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ИЗУЧЕНИЕ РАННЕГО ПОВРЕЖДЕНИЯ ПОЧЕК ПРИ ХРОНИЧЕСКОЙ ОБСТРУКТИВНОЙ БОЛЕЗНИ ЛЁГКИХ В УСЛОВИЯХ НИЗКОГОРЬЯ

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STUDY OF EARLY KIDNEY DAMAGE IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN LOW MOUNTAINS

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036.12]

Известно, сопутствующая патология ренальной системы, может приводить к взаимному отягощению различных заболеваний со стороны других органов и систем. Данное предложение требует, у больных с хронической обструктивной болезнью легких (ХОБЛ) проведения дополнительных и детальных методов как по выявлению факторов риска, а также выявлению ранних маркёров почечного вреждения.

Что тем самым обеспечит, адекватные профилактические мероприятия в совокупности с более тщательной и корректной медикаментозной терапией в будущем. Что в свою очередь благоприятно отразится на качестве жизни данной когорты пациентов, а также отсрочит сроки начала заместительной почечной терапии.

Настоящая работа посвящена анализу преемственности факторов риска развития хронической болезни почек (ХБП) у пациентов с ХОБЛ в условиях низкогорья города Токмок Кыргызской Республики, на более ранних этапах ее проявления. Наши были обследованы 82 пациента с ХОБЛ различной степени тяжести, а также 10 здоровых
To date, chronic obstructive syndrome can be considered as a disease of the respiratory system with systemic manifestations [9-11]. Conducting an analysis of the available literature at the same time, we did not come across works devoted to a detailed study of the primary lesion

It is known that the concomitant pathology of the renal system can lead to a mutual burden of various diseases from other organs and systems. This proposal requires, in patients with chronic obstructive pulmonary disease (COPD), additional and detailed methods for both identifying risk factors and identifying early markers of kidney damage. This will ensure adequate preventive measures in conjunction with more thorough and correct drug therapy in the future. This, in turn, will favorably affect the quality of life of this cohort of patients, as well as delay the start of renal replacement therapy. The present work is devoted to the analysis of the continuity of risk factors for the development of chronic kidney disease (CKD), as well as the early detection of the frequency and magnitude of microalbuminuria (MAU) in patients with COPD in low-altitude conditions of the city of Tokmok, Kyrgyz Republic, at earlier stages of its manifestation. We examined 82 patients with COPD of varying severity, as well as 10 healthy individuals in low mountains (Tokmok city). The average age of the subjects was 60.53 ± 15.48 years, respectively. In the aggregate, the symptoms characteristic of COPD were taken into account, as well as an assessment of the function of external respiration (FVD) and the frequency and magnitude of the early marker of renal damage to MAU were studied in these patients. Given the risk factors for the development of CKD, we determined such parameters as the age of the patients, body mass index (BMI), smoking person index (ICH), the main indicator used to calculate the frequency of smoking, as well as

anamnesis for birth weight. An early and significant increase in MAU in patients with COPD is shown, and there is a tendency for risk factors for the development of CKD. Which in turn correlate with the degree of bronchial obstruction. After conducting the study and obtaining these results, in our opinion, further detailed study is necessary. For a more accurate answer to the question. Given this proposal, the question arises, MAU is simply a common marker of renal damage in COPD or, nevertheless, has its own prognostic value for this associated pathology. It is also worthwhile to pay close attention to risk factors for the development of CKD in patients with COPD, since these indicators have a direct tendency to aggravate the condition and develop complications, both on the part of the renal system and the respiratory tract.

Key words: chronic kidney disease, chronic obstructive pulmonary disease, urogenital system pathology, microalbuminuria, renal system.

At present, chronic obstructive pulmonary disease (COPD) is a very urgent problem in modern health care. The frequency of this nosological unit tends to steady progression, which in turn leads to further serious complications from other organs and systems. Conducted epidemiological studies prove this fact that COPD is characterized more by systemic manifestations, thereby increasing the risk of developing cardiovascular disease by two or even three times. In the aggregate, COPD takes an honorable fourth place among the main causes of the development of chronic heart failure (CHF) in the Russian Federation [1-3].

