LEUKOGRAM AND ESR INDICATORS IN PERSONS WORKING IN VARIOUS INDUSTRIES DURING THE COVID-19 PANDEMIC

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Summary. We compared the indicators of leukogram and ESR in the second year of the COVID-19 pandemic (2021) among employees of two institutions: SF "Peremoga Nova" Poultry Farm (15 people) and the State Fire and Rescue Squad (22 people). The workers of the poultry farm showed certain signs of the development of pro-inflammatory processes (an increase in the level of monocytes and ESR). Such signs are absent in the employees of the fire and rescue squad, which allows us to consider the conditions of professional activity as the main etiological factor of the identified trends. Emotional stress caused by the COVID-19 pandemic could be an additional trigger for the identified trends.

Keywords: occupational diseases, leukogram, stress, pro-inflammatory phenomena, COVID-19 pandemic

Occupational diseases are a serious problem in the country's economy and healthcare system [1; 2]. According to the International Labor Organization (ILO), the medical consequences of occupational diseases lead to 4% loss of the world's gross domestic product [3].

To develop preventive measures, it is important to know the prevalence, distribution and trends of occupational morbidity. In many countries, attention is focused on early diagnosis and prevention, and the identification of new risk factors for occupational diseases [4]. In general, a well-designed system for monitoring occupational morbidity makes it possible to monitor and evaluate its prevalence and trends, take timely preventive measures, and improve the effectiveness of compensation. Such monitoring not only protects the health of workers, but also prevents economic losses [5-7].
Work-related stress and burnout are on the rise all over the world. Such occupational disorders account for 19-30% of the entire working population. To overcome this phenomenon, it is necessary to timely diagnose stress levels among specialists in various professions [8]. Long-term emotional stress in everyday life intensifies the state of psychological stress [9]. Therefore, in recent times, the presence of additional stress caused by the COVID-19 pandemic should be taken into account [10; 11].

One of the available and effective biomarkers of stress and harmful exogenous factors are the parameters of the immune system [12-15]. Therefore, the determination of blood parameters remains an important diagnostic tool for assessing potentially hazardous production factors.

We compared the leukogram and ESR indicators in the second year of the COVID-19 pandemic (2021) among employees of two institutions: SF "Peremoga Nova" Poultry Farm (15 people) and the State Fire and Rescue Squad (22 people). Employees underwent scheduled medical examinations on the basis of the Municipal Non-Profit Enterprise "Cherkasy Central District Hospital" of the Chervonoslobidska Village Council.

Leukogram parameters were determined on a Diagon D-cell 60 analyzer (Diagon Ltd, Hungary). ESR was determined by the Panchenkov method.

It was found that the employees of the SF "Peremoga Nova" Poultry Farm have a statistically significant higher total number of monocytes (P<0.05), relative number of monocytes (P<0.01) and ESR (P<0.05) (Fig. 1-3). In firefighters, the relative number of monocytes approached the upper limit of the norm; in the employees of the poultry farm, it went beyond the upper limit of the norm.
The classic signs of a stressful situation (changes in the ratio of lymphocytes and granulocytes [16]) were not detected in the examined from both occupational groups. In firefighters, there was a trend towards an increase in the relative number of granulocytes, compared with poultry workers, which was not statistically significant (Fig. 2). Perhaps this is a consequence of regular physical activity in firefighters during training as a manifestation of moderate physiological stress [13; 17-19].

Monocytes are the precursors of macrophages; therefore, an increase in their level, in particular during viral epidemics, is a sign of the mobilization of pro-inflammatory factors initiated by macrophages [20].

The erythrocyte sedimentation rate is a recognized pro-inflammatory marker; there is evidence of an increase in this indicator in people with depression [21].

Thus, poultry workers have certain signs of activation of pro-inflammatory processes. It is known that people working with biological objects are at risk of health problems caused by antibiotics, premix feeds, infectious and non-infectious allergenic factors, etc. [22; 23]. The signs of pro-inflammatory processes that we discovered can be associated precisely with the latent stages of hypersensitivity reactions of moderate intensity. On the other hand, one should not exclude the hypothesis of the influence of the pandemic factors (both viral agents and increased emotional stress) on the surveyed factors. Given the careful sanitary control in the production of meat and egg products, it is possible that they became the trigger for pro-inflammatory phenomena. For clearer conclusions, it is necessary to evaluate the characteristics of T-lymphocyte subpopulations, which are a more significant indicator of the presence of stress [24; 25]. Additionally, it is necessary to analyze the accompanying factors that can be included in the body's response to stress – indicators of lipid metabolism, thyroid status, etc. [12; 26].

**Conclusions.** In the second year of the COVID-19 pandemic, poultry workers show certain signs of the development of pro-inflammatory processes (an increase in the level of monocytes and ESR). Similar signs are absent among the employees of the fire and rescue squad. This can be considered a confirmation of the thesis that the conditions of professional activity are the main etiological factor of the identified trends.
References:


