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Specific characteristics of psycho-emotional disorders in patients with chronic obstructive pulmonary disease and different clinical phenotypes: review of clinical cases by the results of personal investigations

Key words: *chronic obstructive pulmonary disease, somato-psychic disorders, neurotization, reactive anxiety, personal anxiety, depression.*

Today chronic obstructive pulmonary disease (COPD) is an urgent problem of public health service in both medico-social and economic aspects because of its increased prevalence, incidence of the disease, disability and death. People suffer from COPD for many years and untimely die of it or its complications [11].

Epidemiologic and statistical data show high prevalence of COPD among the internal diseases in general and the diseases of bronchopulmonary apparatus in particular. According to the data of Medical Statistics Center of Ministry of Health of Ukraine in 2011 the prevalence of COPD was 2969.1 per 100,000 of adult population [2], and the incidence of COPD was 207.8 per 100,000 of adult population. COPD is one of the leading causes of death and its incidence rate increases rapidly [12]. According to recent data as to the prognosis of COPD by 2030 it will become the fourth leading cause of death in the world after cardiovascular diseases, oncopathology and accidents [10], though in 1990 it took the sixth place among causes of death. At the same time COPD is of great importance from the point of view of economics as it makes 1/5th of all causes of disability [11], being a great burden for a particular patient and state economics in general.

COPD is a preventable and curable disease [16]. In recent years frequency of diagnosing COPD has considerably increased. But this is not because of increased incidence rate

of the disease but due to extension of knowledge about it owing to the work of native scientists in the field of pulmonology. They clearly differentiated COPD and chronic bronchitis in state normative documents and continue to deepen the knowledge of it in accordance with modern world views of the problem. In spite of the fact that principles of diagnostics and treatment of COPD are constantly improving it is impossible to achieve complete control of the disease and to stop its progression. That is why today the search of causes and mechanisms aggravating clinical course of COPD [7] and accelerating its development is under way. Modern medicine regards this pathology from the point of view of phenotyping. Different clinical groups or variants of its course are distinguished leading to detection of more accurate confounding factors and individualization of therapy approaches. On this basis currently more and more attention is paid to study of interaction between COPD and concomitant pathology [4, 6], which can be one of such factors. All this is reflected in a new edition of international guidance "Global Initiative for COPD" GOLD [16] and in State coordinative document – The Order of Ministry of Health of Ukraine № 555 of June 27, 2013 [5].

According to the data from foreign researchers the most common concomitant diseases in patients with COPD are cardio-vascular diseases (ischemic heart disease, hyperten-

sion), dysfunction of skeletal muscles, osteoporosis, metabolic syndrome, diabetes mellitus, lung cancer, sleep apnea syndrome and depression [16]. Ukrainian scientists have obtained similar data [1, 9] confirming the urgency of this problem in Ukraine. Today information concerning the prevalence of COPD associated with comorbid states is limited. There are isolated reports as to specific characteristics of clinico-functional course of COPD associated with comorbid diseases, efficacy of treatment and prognosis for this group of patients [13].

At the same time, it should be mentioned that the 21st century is the age of stresses and oppressive sorrows, predominantly psychic and emotional. There is the world tendency to increased prevalence of psycho-emotional disorders and states among population in general [3]. But among the patients with COPD it makes 12–50 % by different data considerably exceeding their prevalence in general population (≤ 5 %). This is precisely why lately more emphasis is put on the study of depression in these patients. Patients with COPD are distressed most because of loss of labor capacity accompanied by frustration and the sense of uselessness for the society and relatives. Usually such sufferings lead to pre-depression states which often have masked or asymptomatic course and are insufficiently studied.

According to figures from foreign authors, prevalence of depression in patients with COPD ranges from 7 % to 80 %. Thus, findings of *Yohannes* et al. [26] correlate with the results of a large US National population sample trial using the questionnaire of the Centre of Epidemiological Depression Study. They had diagnosed depression in 40 % of patients with COPD and these patients were more prone to report the symptoms of depression than those with strokes, hypertension, diabetes mellitus, ischemic heart disease, arthritis or cancer. At the same time *Zhang* et al. in meta-analysis of eight qualitative trials found the prevalence of depression to be 24.6 % in patients with COPD [30]. Occurrence of anxiety in COPD, by the data of foreign sources, ranges from 6 % to 74 % [27]. These considerable differences in statistical data can be explained by differences in sensitivity of psychologic testing respondents in various investigations and differences in criteria of selecting patients considering the influence of external factors. No information is available concerning the prevalence and structure of psycho-emotional disorders in patients with COPD – residents of our region. There are some data from Ukrainian scientists in literature as to the factors influencing the severity of anxiety and depression symptoms, the search for screening methods of diagnostics of these disorders [11] and their drug correction [10].