One of the known factors is that the renal system is a target organ in both CHF and COPD, but against this background, aspects related to nephrology in pathology of the pulmonary system have been studied significantly, little.

Given all sorts of pathological mechanisms that directly underlie changes in the cardiovascular system and the progression of chronic kidney disease (CKD) in COPD, they are significant. Thus, these processes include inflammation of a systemic nature, processes of hypoxemia, activation of the sympathetic nervous system, as well as the renin-angiotensin-aldosterone system (RAAS), endothelial dysfunction, oxidative stress, and also quite prolonged endogenous intoxication [4, 5].

To perform earlier diagnosis of CKD in patients at risk of developing it, who may initially lack protein in the general urine test, a marker for early detection of microalbuminuria (MAU) is tested [6-8].

To date, chronic obstructive syndrome can be considered as a disease of the respiratory system with systemic manifestations [9-11]. Conducting an analysis of the available literature at the same time, we did not come across works devoted to a detailed study of the primary lesion
from the renal system in patients with COPD in low-mountain areas.

It is also worth touching on such a rather important aspect in the significance of risk factors in the development of renal dysfunction in people suffering from COPD. Having studied literary sources, only a small number of works have been found that display risk factors for the development of CKD in patients with COPD. These risk factors include smoking, age, increased body mass index (BMI), and others. These factors can aggravate the prognosis of the disease and lead to a worsening of the disease in the future [12-14]. Thus, in our opinion, risk factors for the development of CKD in patients with COPD in low mountains should be studied.

The aim of our study is to study risk factors and the initial earlier manifestations of kidney damage in patients with pathology of the respiratory system, in particular COPD.

Materials and research methods: In the low mountains of the city of Tokmok Kyrgyzstan, 82 patients with COPD with varying severity were examined. The average age of those was 60.53 ± 15.48 years. The presence of COPD and a severity score were determined according to the Global Initiative for Chronic Obstructive Lung Disease criteria (GOLD, 2011).

The subjects were analyzed by indicators of the function of external respiration (HFD), such as the volume of forced expiration in 1 second (FEV 1%), the volume of forced expiration in 1 second / forced vital capacity of the lungs (FEV 1 / FVC%) Tiffno index, the moment was evaluated volume expiratory flow rate at 25, 50, 75%, 1 / s (MOS25 l / s, MOS50 l / s, MOS75 l / s). According to the results of the study, all the subjects examined by us are divided into three groups, taking into account their severity of bronchial obstruction. Thus, 27 patients with mild COPD severity constituted the first group, 32 patients with moderate severity of chronic obstructive syndrome were waxed into the second group, and 23 patients with severe chronic obstruction were assigned to the third group.

All patients were simultaneously comparable among themselves in terms of gender, age, and the duration of the disease itself was also taken into account. For the implementation of comparative parameters, a control group (CG) was taken, which included absolutely 10 healthy individuals.

Given the risk factors for the development of CKD, we determined such parameters as the age of the patients, the smoking person index (ICH), the main indicator used to calculate the frequency of smoking, body mass index (BMI), which was calculated using a specific formula, as well as anamnesis data regarding birth weight. Since it is known that low birth weight can also be a risk factor for the development of CKD in the future.

To identify the nature of the early damage from the renal system, an analysis was performed using the microalbumin Albu test (Erbalachema), where parameters such as the frequency and magnitude of MAU were determined.

Reliability in the aspect of differences and accounting of the compared indicators was determined according to statistical criteria using a standard software package such as STATISTICA 6.0 and SPSS Statistics. Thus, the processing of the obtained statistical data was carried out; they were considered reliable at p <0.05.

Results and its discussion. Having performed the spirometry procedure for evaluating external respiration, we obtained the following results. So, the FEV1 parameter in patients of the first study group was 86.29 ± 10.74%, this was significantly different from similar parameters in individuals of both the second study group and the third group, respectively (71.95 ± 18.35% and 40.65 ± 12.90%, where p <0.05).

Simultaneously with an increase in the degree of broncho-obstructive syndrome, the indicators of the FEV1 / FVC index, as well as patency both at the level of small, as well as medium and large caliber bronchi, deteriorated. Indicators of HPF are shown in table 1.

Table 1

<table>
<thead>
<tr>
<th>Parameters</th>
<th>The surveyed groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KG(n= 10)</td>
</tr>
<tr>
<td>FEV1, %</td>
<td>108,4 ± 13,79*</td>
</tr>
<tr>
<td>FEV1 / FVC, (%)</td>
<td>103,7 ± 4,87*</td>
</tr>
<tr>
<td>MOS25, (l / s)</td>
<td>79,80 ± 17,45*</td>
</tr>
<tr>
<td>MOS50, (l / s)</td>
<td>104,1 ± 20,40*</td>
</tr>
<tr>
<td>MOS75, (l / s)</td>
<td>98,00 ± 8,64, *</td>
</tr>
</tbody>
</table>

Note: parameters have significance between groups, p <0.05.
I would like to note an important point in the study regarding the development of risk factors for CKD in patients with COPD in low altitude settings. A correlation analysis was performed both in the general group of patients, taking into account their severity, and in HA.

Thus, on the basis of the results obtained, a definite conclusion can be drawn that, in low-mountain residents, in particular, the city of Tokmok, the signs of the development of CKD risk factors in patients with COPD turned out to be the age of patients, this symptom took first place in the development of renal dysfunction.

So, in the 1st group with mild COPD, the average age was $53.04 \pm 2.523$, in patients with moderate to severe chronic obstructive syndrome, the average age was $60.53 \pm 2.737$, and in patients with severe COPD, the average age was $62.00 \pm 1.693$. The data are displayed in table 2.

### Table 2

<table>
<thead>
<tr>
<th>Patient group</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>$M$</th>
<th>$\pm m$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of patients</td>
<td>27</td>
<td>31</td>
<td>80</td>
<td>53.04</td>
<td>$\pm 2.523^3$</td>
</tr>
<tr>
<td>ICH</td>
<td>7</td>
<td>180</td>
<td>240</td>
<td>209.14</td>
<td>$\pm 10.751$</td>
</tr>
<tr>
<td>BMI</td>
<td>27</td>
<td>19.2</td>
<td>37.2</td>
<td>27.304</td>
<td>$\pm 0.8855$</td>
</tr>
<tr>
<td>Birth weight</td>
<td>27</td>
<td>2500</td>
<td>3800</td>
<td>2992.59</td>
<td>$\pm 74.903$</td>
</tr>
<tr>
<td>Age of patients</td>
<td>32</td>
<td>31</td>
<td>84</td>
<td>60.53</td>
<td>$\pm 2.737^1$</td>
</tr>
<tr>
<td>ICH</td>
<td>11</td>
<td>132</td>
<td>240</td>
<td>175.64</td>
<td>$\pm 10.644^4$</td>
</tr>
<tr>
<td>BMI</td>
<td>32</td>
<td>18.6</td>
<td>38.1</td>
<td>27.306</td>
<td>$\pm 0.9291$</td>
</tr>
<tr>
<td>Birth weight</td>
<td>32</td>
<td>2500</td>
<td>3800</td>
<td>2976.59</td>
<td>$\pm 66.826$</td>
</tr>
<tr>
<td>Age of patients</td>
<td>23</td>
<td>47</td>
<td>75</td>
<td>62.00</td>
<td>$\pm 1.693^2^3$</td>
</tr>
<tr>
<td>ICH</td>
<td>9</td>
<td>144</td>
<td>300</td>
<td>220.00</td>
<td>$\pm 16.852^4$</td>
</tr>
<tr>
<td>BMI</td>
<td>23</td>
<td>17.1</td>
<td>35.9</td>
<td>25.978</td>
<td>$\pm 1.0693$</td>
</tr>
<tr>
<td>Birth weight</td>
<td>23</td>
<td>2800</td>
<td>3700</td>
<td>3141.30</td>
<td>$\pm 50.555$</td>
</tr>
<tr>
<td>Age of patients</td>
<td>10</td>
<td>38</td>
<td>60</td>
<td>50.90</td>
<td>$\pm 2.433$</td>
</tr>
<tr>
<td>ICH</td>
<td>5</td>
<td>120</td>
<td>264</td>
<td>170.40</td>
<td>$\pm 25.286^1^2$</td>
</tr>
<tr>
<td>BMI</td>
<td>10</td>
<td>24.7</td>
<td>32.9</td>
<td>29.010</td>
<td>$\pm 0.9435$</td>
</tr>
<tr>
<td>Birth weight</td>
<td>10</td>
<td>2300</td>
<td>3700</td>
<td>3210.00</td>
<td>$\pm 124.231$</td>
</tr>
</tbody>
</table>

**Note:** the average age of the patients of the second group is significantly higher than the control group $p<0.05^1$.

The age of the patients of the third group was statistically significantly higher than the control group $p<0.05^2$. Also, the average age of the patients of the third group is significantly higher than the first group, $p<0.05^3$. Also, the ICH of patients of group 3 is significantly higher than group 2 $p<0.05^4$, such parameters as BMI and birth weight in the study did not have statistical significance.

The number of patients with CKD is increasing worldwide, which significantly reflects the nature of the pandemic. Mostly, I would like to note that an important trend is caused, first of all, by absolutely not those mechanisms leading to pathological processes in which a patient may be under the supervision of a nephrologist, but because of the augmentation of the increase in the number of patients with a significant degree of cardiovascular pathology. Meanwhile, to a certain extent, the contribution of COPD, as a pathology having the result of systemic manifestation to the formation of CKD, has not been sufficiently developed and studied.
In patients with a history of diabetes mellitus (DM), metabolic syndrome (MS), hypertension (GB), as well as in patients with vascular atherosclerosis, the most susceptible marker of endothelial dysfunction is MAU [15, 16].

In patients with COPD using test strips to determine MAU, we have identified the following data that reflect signs of the presence of endothelial dysfunction.

It should be noted that the values of this parameter in patients with COPD having a mild severity of 0.05 ± 0.03 g/l, as we see, there was a tendency to increase in persons of the second group to 0.07 ± 0.04, and in the third to 0.09 ± 0.03 g/l. (fig.)

If we take into account every fourth patient with COPD, then each reveals a functional disorder on the part of the renal system. Thus, the risk of increasing if there is a combination with a pathological process in the circulatory system rises. Most likely, there is a possibility that this may be due to both a systemic consequence of COPD and the presence of respiratory and heart failure [11].

Consequently, the presence in the pathogenesis of common links of the mechanism, such as general systemic inflammation, dysfunction of the endothelial system form the mutually aggravating effect of COPD on the cardiovascular and in particular on the renal system.

This definition in world practice is referred to as the cardiorenal continuum. Finding out these changes at the stages of the earlier manifestation of the pathological process, which currently needs timely further and more detailed, and accordingly close study [17].

A study indicates that in all, in the aggregate of patients with chronic obstructive syndrome, MAU is detected. It is worth noting that with an increase in the severity of COPD, an increase in the level of albumin excretion reliably occurs.

Thus, a study to identify an early marker of renal damage to MAU can detect kidney damage at earlier stages of COPD. Therefore, evaluate the severity of the latter. There are also risk factors for developing CKD, such as the age-related aspect, and smoking.

**Conclusion:**
1. The identification at the early stages of statistically significant risk factors for the development of CKD, such as old age, smoking in patients with COPD is important, in the development of possible complications from other organs and systems in the future.
2. Taken together, all patients with chronic obstructive syndrome have MAU as one of the early signs of kidney damage.
3. The higher the severity of chronic obstructive syndrome, the higher the indicators of the early marker of renal damage of MAU.
Literature: