk*;*
- Assessing prognosis and predicting patient outcomes.

Spirometry is essential for monitoring the course of the disease, assessing the effectiveness of therapy and the effect of the disease on lung function for monitoring persons exposed to harmful factors, and drugs that have toxic effects on the respiratory system.
During the research the correct implementation of procedures in compliance with all recommendations for its implementation and quality control criteria should be achieved, as it affects the interpretation of the results, verification of functional disorders, and the administration of appropriate therapy.
The instructions for spirometry may include such things as not to use a bronchodilator inhaler (several hours or more, depending on the inhaler). Also, not to have alcohol or a heavy meal, or do vigorous exercise for a few hours before the test, smoking for 24 hours before the test [6-7].
Contraindications for spirometry include recent myocardial infarction, pneumothorax, unstable angina pectoris, thoracic and abdominal aneurysms, cerebral aneurysms, recent eye surgery, hemoptysis of unknown origin, recent abdominal or thoracic surgical procedures, active tuberculosis.
Chronic obstructive pulmonary disease (COPD) is characterised by airflow obstruction. The presence of airflow obstruction is confirmed by performing spirometry. COPD progresses slowly and early symptoms such as cough and sputum are usually insufficient for the patient to seek treatment [3-5]. Consequently, a diagnosis is often not made until about half of the lungs' reserve capacity has been lost.

Roflumilast is a selective inhibitor of the enzyme phosphodiesterase-4 that targets the systemic inflammation associated with COPD. Roflumilast has a variety of anti-inflammatory effects including decreasing inflammatory mediators and the expression of cell surface markers and inhibition of apoptosis [8]. Several clinical trials evaluating roflumilast in the treatment of COPD have demonstrated that roflumilast improves lung function and reduces exacerbations. Data suggest that roflumilast reduces moderate to severe exacerbations with the benefit most well established in patients with severe disease. Roflumilast, as part of a combination regimen with long-acting bronchodilators, is reasonable treatment for patients with severe to very severe COPD associated with chronic bronchitis and a history of exacerbations [8-10].

2. Material and Methods

Spirometry was performed to 151 patients at 30, 90 and 180 days of treatment using conventional regimens in combination with roflumilast [1-2].

The patients were divided into groups based on the treatment assignment.

Group I - 85 patients who received maintenance treatment without roflumilast.

Group II - 66 patients was divided into:

II-a subgroup - 31 patients who as a part of maintenance treatment used roflumilast 500 micrograms (one tablet) *r*once daily 30 days.

II-b subgroup - 24 patients, who as a part of maintenance treatment used roflumilast 500 micrograms (one tablet) once daily 90 days,

II-c subgroup - 11 patients, who as a part of maintenance treatment used roflumilast 500 micrograms (one tablet) *r*once daily 180 days. There were 15 healthy persons examined (PHP). Maintenance treatment included: M-long-acting anticholinergics, β-2 agonists, short-acting inhaled and systemic glucocorticosteroids.

3. Results and discussion. The diagnostic criterion of COPD of the 3rdstage is a decrease of 30% <FEV1<50% from predicted together with FEV1/FVC<70% and improvement ofFEV1 not more than 12% from predicted after a test with a bronchial spasmolytic, which points at incomplete reversibility of a wheeze. The respiratory function was estimated by 151 patients through spirography, which was carried out with the help of the device "Spirocom" (the city of Kharkiv, Ukraine).

The research studies have shown that before treatment, the indices of the respiratory function amounted to: FVC,% - 72,69 ± 3,77, FEV1,% - 38,11 ± 3,43, PEF25% - 36,21 ± 3,18, PEF50% - 32,62 ± 2,21, PEF75% - 34,41 ± 3,70, FEV1/FVC,% - 52,42 ± 3,54. In the course of the research studies, we observed a slight improvement of indices of the respiratory function on the 30thday of treatment in patients of the 1st group. We did not note the positive dynamics of indices of FVD on the 90thand 180th days of treatment that turned out to be uncertain.

While evaluating data of spirogram, we fixed a number of favourable changes, in particular, an increase of indices of FEV1 by1, 20 times (p1> 0.01) in individuals of the 2nd (a) subgroup of the research study and by1.18 times in patients of the 2nd (b) subgroup of the research study (p1> 0.01) compared with the basic data before the treatment, though this parameter was 2.07 and 2.12 times (p2> 0.01) lower then values in the control group. Besides, the index of PEF25increased by 1.08 times in patients of the 2nd (a) subgroup of the research study and by1.22 times in individuals of the 2nd (b) subgroup of the research study (p1> 0.05) that was 1.9 and 1.7 times lower than in the corresponding groups of the research study (p2> 0.05) from the values in the control group. PEF50 increased by 1.2 and 1.4 times in the examined of the 2nd (a) and (b) subgroups of the research study (p1> 0.05). The index of PEF75 increased by1.4 times in patients of the 2nd (a) subgroup of the research study and by 1.4 times in individuals of the 2nd (b) subgroup of the research study (p1> 0.05) compared with similar data before the beginning of the patients' treatment with COPD of the 3rd stage.

The index of FVC became 1.10 times greater in patients of the 2nd (a) subgroup of the research study and 1.04 times greater in individuals of the 2nd (b)subgroup of the research study (p1> 0.05) compared with similar data before patients' treatment, but nevertheless remained 1.33 and 1.36 times lower compared with virtually healthy individuals.

At the moment of the completion of the therapy, FEV1/FVC increased by 1.09 times compared with data before the treatment (p1> 0.05) while using roflumilast in the course of 30 days in the patients' treatment of COPD of the 3rdstage.

4. Conclusions

1. The remission of COPD of the 3rdstage is characterized by the decrease of the respiratory function (the decrease of FEV1, FVC, FEV1/FVC).
2. The prolongation of roflumilast by the patients with COPD of the 3rd stage as a part of a basic therapy to 90 days compared with 30-days course is characterized by a significant improvement of the indices of the respiratory function.
3. The treatment with roflumilast, which is included in the basic treatment of COPD has led to the most visible improvement of the indices of the respiratory function, namely, in that group of patients, who have been taking it during 180 days, compared with 30 and 90-daysof the treatment period and especially compared with the group of patients to whom the roflumilast was not included in the basic therapy.

5. References

1. Ministry of Health of Ukraine. 2007, 128.
2. The Order of Ministry of Health of Ukraine, 2013, 555.
3. Feshchenko YI. COPD control–is it possible today?. Health of Ukraine. 2010; 1(13):10-11.
4. Feschenko YI. Leading experts analyzed the current situation of COPD in Ukraine and outlined ways to solve it. Health of Ukraine. 2010; 24(253):31-33.
5. From the Global Strategy for Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2014. Secondary from the Global Strategy for Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2014.
6. Making spirometry happen. Thorax, 1994; 54(53):A43.
7. Bartolome R, Celli MD. The Importance of Spirometry in COPD and Asthma. Effect on Approach to Management. CHEST. 2000, 15S-19S.
8. Torphy TJ. Phosphodiesterase isozymes: molecular targets for novel antiasthma agents. Am J Respir Crit Care Med. 1998; 157:351-70.

9. Rabe KF *et al*. Roflumilast-an oral anti-inflammatory treatment for chronic obstructive pulmonary disease: a randomised controlled trial. Lancet. 2005; 366:563-71.
10. Fabbri LM. Roflumilast in moderate-to-severe chronic obstructive pulmonary disease treated with long acting bronchodilators: two randomised clinical. Lancet. 2009; 374:695-703.