Researchers dealing with comorbid psycho-emotional disorders have suggested a number of theoretical models to study the relationship between depression, anxiety and COPD. Most of them consider the mechanism of development of depression in patients with COPD to be the result of complex influence of such risk factors as smoking, hypoxia, systemic inflammation as well as the influence of the disease on the patients' lives [21, 26].

It should be mentioned double influence of smoking on the state of psycho-emotional system: on the one hand, nicotine may influence the mood through cholinergic receptors, and

quitting smoking is a great stress [22]; on the other hand, by the results of scientific research, depression is diagnosed more often in smokers than in persons who do not smoke [28]. Recently it was found that the change of serotonin transporter gene is associated with smoking and depression, explaining the genetic determinant in the pathogenesis of COPD [17]. Both COPD and smoking lead to the development of hypoxia which in its turn is of great significance in the development of depression, psychomotor inhibition, disturbances of memory and cognitive function [14, 21]. Systemic inflammation in COPD is related to its various phenotypes including depressive. Moreover, depression itself is associated with immunodysfunction [25] and increased susceptibility to infections [15] which can at least partially explain high incidence of infection exacerbations in patients with COPD and concomitant depression [19]. Some theories of depression development in patients with COPD are based on the influence of the disease on special aspects of persons' life. These models generalized by *Norwood* [24] show that distress and loss of usual working capacity contribute to the development of depression while positive social and medical aid facilitate the course of COPD. Respiratory disturbances and panic states make the basis for hyperventilation anxiety model which in its turn demonstrates that development of hypercapnia leads to aggravation of dyspnea and sense of anxiety [24]. There is also a theory of hypersensitivity to carbon dioxide, it is based on the results of investigations which demonstrate similar excessive sensitivity of brain chemoreceptors in patients with COPD and patients with panic disorders having «unreal dyspnea attacks» [18, 20].

In spite of the fact that there is much information as to the prevalence of depression and anxiety disorders, little attention is given to their influence on life of patients with COPD. *Ng T. P.* et al. found that prevalence of depression depends on the severity of COPD, and patients with severe COPD and depression are more likely to have exacerbations, frequent rehospitalizations and worse survival [23].

Modern scientists work much to study the prevalence of depression in patients with COPD as well as the relationship between these comorbid diseases. But scientific literature lacks information concerning other borderline psycho-emotional disorders associated with COPD.

Taking into consideration abovementioned mechanisms of the development of psycho-emotional disorders and COPD reviewed in literature as well as the information that chronic somatic pathology (including COPD) contributes to formation of emotional and personal patients' characteristics by «neurotic» triad type, we defined the objective of our work – to evaluate the course of COPD by personal observations on the basis of available knowledge about the prevalence and types of somato-psychic disorders.

Materials and methods

43 in-patients with COPD (30 males (69.7 %) and 13 females (30.3 %)) of Vinnytsia City Clinical Hospital № 1 and 21 apparently healthy persons (14 males (66.6 %) and 7 females (33.4 %)) were included into the study and investigated in 2013. Mean age of COPD patients was (65.1 ± 1.9) years, and in the control group it was (56.0 ± 7.3) years. The

duration of COPD was (10.6 ± 1.2) years. The diagnose of COPD was made according to the Order of Ministry of Health of Ukraine № 555 of June 27th, 2013. Depending on the severity of disease the patients were divided as follows: Grade II – 16 persons (37.2 %), Grade III – 25 persons (58.14 %), Grade IV – 2 persons (4.65 %).

Investigation of psycho-emotional state in COPD patients and control group was done using the complex of standard questionnaire methods:

1. Determination of neurotization level (NL) by L. I. Wasserman (2002).

2. Determination of the level of reactive anxiety (RA) and personal anxiety (PA) using Spielberger – Hanin scale (State-Trait Anxiety Inventory) (2002).

3. Determination of depression level (DL) using the method of V. Zung (1971) (The Zung self-rating depression scale) in adaptation of T. I. Balashova (2002) [8].

Results and discussion

Patients with COPD were found to have significantly higher prevalence of concomitant somato-psychic disorders in comparison with healthy persons. High NL was diagnosed in 34 (79.0 %) versus 3 persons (14.3 %) ($p < 0.001$), high level of RA – in 18 (41.8 %) versus 5 persons (23.8 %), high level of PA – in 33 patients with COPD (76.7 %) versus 6 (28.6 %) among healthy persons ($p < 0.001$). Clinically significant DL was found in 10 patients of the main group (23.2 %) versus 1 case (4.7 %) in the control group ($p < 0.001$). Having analyzed the prevalence of somato-psychic disorders in COPD patients according to the severity of disease we found an increased prevalence of SPD among the patients to be associated with an increase of severity of COPD (Fig. 1).

Thus, among the patients with COPD of grade II high NL was diagnosed in 11 persons (68.75 %), high RA and PA levels – in 8 (50 %) and 10 (62.5 %) cases respectively; among the patients with COPD of grade III high NL was diagnosed in 21 patients (84 %), high RA and PA levels – in 9 (36 %) and 21 (84 %) cases respectively; among the patients with COPD

of grade IV high levels of neurotization and depression were found in 2 persons (100 %), high RA level – in one patient (50 %) ($p < 0.001$).

According to our observations clinically significant somato-psychic states were found to aggravate the course of COPD, to decrease the tolerance to everyday physical activity, to worsen the quality of patients' lives, to enhance progression in decreasing respiratory function indices as opposed to the patients with less severe SPD.

We present here the review of clinical cases of COPD course associated with various somato-psychic characteristics in patients treated at the pulmonology department of Vinnytsia City Clinical Hospital № 1.

Clinical case № 1. Medical history № 2312

Patient B., 72 years. Diagnosis in admission to the hospital: Chronic obstructive pulmonary disease, Grade III, severe course, severe infective exacerbation. Secondary lung emphysema. Pulmonary insufficiency, Grade II.

The patient presented with complaints of dyspnea at rest which increases in usual physical activity, frequent cough with viscous mucopurulent sputum, increase of body temperature to 38°C . He suffers from the disease for 20 years when dyspnea began to appear in walking upstairs and cough with small amount of mucoid sputum.

COPD was diagnosed 8 years ago. Exacerbations requiring hospitalization occur 3–4 times a year, he often calls an ambulance. During the last 4 years he has the group III of disability and does not work. He has been smoking for 32 years, index of smoking is 32 packs a year. He uses salbutamol to relieve the symptoms and seretid-discus 500/50 mg – 1 inhalation 2 times daily – for basic treatment.

The objective examination showed: general state of moderate severity, respiratory rate at rest – 24 per minute, noisy breathing, wheezing is heard distantly, in auscultation rough breath sounds with prolonged expiration are heard over the lungs. Pulse rate – 68 beats per minute, rhythmical. Arterial pressure on the left and right shoulder – 120/60 mm Hg and 130/70 mm Hg respectively.

