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Features of clinical and functional course of chronic obstructive pulmonary disease with concomitant somatopsychic disorders

Key words: *chronic obstructive pulmonary disease, somatopsychic disorders, somatopsychic dysfunction syndrome, clinically-psychological phenotypes of chronic obstructive pulmonary disease.*

The impact of emotional factors in the development and progression of diseases of internal organs and systems is becoming increasingly important in modern medicine views. At the same time, much attention is paid to the opposite process – the occurrence of psycho-emotional disorders areas in response to the physical illness that manifests increasing frequency borderline neuropsychiatric disorders in the world and in Ukraine.

According to modern concepts of chronic obstructive pulmonary disease (COPD), it is considered as a systemic disease with extrapulmonary manifestations, one of which is a violation of psycho-emotional sphere of patients [4]. The presence of concomitant mental dysfunction associated with crueler in the clinical sense and unstable course of COPD, reduced quality of life and worse adherence to treatment [2]. This problem and its impact on patient perception of disease and the relationship between underlying disease and the state of psycho-emotional sphere are becoming increasingly important in COPD [5].

The aim of our study was to establish the features of the clinical course of COPD in relation to the type and severity of concomitant somatopsychic disorders (SPD), to research of the character of their impact on the symptoms, parameters of respiratory function (PRF) and control over COPD.

Materials and methods

306 in-patients with COPD (224 (73.2 %) men and 82 (26.8 %) women, whose average age was $(65,3 \pm 0,6)$ years) were investigated. The diagnose of COPD was made according to the Order of Ministry of Health

of Ukraine № 555 of June 27, 2013 [1]. All patients were in a stable phase of the disease and received basic treatment according to the order MOH Ukraine number 555 from 27. 06.2013 year [1].

After signing the informed consent of patients to participate in the study they were examined using conventional in pulmonological practice diagnostic methods (including by means of The Modified Medical Research Council Dyspnea Scale (MMRC) and questionnaire COPD Assessment Teste (CAT)) [6]. Respiratory function (RF) investigated by computer Spirographs MasterScope CT.

Research of psycho-emotional state of COPD patients was performed using available for use by a General Practitioner set of standardized methodologies statement [3]:

1. Determination of neurotization level (NL) by L.I. Wasserman (2002). For high neurotization accepted rate of more than 60 %, the low level – less than 60 % rate on the scale.

2. Determination of the level of reactive anxiety (RA) and personal anxiety (PA) using C.D.Spielberger-Y.L.Hanin scale (State-Trait Anxiety Inventory) (2002). It was believed that patients who scored 46 or more points on the scale were highly anxious, 31-45 points – moderate anxiety, and less than 30 points – lower anxiety.

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). According to the interpretation of the scale, less than 50 points – a «state without depression», 50-59 points – «Light situational depression or neurotic genesis depression», 60-69 points sub-depression state or masked depression», 70 points and above ->true depression».

To form the comparison group of patients, depending on the psycho-emotional state we used integrative index (II) severity somatopsychic dysfunction (SPD). For this conducted the algebraic summation of the severity of each of the described somatopsychic conditions and were two comparison groups: the first (I) – for the total score less than 5 (interpreted as clinically insignificant levels SPD), second (II) – for total score of 5 or more (interpreted as a clinically significant level SPD).

Statistical analysis of the results have done on a personal computer using statistical software package SPSS 20.0 for Windows, by using parametric and nonparametric methods of processing the results according to the type of distribution of variables. Considered the error probability indicators of $p < 0,05$.

Results

As a result of the frequency distribution of patients, taking into account features of combination of SPD according to the level of their severity (via II), we have got that concomitant clinically significant syndrome SPD was detected in 68 (22.2 %) patients with COPD (See Fig. 1).

Moreover their number included 30 (44.1 %) patients with COPD group B and 38 (55.9 %) patients with COPD group D. On the other side, the part of patients with clinically significant syndrome SPD inside the clinical group B was 24,6 % ($n = 30$), and in the clinical group D - 32,2 % ($n = 38$) (see. Figure 1). Thus, in COPD-patients there is a statistically significant relationship ($\chi^2 = 19,750$, $p < 0.001$) between signs «multi-symptoms clinical course of COPD» and «severity of SPD». It can provide conditional phenotype of COPD with existing clinically significant disorders of patient's psycho-emotional sphere.

