

Which Variant of Shock Accompanies Acute Pneumonia?

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The legacy of long-term use of antibiotics has not only “presented” humanity with such a global problem as resistant microflora [1], but also distorted the nature of assessments of several observed facts. One of the natural consequences of a significant decrease in the effectiveness of antimicrobial therapy was the growth of septic complications, which in the coming century turned into one of the most difficult tasks of modern medicine [2]. In the general group of patients with sepsis and septic shock, acute pneumonia (AP) occupies a leading place, reaching 50% of cases [3]. At the same time, it is this category of patients that attracts attention with the negative results of traditional microbiological blood tests compared with other diseases [4,5].

The growth of viral forms of lung inflammation has not changed the interpretation of the disease, continuing to consider the pathogen as a leading factor. In this regard, in recent years, the severity of the condition of patients with viral pneumonia is explained by the development of viral shock, which, apart from analogies with bacterial forms of inflammation, has no objective evidence of its nature [4,6]. The existing system of views on the essence of the so-called septic complications in AP is not a harmless concept, since it determines the principles of care for these patients and the results of treatment. The lack of tangible success in the treatment of the most severe category of patients with AP makes us first of all look at the existing dogmas about the alleged causes of septic complications through the prism of the basic canons of medical science.

As is known, the blood pressure in the vessels of the small circulatory circle is several times lower than in the periphery [7]. An increase in this indicator in the vascular sector of the lungs by only 5 mmHg creates a risk of interstitial edema of the surrounding tissues, and its increase by 10 mmHg leads to generalized edema of the organ [8]. Nature has protected us from the need to regulate such shifts in the event of their occurrence. This is done automatically by existing autonomous mechanisms, one of which is the so-called unloading reflex, discovered almost a century ago by H. Schwiegk [9]. The signal from the baroreceptors of the pulmonary vessels, which occurs when the pressure in them increases, leads to a reflex decrease in this indicator in a large circle. An increase in the capacity of the vascular network at the periphery delays part of the circulating blood in it, reducing the load on the lungs.

An additional mechanism for reducing the volume of blood passing through a small circle in conditions of increasing inflammatory edema is a generalized spasm of small vessels of the pulmonary sector, which is especially manifest in aggressive forms of inflammation. The latter protective mechanism has recently received additional confirmation during tomographic studies of COVID-19 pneumonia [10,11]. A sign of blood retention in the venous sector and decompensation of this mechanism is an increase in central venous pressure.

The reflex nature of the redistribution of circulating blood in patients with AP, which has a trigger mechanism in a small circle, is a fundamental difference in the causes of a similar pattern observed in other inflammatory processes. In this regard, the shock observed when lung tissue is affected is, as a rule, pulmonogenic, and not septic in origin [12]. In other localities of the focus of inflammation, an important role in the development of such a clinical picture is acquired by the obvious loss of fluid, which usually accompanies such dis-

eases, and biologically active factors that directly affect the tone of peripheral vessels. The existing diagnostic system for sepsis and septic shock, which considers peripheral blood pressure as one of the most important tests [13], initially presents secondary abnormalities in patients with AP as the leading ones.

The principles of correction of circulatory disorders, justified to help patients with septic complications, contradict the pathogenesis of shock, which accompanies the development of the inflammatory process in the lung. Infusion therapy, which is currently one of the main methods of emergency care for shock, has an effect directed against the protective and adaptive mechanisms of a patient with AP. The first barrier that solutions injected into a vein reach is the vessels of a small circle, which the body is just trying to unload.

Emergency care for AP disease determines the fate of these patients, especially those who enter intensive care units. This is exactly the category of patients who differ in the severity of their condition, but still have hopes that the beginning of treatment can bring a positive result. However, it is no secret that the results of treatment of patients with inflammatory processes of the lung tissue are decreasing every year, and the mortality rates among them in intensive care units have reached 50 percent or more in recent years [6,14,15]. An additional sign of the low effectiveness of modern AP treatment is the frank reports of some authors about the deterioration of patients' condition during treatment and even the development of shock in them, which was not there at admission [16-18].

At the same time, the statistics of the SARS-CoV-2 pandemic provided new information that medical care for inflammatory processes of lung tissue is not a reliable protection that severe patients can rely on today. Studies of the consequences of coronavirus infection have shown that this pathogen has a direct damaging effect on lung tissue, while other organs suffer as a result of the resulting shock and the so-called cytokine storm [19].

In unexpected conditions, when medicine has lost the ability to use antibiotics, which it has used for many years as the main treatment for AP, most patients cope with such diseases at home, without reaching the walls of hospitals. Only the condition of 5% of the patients among the sick required hospitalization in intensive care units (20,21), but the mortality rate among them reached and even exceeded 50% [22-24].

The concentration of such patients in accordance with epidemiological requirements in specialized intensive care units significantly increased the likelihood of observing tragic outcomes of the disease and began to undermine the confidence of service personnel in the effectiveness of modern medical care. These circumstances led to the appearance in the medical literature of a new direction of publications in the form of polemical repentances [25,26].

Today, unprecedented efforts are being made to find and create effective antimicrobial and antiviral drugs in the hope of reviving the former success of antibiotics. The result that such a very successful find can bring will be a short-term success, but not a victory. To understand the utopian nature of these aspirations, it is enough to once again assess the situation caused by the prolonged use and continuous improvement of antimicrobial agents. Today we have a detailed picture of the consequences that inevitably had to arise with such an active intervention in the proportions of the nature around us.

The emphasis of this appeal is aimed at the most important side effect of antibiotics, without the elimination of which it is impossible to imagine the development and adoption of optimal solutions to the problem of AP. We are talking about the long-term negative didactic effect of this therapy on the formation of a professional worldview regarding the concept of the disease. Therefore, first of all, it is necessary to revise the existing ideology of acute nonspecific inflammation of the lung tissue and reflect in the new teaching about the disease the classical foundations of medical science, avoiding the already tested short-term hobbies [12]. Without this intellectual and analytical work, the search for solutions will continue in a narrow direction, hindering the development and application of pathogenetic methods of care for this category of patients.

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Conflict of Interest

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