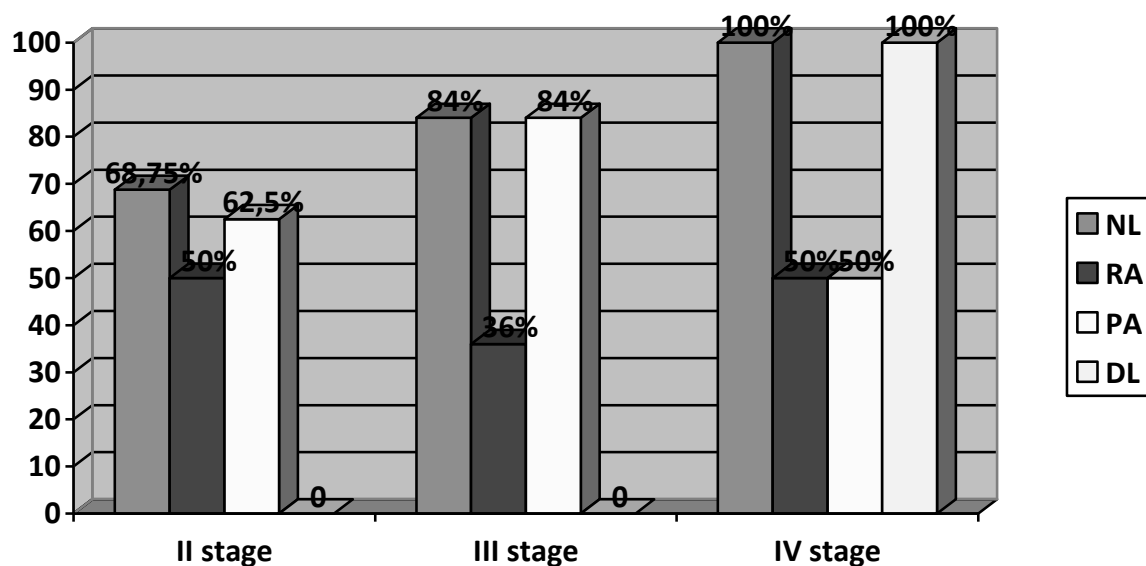


Fig. 1. Prevalence of somato-psychic disorders depending on the severity of COPD.

Additional methods of investigation. Investigation of respiratory function using computed spirometry showed: $FVC=71\%$ (2.92 l), $FEV_1=43\%$ (1.36 l), $FEV_1/FVC=46.6\%$ (percentage is given with regard to proper values, investigation was done after taking 400 μg of salbutamol). Pulse oxymetry showed $SatO_2$ of arterial blood – 88 %. Radiography of the chest organs detected inflated covering layer of the lungs, streaking and low-structural lung roots, deformed lung pattern.

Dyspnea was confirmed by the modified international scale of dyspnea (mMRC) as the patient got 4 points. By the results of CAT questionnaire (COPD assessment Test) the patient got 40 points – the highest possible number.

Determination of the level of reactive anxiety (RA) and personal anxiety (PA) was done using Spielberger – Hanin test. Having made simple calculations by appropriate formulas we got the following results: RA level score = $(17 + 38) = 55$ and PA level score = $(36 + 20) = 56$ which are considered to be high. Determination of depression level (DL) was done using the method of V. Zung. It was found to be 53 scores which corresponds to clinically subdepressive state (“masked” or «somatoform» depression). In determining neurotization level (NL) by L.I.Wasserman the patient gave positive answers to 33 questions out of 40, therefore NL was high - 82.5 %.

In conclusion we can say that this patient has an extremely severe course of COPD (by the number of symptoms, hospitalization rate, the extent of given therapy), and the indices of respiratory function correspond to GOLD-3. As to the classification of COPD according to the Order of Ministry of Health of Ukraine № 555 this patient can be referred to group D which is characterized by a large number of symptoms, frequent exacerbations and high risk of unfavourable events. In this case association of COPD with clinically significant somato-psycho syndromes of anxiety, neurotization and depression promoted to some extent somatization of COPD symptoms. The examined patient with such somato-psycho status should undergo treatment of SPD in complex COPD therapy. Consultation of the psychologist is advisable.

Clinical case №2. Medical history № 1179. Patient Z., 73 years of age. Diagnosis in admission to the hospital: Chronic obstructive pulmonary disease, grade III, severe course, mild noninfective exacerbation. Secondary lung emphysema. Pulmonary insufficiency of grade II. Chronic cor pulmonale, compensated CH_0 .

The patient presented with complaints of dyspnea during usual physical activity, feeling of wheezing in talking and deep breathing. She suffers from the disease for 15 years and has one exacerbation a year. She uses salbutamol to relieve the symptoms and seretid-discus 500/50 mg - 1 inhalation 2 times daily - for basic treatment.

The objective examination showed: satisfactory general state, respiratory rate at rest – 22 per minute. In auscultation rough breath sounds with prolonged expiration are heard over the lungs as well as scattered dry wheezing rales. Pulse rate – 76 beats per minute, rhythmical. Arterial pressure on the left and right shoulder – 120/70 mm Hg and 125/80 mm Hg respectively.

Additional methods of investigation. Investigation of respiratory function using computed spirometry showed: $FVC = 61$

% (2.27l), $FEV_1 = 35\%$ (1.01l), $FEV_1/FVC=44\%$ (percentage is given with regard to proper values, investigation was done after taking 400 microgram of salbutamol). Pulse oxymetry showed $SatO_2$ of arterial blood – 98 %. Radiography of the chest organs detected increased airiness of lung tissue on both lung apices, streaking roots, basal adhesions on the left.

The level of dyspnea was determined by mMRC scale and was found to be 4 points. By the results of CAT questionnaire the patient got 9 points.

Careful investigation of RA and PA levels found the following results. RA level score = $(16 + 20) = 36$ corresponding to moderate level of RA. PA level score = $(27 + 10) = 37$ corresponding to moderate level of PA and suggests that insignificant increased anxiety is a personality trait of this patient. General DL level score was, according to calculations, 29 corresponding to “depression free” state. In determining NL by L.I.Wasserman the patient gave 12 positive answers to 40 questions to detect neurotization symptoms. Therefore NL was 30 % suggesting low NL.

In conclusion it can be stated that association of COPD with clinically insignificant level of SPD in the form of some increased anxiety was characterized in that patient by nonsevere clinical course (few symptoms, infrequent hospitalizations because of exacerbations) which to some extent contradicted the functional data (respiratory function indices corresponded to stage GOLD 3). Summarizing the results of patient's Z. examination and using modern classification of COPD she can be referred to group C which is characterized by a small number of clinical manifestations and increased risk of unfavourable events.

Having compared the course of COPD in two patients we can state that on the background of virtually the same respiratory function indices it is characterized by more severe manifestations in the first patient and is associated with referral of the patient to the group with more unfavourable course and prognosis (group D in this case). Taking into account the fact that severe course of COPD, according to our data, was associated with marked changes in functional state of psycho-emotional sphere, we confirm the coexistence of those states – somatic (classic COPD) and psychic (concomitant SPD). This undoubtedly should become the object of thorough study in practical work of every doctor who manages patients with COPD.

Conclusions

1. Today chronic obstructive pulmonary disease (COPD) is an urgent medical and social problem. Lack of information about possible causes of its progression despite modern methods of treatment requires the search of promoting factors of this process.

2. Comorbid psycho-emotional disorders may be considered as one of the factors leading to inadequate control of the disease.

3. Patients with COPD have significantly higher prevalence of concomitant somato-psycho syndromes in comparison with healthy persons: high level of neurotic disorders was found in 34 (79.0 %) versus 3 patients (14.3 %), high level of state anxiety – in 18 (41.8 %) versus 5 patients (23.8 %), trait anxiety – in 33 (76.7 %) versus 6 patients (28.6 %), depressive

states were diagnosed in 10 (232 %) versus 1 case (4,7 %) in the control group ($p < 0,001$).

4. The prevalence of psycho-emotional disorders was found to depend on the severity of COPD which correlates with the findings of foreign authors.

5. The review of clinical cases showed the course of the disease to be associated with the severity of clinically significant somato-psychic disorders, leading to more unfavourable prognosis for the patient.

6. Further investigation of correlations between somatic and psycho-emotional components in patients with chronic obstructive pulmonary disease as well as the study of its course, quality of life are required to work out the principles of managing this group of patients.

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ОСОБЕННОСТИ ПОРАЖЕНИЯ
ПСИХОЭМОЦИОНАЛЬНОЙ СФЕРЫ У БОЛЬНЫХ
ХРОНИЧЕСКИМ ОБСТРУКТИВНЫМ
ЗАБОЛЕВАНИЕМ ЛЕГКИХ С РАЗЛИЧНЫМИ
КЛИНИЧЕСКИМИ ФЕНОТИПАМИ: АНАЛИЗ
СЛУЧАЕВ КЛИНИЧЕСКОГО ТЕЧЕНИЯ
ПО РЕЗУЛЬТАТАМ СОБСТВЕННЫХ
ИССЛЕДОВАНИЙ

А. А. Довгань

Резюме

Актуальность. Хроническое обструктивное заболевание легких (ХОЗЛ) — важная медико-социальная проблема современности, которая обуславливает поражение не только дыхательной системы, но и других систем организма, что значительно влияет на психоэмоциональное состояние пациента и течение заболевания. Наиболее частыми коморбидными состояниями при ХОЗЛ являются сердечно-сосудистые заболевания, дисфункция скелетных мышц, остеопороз, метаболический синдром, сахарный диабет, рак легких, синдром ночного апноэ и депрессия. Распространенность депрессии среди больных ХОЗЛ значительно превышает таковую в общей популяции. При этом часто тревожные, преддепрессивные состояния у больных ХОЗЛ протекают скрыто и мало исследованы.