Considering this, we have conditionally adopted two clinically-psychological phenotypes of patients with COPD. To the first, psychologically unstable, phenotype were selected 68 patients with the highest expression levels of three or more SPD syndromes,

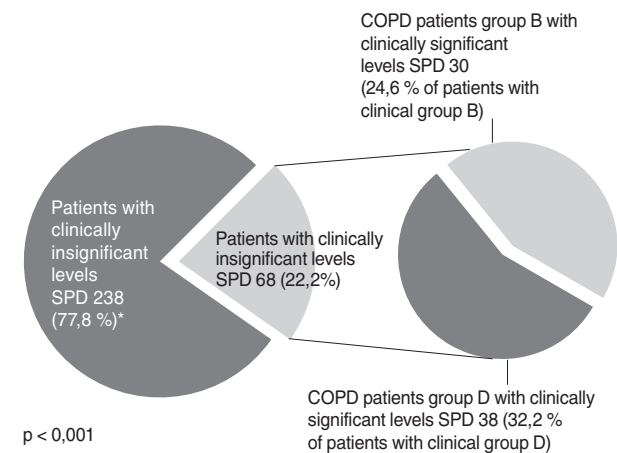


Fig.1. The prevalence of clinically significant SPD syndrome in patients with COPD according to clinical group of disease.

representing 22.2 % of all surveyed patients with COPD. Other 238 COPD-patients attributed to the psychologically resistant phenotype, representing 77.8 % of the total. According to our observations, in combination COPD with concomitant clinically meaningful SPD it was formed difficult in clinical meaning course of the disease, that manifested likely increase the annual number of exacerbations of COPD in patients with a psychologically unstable phenotype. As can be seen from Table. 1, the share of patients who had two or more exacerbations per year, in the group with clinically significant syndrome SPD was 46 (67.6 %) patients, compared with 94 (39.5 %) in the group of psychologically resistant phenotype, ($\chi^2 = 16,888$, $p < 0.001$).

As a result of the frequency distribution of patients in both groups on the grounds of «attitude to smoking» we found that all patients with a psychologically unstable phenotype of COPD are smokers, with the proportion of those who can not give up this bad habit is 54 (79.4 %) patients, and it is significantly higher than the prevalence among those patients with stable psycho-emotional state – 90 (41.7 %) patients, ($\chi^2 = 40,348$, $p < 0.001$) (Table. 2).

Group of the research	Patients who had less than 2 exacerbations per year		Patients who had more than two exacerbations per year	
	Abs.	%	Abs.	%
	Patients with psychologically unstable COPD phenotype (n=68)	22	32,4	46
Patients with psychologically resistant COPD phenotype (n=216)	144	60,5	94	39,5
χ^2	16,888			
p	<0,001			

Group of the research	Patients who smoked in the past		Patients who still smoke			
	Abs.	%	Abs.	%		
	Patients with psychologically unstable COPD phenotype (n=68)	–	–	14	20,6	54
Patients with psychologically resistant COPD phenotype (n=216)	82	38,0	44	20,4	90	41,7
χ^2	40,348					
p	<0,001					

Among patients with COPD psychologically unstable phenotype dominated smokers, smoking experience exceeding 10 pack-years – 54 (79.4 %), while in the group with no significant level of syndrome SPD part of their was 134 (56,8 %) persons, ($\chi^2 = 11,459$, $p = 0.001$) (Table.3).

We can suppose that such a high prevalence of smoking habit among patients with COPD psychologically unstable phenotype is due that they subconscious use nicotine as a substance that affects the mood by cholinergic receptors. At the same time, smoking leads to increased bronchial obstruction and hypoxia, which in turn leads to worsening of the COPD clinical course, increased its symptoms and thus to worsening psycho-emotional state of the patient, thus triggering mechanism «vicious circle». On the other hand, giving up smoking is a significant stress for the patient [7], accompanied by a deterioration of mood, increased anxiety and can lead to anxiety-depressive syndrome, the presence of which, to our knowledge, worsens the course of COPD.

Analyzing the impact of clinically significant SPD on the severity of dyspnea in COPD patients with different phenotypes, we conducted a statistical comparison of the average scores obtained patients on a scale mMRC. Thus, the average score of dyspnea on a scale mMRC in COPD patients with concomitant clinically significant SPD was ($3,25 \pm 0,10$) and was statistically likely higher than ($2,44 \pm 0,07$) scores in a psychologically stable COPD patients, ($t = 5,843$, $p < 0.001$) (Fig. 2).

It was also found that patients with a psychologically unstable phenotype have a statistically likely higher average scores on test for assessing symptoms of COPD CAT (see. Fig. 2), which is ($23,53 \pm 0,95$) vs. ($18,23 \pm 0,57$) in the group with steady psycho-emotional state, ($t=4,513$, $p<0.001$). In our opinion identifying psychologically unstable COPD phenotype at patient is associated with more severe in clinical meaning of COPD course.

Given the fact that the LF parameters are the main objective verification criteria of COPD as nosology, and determination the severity of its course, we tried to evaluate the dependence of change the LF parameters in COPD patients from the type and severity of change their psycho-emotional sphere.

In all the surveyed patients stable bronchial obstruction confirmed ratio of FEV1/FVC that was <70 % of predicted. As FEV1 % is the most labile and important indicator to determine the severity of obstruction in COPD, we have been used it for establishment of depends on the severity of COPD from patients' emotional state.

Thus, to study the features of LF functional status in patients with various, conventionally allocated by us, clinically-psychological phenotypes of COPD, we have analyzed average values of FEV1 depending on the importance of II SPD (Table. 4).

Table 4 shows that the average values of FEV1 in COPD patients with psychologically unstable phenotype likely

lower than in patients with psychologically resistant phenotype, indicating the existence of a direct negative correlation between the severity of bronchial obstruction and patients' state of psycho-emotional sphere.

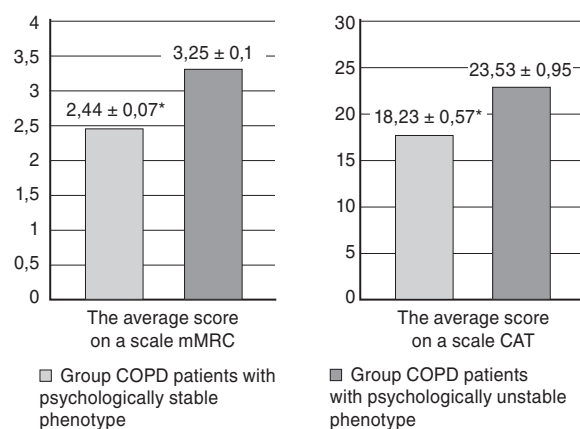


Fig. 2. Comparison of the mean values of the scales mMRC and CAT in patients with COPD at different psychological phenotypes

Group of the re-search	Patients who have never smoked		Patients with smoking index 10 pack-years and less		Patients with smoking index more than 10 pack-years	
	Abs.	%	Abs.	%	Abs.	%
Patients with psychologically unstable COPD phenotype (n=68)	1	1,5	13	19,1	54	79,4
Patients with psychologically resistant COPD phenotype (n=216)	92	38,7	12	5,0	134	56,3
χ^2	41,485					
p	< 0,001					

Clinically-psychological phenotype	FEV ₁ , %	F*	p
	M ± m		
COPD patients (n=306):	54,3 ± 1,1	9,032	0,031
Patients with psychologically resistant COPD phenotype (n=238)	66,2 ± 3,1		
Patients with psychologically unstable COPD phenotype (n=68)	49,7 ± 1,8		

Remark. * F - Fisher's criterion.

Conclusions

Multi-symptomatic course of COPD determines development of secondary changes in the psycho-emotional sphere patients, which aggravate its course by reverse effect. This interplay allows roughly divided into two phenotypes COPD: psychologically stable and psychologically unstable, which requires appropriate treatment in addition to the treatment of COPD.

The combination of clinically significant COPD worsen SPD its clinic, which is manifested increasing severity condition of the patients due to the increased number and severity of symptoms, increasing the number of exacerbations

per year and its inability to smoking cessation as a factor that worsens the state of passability of the airways ($p < 0.001$).

It was established a direct negative correlation between the severity of patients' bronchial obstruction and their psycho-emotional state.

In the case of detecting a patient with a multi-symptomatic course of COPD and with moderate and low performance LF we recommended to conduct additional inspection of its psycho-emotional sphere using exposed questionnaire methods or, if necessary, consulting psychiatrist.

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