

Acute Chemical Lung Injury

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Annotation: The article is devoted to the causes leading to the development of acute lung injury, acute poisoning with drugs, pesticides causing indirect lung injury, occupy one of the first places. Inhalation poisoning with smoke, toxic gases, which are the cause of direct acute lung injury, also occupy far from the last place. The main types of pathology in severe inhalation intoxication are toxic bronchoalveolitis, toxic pneumonia or toxic pulmonary edema. The listed nosological units are currently considered as special cases of acute lung injury of chemical etiology.

Keywords: lungs, acute lesion, causes.

Introduction. Acute respiratory failure occupies a leading place in the genesis of diseases of chemical etiology. One of its most severe forms is acute lung injury (ALI), which largely determines the course and outcomes in critical conditions, since the mortality rate in the most severe forms is 40-60% (Belonogov I., 2014) [1].

In the list of causes leading to the development of acute lung injury, acute poisoning with drugs, pesticides causing indirect lung injury, occupy one of the first places. Inhalation poisoning with smoke, toxic gases, which are the cause of direct acute lung injury, also occupy far from the last place (Kostyuchenko L.N. et al., 2018) [4].

It should be noted that in the total number of patients admitted to poisoning treatment centers, patients with ALI constituted a small percentage; as a rule, these were patients who did not receive adequate medical care in the first hours of acute poisoning. Nevertheless, the fight for the life of each of them is the most important problem of the resuscitation department of the toxicological profile.

A special problem is mass poisonings that occur as a result of emergency situations in peacetime: chemical accidents, catastrophes, natural disasters, deliberate use of chemical compounds as toxic substances, terrorist acts. Therefore, it seems relevant to improve the early diagnostics of ALI primarily by non-invasive methods, as well as further search for ways of pharmacological correction by generally available and, at the same time, highly effective drugs (Vdovina, N.V. 2024) [2].

The main types of pathology in severe inhalation intoxication are toxic bronchoalveolitis, toxic pneumonia or toxic pulmonary edema. The listed nosological units are currently considered as special cases of acute lung injury of chemical etiology (Litvinova O.S., Kalnovskaya M.V., 2017) [5].

Among acute poisonings, the first place is still occupied by drugs with neurotropic action, alcohol and drugs. In general, patients with acute poisoning with household neurotropic poisons make up 70-80% of all those admitted to toxicology centers; for a large one, approximately 4500-5500 patients per year. In the overwhelming majority of cases of severe forms of acute poisoning in the home with substances that have a neurotropic effect, when the severity of the lesion reaches the level of coma and the patient requires artificial ventilation of the lungs, damage to the respiratory system determines the prognosis of the condition, since the patient may not live to the level of critical disorders of the kidneys, liver, etc. (Kashtanova I.S., et al., 2014) [3].

Many issues related to the pathogenesis of ALI remain unresolved. The pathophysiological basis of respiratory and metabolic disorders in acute poisoning has not been sufficiently studied, which explains the untimely diagnosis of ALI at the pre-hospital and hospital stages. In case of respiratory organ damage, the location of systemic and pulmonary circulation disorders, the balance of fluid sectors of the body, lung hydration and other homeostasis disorders - a pathology that is the basis for intensive care - has not been determined. The study of these issues is associated with the possibility of improving the diagnosis, prevention and treatment of cardiorespiratory disorders in diseases of chemical etiology (Ahmad, K., 2017) [8].

In critical medicine, there are certain criteria for diagnosing ALI, but they characterize a developed pathological process with obvious clinical signs. Many studies are devoted to the development of methods for diagnosing and treating ALI of chemical etiology based on the study of the leading links of pathogenesis. The main pathogenetic factor of ALI is hyperhydration of the lungs, which is associated either with an increase in hydrostatic pressure in the pulmonary capillaries or with increased permeability of the endothelium of the pulmonary capillaries. An important role belongs to microcirculation disorders in the pulmonary circulation system. The above changes lead to serious disturbances in the gas exchange function of the lungs, which cause the development of hypoxemia. ALI with toxic inhalation exposure is characterized by more extensive damage to alveolocytes, severe inflammation, and edema with relatively intact capillary endothelium. With indirect ALI, with enteral administration of neurotropic poisons, there is, first of all, CNS depression, hypoxia, impaired neurohumoral regulation of vascular tone, and changes in the rheological properties of the blood, which creates conditions for the development of profound disorders of the microcirculation system and water-electrolyte imbalance. In this case, interstitial edema, alveolar collapse, and a severe inflammatory reaction with relatively intact alveolocytes predominate (Luzhnikov E.A., 2014; Croake, A., 2019) [6,10].

Despite the successes achieved in intensive care, the results of ALI treatment remain disappointing. Analysis of fatal outcomes in ALI showed that therapy was ineffective in the group of patients in whom arterial blood oxygen tension under artificial ventilation (AVL) was low and changes in the AVL parameters did not lead to an increase in arterial blood oxygen tension, that is, oxygen diffusion in the lungs was actually impaired, while the obstructive component was excluded. A study of the pathogenesis of these disorders using impedance methods - integral body rheography according to M.I. Tishchenko, thoracic rheography according to B.B. Shramek, integral dual-frequency impedancemetry made it possible to establish that thoracic hyperhydration is characteristic of patients with this kind of disorder (Beike, L., 2019) [9].

Experimental data suggest that pharmacological ways of correcting pulmonary hyperhydration are far from exhausted, especially in the early stages of ALI development, and improving treatment methods for this formidable condition can significantly improve the results. The essence of the problem also lies in diagnosing hyperhydration at the initial stages, when there are no obvious clinical manifestations, such as abundant foamy sputum, etc., but when the oxygenation index drops to critical values and there are no clear methodological criteria explaining the occurrence of such a formidable complication (Tarasenko A.A., 2019) [7].

Conclusion. Thus, the study of literature data shows that in the list of causes leading to the development of acute lung injury, acute poisoning with drugs, pesticides causing indirect lung injury, occupy one of the first places. Inhalation poisoning with smoke, toxic gases, which are the cause of direct acute lung injury, also occupy far from the last place.

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