Study of the significance of biological indices (BI) for assessing the severity of patients with chronic obstructive pulmonary disease

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Biological indices are intended to determine the biological age of a person. Biological age is determined using ART "IMEDIS-TEST" by testing the mesenchyme in potency from D2 to D36, which corresponds to biological indices from 1 to 21 [1]. The mesenchyme is a collection of motile process cells of the embryo that are evicted from different parts of the mesoderm. Smooth muscle tissue and tissues of the internal environment of the body are formed from the mesenchyme - all types of connective tissue (including skeletal and cartilaginous), hematopoietic tissue and blood itself, which determines the diagnostic value of drugs based on mesenchyme [2]. Back in 1928, Academician A.A. Bogomolets.
[3] pointed out the enormous role of the functional state of the connective tissue, that the elements of the mesenchyme play a decisive role in the state of health of every person, and that the body always has the age of its connective tissue.

Based on the foregoing, we investigated the diagnostic significance of testing general and particular biological indices for assessing the state of the bronchopulmonary system in patients with obstructive bronchitis using the electropunctural vegetative resonance test "IMEDIS-TEST".

Materials and research methods

We examined 154 patients with chronic obstructive pulmonary disease (COPD) of varying severity in the exacerbation phase, who were hospitalized. The control group consisted of 21 healthy volunteers aged 36 to 41 years, non-smokers, without allergic diseases, without a history of risk factors for COPD, chronic processes in the nasopharynx, broncho-pulmonary and cardiovascular systems, without X-ray changes in the chest organs.

For the diagnosis of COPD, the International Classification of Diseases X revision (ICD-10), prepared by WHO (Geneva 1992), definitions of the All-Russian Research Institute of Pulmonology, WHO epidemiological criteria, data from the International Consensus and the Federal Program for the Diagnosis and Treatment of COPD were used. According to international recommendations, the stages of COPD were assessed depending on the level of volume reduction forced expiration in 1 second (FEV_{one}).

The function of external respiration was investigated using a spirograph with computer processing "Spirotest" (Russia), with registration of lung volumes: VC (VC) - vital capacity of the lungs, FVC (forced vital capacity of the lungs, FEV1 (FVC1.0) - forced expiratory volume in the first second; velocity indicators: POS (PEFR) - peak expiratory flow rate, MOS25 (FEF25%), MOS50 (FEF50%), MOS75 (FEF75%) - maximum volumetric flow rates of the curve at points corresponding to 25%, 50%, 75% FVC; relative indicator: the ratio of the forced expiratory volume in the first second to the vital capacity of the lungs (FEV1 / VC) - Tiffno's index.

A general blood test was performed according to the standard method. Bronchoscopy was performed using an Olympus 1T20 fiberoptic bronchoscope. X-ray examination of the chest organs was performed on a digital fluorograph Renex-Fluro "Gelpik" (Russia).

Electropuncture ART was performed using the IMEDIS-BRT-PC apparatus (Russia) with computer processing of the results using the IMEDIS-EXPERT software.

The results obtained were subjected to static processing on a personal computer using the Statistica 6.0 program (Soft.Inc., 2001) [4]. For the parameters described by a normal distribution, the arithmetic mean (M) and the standard error of the mean (m) were determined. In pairwise comparison, the level of significance of differences was assessed by the parametric Student's test for independent samples. The study of the strength and directionality of relationships between variables was carried out using the parametric correlation coefficient of Pearson (Pearson r). When determining the correlations between nonparametric variables, the Spearman Rank R was calculated. The reliability of the differences in indicators determined by parametric and nonparametric methods was considered confirmed at $p < 0.05$ (at $t = 2$, $p > 95.5$), the relationship of moderate strength was ascertained at $r = 0.5–0.69$; strong at $r = 0.7–0.89$). We also used multivariate factor analysis - principal component analysis with multivariate rotation.

Table 1 shows the age and sex composition of the main group depending on the severity of COPD.

Table 1

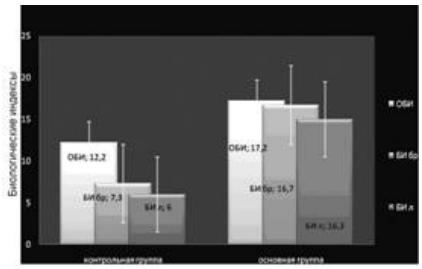
	Age periods

Degree gravity	Men (n = 85)			Women (n = 69)			Total
	22-50 years old	51–65 years old	Older 65 years	21-45 years old	46-60 years old	Older 61 years old	
COPD 1 degree (n = 40) 26.0 %	13 (32.5%)	7 (17.5%)	2 (5.0%)	9 (22.5%)	5 (12.5%)	4 (10.0%)	40
COPD 2 degree (n = 54) 35.1 %	5 (9.5%)	12 (22.2%)	7 (12.9%)	5 (12.5%)	20 (37.0%)	7 (12.9%)	54
COPD 3 degree (n = 60) 38.9 %	3 (5.0%)	26 (43.4%)	10 (16.6%)	4 (10.0%)	13 (21.7%)	7 (11.7%)	60
Total	21	45	nineteen	13	38	18	154

Results and its discussion

The results are shown in Fig. 1-6.

In fig. 1 shows the comparative characteristics of the indices of BI of general (OBI) and BI of bronchi and lungs (BI br, BI l, respectively) in the control and main groups.

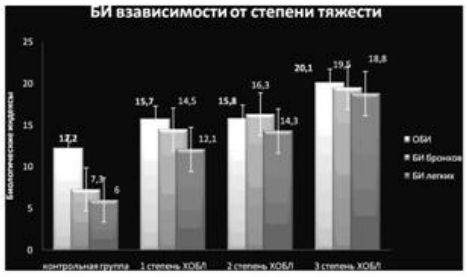


Rice. one.BI of the control and main groups

When comparing the main and control groups, in general, there are significant differences between the values of OBI, BI br, BI l ($p < 0.01$). This confirms the data of factor analysis, where BI is the second most important factor explaining 18% of the total variance among the ART EP tests, which may indicate a change in the state of the bronchopulmonary system in COPD.

There are no significant differences between the values of OBI and BI br, BI l in the main group, the differences between OBI and BI l, OBI and BI br in the control group are significant ($p = 0.006$ and $p = 0.004$, respectively). There are no significant differences between BI l and BI br in the control group. Apparently, in the control group of people, the state of health of the bronchopulmonary system was better than the state of health of their other organs and systems, which a priori indicates the correct selection of the control group.

To search for patterns of changes in BI, depending on the severity of the disease, the BIs of 3 subgroups of patients were compared with each other and the control group. The comparative analysis was carried out using the Spearman Rank Test. The results of this comparison are shown in Fig. 2.

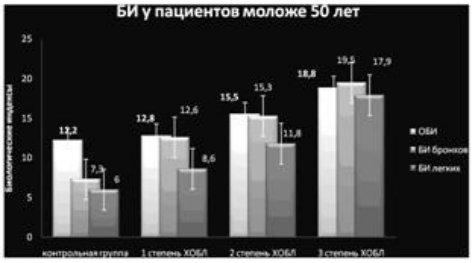


Rice. 2.BI depending on the severity of COPD

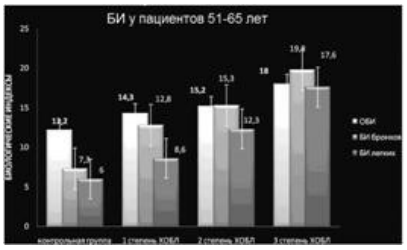
When dividing the studied patients according to the severity of the disease without taking into account gender and age, it was found that there were no significant differences between OBI and BI br within the identified subgroups. In addition, no differences were found between OBI in the subgroups of patients with mild and moderate COPD, the differences between BI br and BI l in these subgroups are also insignificant, although there is a tendency for such differences. There is a significant difference between the BI of the subgroups and the control group. Differences between BI

patients with moderate and severe course are significant (p = 0.003). Thus, the BI test, regardless of the age of patients, allows them to be divided into severe and non-severe and cannot serve as a criterion for identifying the severity of COPD in three degrees.

During the study, we observed a large difference in BI indices depending on the severity of the process in younger patients, so we ranked the group and analyzed BI, taking into account the severity and age of the patients. Group 1: men up to 51 years old and women up to 46 years old (Fig. 3); Group 2: men up to 66 years old and women up to 61 years old (Fig. 4); Group 3: men over 65 and women over 61 (Fig. 5). In patients of 2 age groups: under 66 years old, significant differences in BI were obtained in patients with mild, moderate and severe COPD. The difference is significant between all subgroups and the control group. There is a lack of significant differences between OBI and BI br. The difference between BI br and BI l in mild and moderate COPD is significant, in contrast to the entire study group, when the patient's age was not taken into account. Thus, there is a direct correlation between BI and the severity of COPD, but only in male patients younger than 66 years old and women younger than 61 years old. To simplify testing, the OBI test can not be checked separately, but immediately proceed to testing the BI br, since these tests duplicate each other. But it must be borne in mind that this fact will take place if the state of the bronchopulmonary system is the worst in the body, because OBIs reflect the state of the whole organism and most often, in the presence of combined pathology, they can be worse than BI br. It can be assumed that there is a reliable coincidence of OBI and BI indicators. br is due to the fact that in the patients we examined, the leading pathology was COPD. On the contrary, in the control group we see a significant difference between OBI and BI br, and OBI and BI l, which, as we have already noted above, confirms the correctness of the selection of subjects for the control group, i.e. the bronchopulmonary system of these people is in good condition.

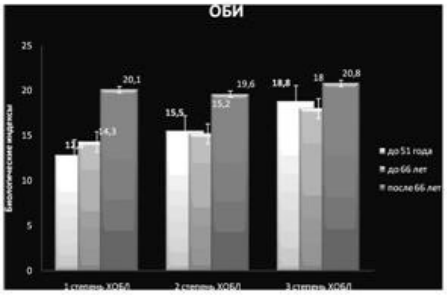


Rice. 3.BI depending on the severity of COPD in patients younger than 51 years old



Rice. 4.BI depending on the severity of COPD in patients younger than 51-65 years old

Rice. five.BI depending on the severity of COPD in patients over 65 years of age



Rice. 6.Age dependence of OBI in patients on the severity of COPD

In fig. 6 shows the age dependence of OBI on the severity of COPD. The higher the age, the less informativeness of OBI testing. It appears that age-related changes mask the conditions of the bronchopulmonary system in these patients.

Thus, when using BI to assess the health status of patients, attention should be paid to their age.

Conclusions:

1. In old age, BI values do not depend on the severity of the disease; can not used as a diagnostic criterion for ART to determine the severity of COPD.

2. BI do not depend on age in men under 66 and in women under 61 years of all 3 groups examined patients and significantly increase with the severity of the condition.

3. There are no significant differences between the dynamics of changes in OBI, BI l and BI br depending on the degree of the severity of COPD, which allows us to limit ourselves to the study of only BI br.

Literature

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