MODERN METHODS OF TREATING PULMONARY HYPERTENSION

Bakhramova Azima Abbasovna
Bukhara State Medical Institute, Bukhara city, Uzbekistan

Pulmonary hypertension is an increase in pressure in the pulmonary circulation. In most cases it is secondary, in some cases it is idiopathic. Pulmonary hypertension may involve narrowing, contraction, loss, and/or blockage of the pulmonary vessels. Severe pulmonary hypertension leads to right ventricular overload and right ventricular failure. Symptoms of pulmonary hypertension include fatigue, shortness of breath on exertion, and sometimes chest discomfort and syncope. Diagnosis is made by recording elevated pulmonary artery pressure (assessed using echocardiography and confirmed by right heart catheterization). Treatment is with pulmonary vasodilators and diuretics. In some severe cases, lung transplantation is considered as an option. If a treatable cause of the disease is not identified, the prognosis is poor. Pulmonary hypertension can be caused by various diseases and medications. The most common causes of pulmonary hypertension include:

Left ventricular failure, including diastolic dysfunction

Parenchymal lung diseases accompanied by hypoxia

Several other causes of pulmonary hypertension include sleep apnea, connective tissue diseases, and recurrent pulmonary embolism.

The classification of pulmonary hypertension currently includes 5 groups (see table Classification of Pulmonary Hypertension) based on a number of pathological, physiological and clinical factors. In the first group (pulmonary arterial hypertension [PAH]), the small pulmonary arterioles are primarily affected.

A small number of cases of pulmonary arterial hypertension (PAH) occur sporadically, regardless of any diagnosed disorder; in such cases the disease is called idiopathic pulmonary arterial hypertension.

Hereditary forms of PAH (autosomal dominant with incomplete penetrance) have been identified; Mutations of the following genes were found:

Activin-like kinase receptor type 1 (ALK-1)

Bone morphogenetic protein receptor type 2 (BMPR2)

Caveolin 1 (CAV1)

Endoglin (ENG)

Growth differentiation factor 2 (GDF2)

K-member of potassium channel subfamily 3 (KCNK3)

Mothers against decapentaplegic homologue 9 (SMAD9)

T-box transcription factor 4 (TBX4)

Mutations in the BMPR2 gene are responsible for 75% of cases. Other mutations are much less common, occurring in about 1% of cases.

In approximately 20% of cases of hereditary PAH, the causative mutations are not identified.

Mutation of the eukaryotic translation initiation factor 2 alpha kinase 4 (EIF2AK4) gene has been associated with pulmonary veno-occlusive disease, a form of group 1 PAH (1, 2).

Certain medications and toxins are risk factors for the development of PAH. There has been a proven connection between the development of PAH and appetite suppressants (fenfluramine, dexfenfluramine, aminorex), toxic rapeseed oil, benfluorex, amphetamines, methamphetamine and dasatinib. Similarly, other protein kinase inhibitors have been associated with drug-induced pulmonary hypertension (3). Prescribing SSRIs (selective serotonin reuptake inhibitors) to pregnant women increases the risk of developing persistent pulmonary hypertension in newborns. Drugs that are probably or potentially associated with PAH include amphetamine-like drugs, cocaine, phenylpropanolamine, St. John's wort, interferon-alpha, interferon-beta, alkylating agents, bosutinib (only potentially associated with PAH), direct-acting antivirals against hepatitis C virus , leflunomide, indirubin and L-tryptophan (4).

Patients with hereditary hemolytic anemia, such as sickle cell disease, are at high risk of developing pulmonary hypertension (10% of cases based on right heart catheterization criteria). The mechanism is associated with intravascular hemolysis and the release of extracellular hemoglobin into the blood plasma, which prevents vascular occlusion by nitric oxide, generates reactive oxygen species and activates the hemostatic system. Other risk factors for developing pulmonary hypertension in sickle cell disease include iron overload, liver dysfunction, thrombotic disorders, and chronic kidney disease.

Bibliography.

1. Eyries M, Montani D, Girerd B, et al: EIF2AK4 mutations cause pulmonary veno-occlusive disease, a recessive form of pulmonary hypertension. Nat Genet 46(1):65-9, 2014. doi: 10.1038/ng.2844
2. Girerd B, Weatherald J, Montani D, Humbert M: Heritable pulmonary hypertension: from bench to bedside. Eur Respir Rev 26(145):170037, 2017. doi: 10.1183/16000617.0037-2017
3. Бахрамова А. А. ГИПЕРТОНИЧЕСКАЯ БОЛЕЗНЬ //Евразийский журнал медицинских и естественных наук. – 2023. – Т. 3. – №. 9. – С. 45-51.
4. Abbosovna B. A. Overweight and Obeseve People are at High Risk of Developing Metabolic Syndrome //Research Journal of Trauma and Disability Studies. – 2023. – Т. 2. – №. 12. – С. 44-50.
5. Badritdinova, M. N., Bakhtiorovich, X. B., Abbosovna, B. A., & Akbarovna, N. M. (2023). Rhythm and Conductivity Disorders in Patients with Hypertension. Journal of Advanced Zoology, 44.