Цель. На основании изучения распространенности и видов соматопсихических расстройств (СПР) оценить течение ХОЗЛ с помощью собственных наблюдений.

Результаты. Больные ХОЗЛ имели достоверно более высокую распространенность сопутствующих СПР в сравнении с контрольной группой, а именно: высокий уровень невротизации диагностирован у 34 (79,0 %) пациентов против 3 (14,3 %), реактивной тревожности — 18 (41,8 %) против 5 (23,8 %), личностной тревожности — 33 (76,7 %) против 6 (28,6 %), депрессивные состояния — 10 (23,2 %) против 1 (4,7 %) в группе контроля ($p < 0,001$). Установлено, что распространенность расстройств психоэмоциональной сферы зависит от тяжести ХОЗЛ, что коррелирует с данными зарубежных авторов. Анализ клинических случаев показал, что тяжесть течения ХОЗЛ ассоциируется с выраженностью клинически значимых СПР и отображается в более неблагоприятном прогнозе для пациента.

Выводы. Коморбидные психоэмоциональные расстройства могут выступать как один из факторов, способствующих недостаточному контролю над заболеванием. Распространенность сопутствующих расстройств психоэмоциональной сферы у больных ХОЗЛ достоверно выше, чем у здоровых лиц, и зависит от тяжести заболевания. Сравнение клинических случаев больных ХОЗЛ с разным состоянием психоэмоциональной сферы показало, что наличие у пациента клинически значимых СПР отягощает течение и прогноз заболевания.

Ключевые слова: хроническое обструктивное заболевание легких, синдром соматопсихических расстройств, невротизация, реактивная тревожность, личностная тревожность, депрессия.

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SPECIFIC CHARACTERISTICS OF
PSYCHOEMOTIONAL DISORDERS IN PATIENTS
WITH CHRONIC OBSTRUCTIVE PULMONARY
DISEASE WITH DIFFERENT CLINICAL
PHENOTYPES: REVIEW OF CLINICAL CASES
BY THE RESULTS OF PERSONAL
INVESTIGATIONS

A. O. Dovgan

Abstract

Actuality. Today chronic obstructive pulmonary disease (COPD) is an urgent medical and social problem leading to the affection not only respiratory system but also other body systems and having a great influence on psychoemotional state of patients and the course of the disease. The most common comorbidities in COPD are cardio-vascular diseases, dysfunction of skeletal muscles, osteoporosis, metabolic syndrome, diabetes mellitus, lung cancer, sleep apnea syndrome and depression. Prevalence of depression among the patients with COPD is considerably higher than in general population. Often thoughts of possible disability lead to pre-depression states which have asymptomatic course and are insufficiently studied.

Aim. To evaluate the course of COPD by means of personal observations on the basis of available knowledge about the prevalence and types of somatopsychic disorders.

Results. Comorbid psycho-emotional disorders may be considered as one of the factors leading to inadequate control of the disease. Patients with COPD have significantly higher prevalence of concomitant somatopsychic syndromes in comparison with normal persons: high level of neurotization was found in 34 (79,0 %) versus 3 patients (14,3 %), high level of reactive anxiety — in 18 (41,8 %) versus 5 patients (23,8 %), personal anxiety — in 33 (76,7 %) versus 6 patients (28,6 %), depressive states were diagnosed in 10 (23,2 %) versus 1 case (4,7 %) in the control group ($p < 0,001$). The prevalence of psycho-emotional disorders was found to depend on the severity of COPD which correlates with the findings of foreign authors. The review of clinical cases showed the course of the disease to be associated with the severity of clinically significant somatopsychic disorders, leading to more unfavorable prognosis for the patient.

Conclusions. Prevalence of concomitant psychoemotional disorders in patients with COPD is significantly higher than in healthy persons, they depending on severity of the disease. Comparison of clinical cases of patients with COPD associated with psychoemotional states showed that the presence of clinically evident somatopsychic disorders worsens the course of the disease and the prognosis for the patient.

Key words: chronic obstructive pulmonary disease, somatopsychic disorders, neurotization, reactive anxiety, personal anxiety, depression.

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