

COVID-19: Traditions, Facts and Science

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Abbreviations

AP: Acute Pneumonia; COVID-19: Coronavirus Disease; SARS: Severe Acute Respiratory Syndrome; MERS: Middle East Respiratory Syndrome

The problem of AP belongs to the category of those scientific topics that have not been subjected to a serious conceptual revision. Discussions on this topic in recent decades have had a pre-known direction, where the pathogen was assigned the place of the main cause of the disease, and the essence of the dispute was to find the most effective way to neutralize it. The beginning of the COVID-19 pandemic, which gave a stream of patients with monoetiological inflammation and an infinite number of clinical options, did not affect the ideology of the problem and the search for a “pill for pneumonia”. “Cognitive bias” with adherence to certain stereotypes and the difficulty of changing attitudes, despite contradictions and facts, are the main obstacles to future promising solutions [1].

The coronavirus pandemic was an unexpected and serious challenge for modern medicine, for which it was unprepared both in terms of surprise and the effectiveness of its professional efforts. Of course, for most people on the planet, this catastrophe really came as a complete surprise, but medical specialists who study respiratory diseases have no excuse to explain this event by its unpredictability, since there were all the prerequisites for such an expectation.

Until recently, the solution to the problem of AP was considered only from the position of suppressing the pathogen with antibiotics. This narrow concept arose as a result of the first successes of antibiotic therapy, but its didactic influence grew over the years, despite the emergence of more and more new counterarguments.

For many years, the rising trend of viral pneumonia has been discussed in the medical literature, and a decade ago, 200 million cases were reported worldwide each year, accounting for almost half of all AR cases [2-4]. In addition, the experience of getting acquainted with the coronavirus itself has already been acquired by medicine over the past twenty years as a result of at least two major epidemics - SARS and MERS [5], so its third invasion can not be considered an unfamiliar problem.

Such information obliged to adapt the principles of providing medical care to patients with AP in accordance with trends in the etiology of the disease and the increase in the number of cases when antibiotics lost their value. However, antibiotics have been perceived as a universal remedy for several decades, and the initial treatment of AP has long been defined as “antibiotics alone”. The paradox of this type of treatment was that its effectiveness continued to fall over the years, and its value and perception, on the contrary, grew, creating a halo of panacea. No one asked the question: “why is one antibiotic the main, and often the only remedy for the treatment of incomparable diseases, including AP?”

This approach, despite its contradictions with the principles of clinical medicine, has long been dominant. If AP, otitis, pyelonephritis, pulpitis, enterocolitis, etc. are equated with each other according to the assumed etiological sign, are treated with one drug and for a long time this tactic in most patients justifies expectations, then the assessment and role of other parameters of the disease, for example, pathogenesis, looks even superfluous. Why go into the details of the mechanisms of development of various diseases, when the appointment of a single drug can bring the desired result, is not it?

This paradox has had a far-reaching didactic impact on the idea of the essence and nature of AP. Shortly before the pandemic, antibiotics in the treatment of AP continued to be considered by experts as a “cornerstone” among care products [6,7]. But the most striking thing is that the flow of coronavirus pneumonia did not affect treatment priorities in any way. Among patients hospitalized with coronavirus infection, up to 70 - 80 percent or more continue to receive antibiotics, although bacterial or fungal co-infection has been detected only in isolated cases [8-10] and in the UK cases of COVID-19 pneumonia are included in the treatment program for community-acquired pneumonia [11].

Long-term reverence for antibiotics has given rise to a persistent idea of the dependence of AP on its pathogens. Complications and treatment failures, which grew over the years, were attributed to the particular virulence of the pathogen and the difficulty of identifying it, although, in the end, it was recognized that bacteriological diagnosis does not affect the results of treatment [7]. Nevertheless, bacterial forms of AP that do not pose an epidemiological problem were attributed to infectious diseases. Long-term use of antibiotics has undoubtedly had an impact on the human microbiota and its proportions and contributed to an increase in viral forms of inflammation, but this postulate is still waiting for its scientific confirmation.

Thus, for a long period of time, medicine has sought to suppress the pathogens of AP, in fact placing the elimination of functional and morphological changes on the patient's body. Studies of the mechanisms of the disease were focused on the cellular and molecular level, focusing on the features of tissue damage by bacterial agents and not paying attention to the localization of the process. The choice of additional means of treatment, the need for which grew every year, was carried out from a set of general therapeutic methods, although the distinctive features of the blood supply to the lungs, unlike other organs and tissues, require unique approaches to treatment.

A paradox is also the peculiarity of AP assessment in clinical settings. When making a diagnosis, first of all, it turns out the X-ray picture of the lungs, which reflects the degree of spread of the inflammatory process. This objective information allows us to present the severity of the relevant functional disorders and the specific clinical situation. However, as soon as a clinical and radiological diagnosis is made, microbiological diagnosis begins to play a leading role in the choice of treatment. But, after all, at this stage of the disease, the cause of the severity of the patient's condition is already the focus of inflammation itself, and not its etiology, and, regardless of the type of infectious agent, the main value will be the percentage of lung tissue damage, right?

Based on the classical materials of medical science about the features of the cardiovascular system and above all, about the existing inseparable unity and feedback between its two circulatory circles, it is not difficult to imagine what happens in the body if suddenly there are violations of blood flow in the small circle. It is this reason that leads to a cascade of subsequent disorders in patients with AP, but, contrary to the basics of this knowledge and logic, the condition of patients in this group is not only evaluated by blood circulation indicators in a Large circle, but also adjusted in accordance with these identified deviations.

If we take into account that our body is a complex self-regulating system and compensates for many disorders autonomously, and blood circulation indicators in two circles differ in antagonism, then external intervention to correct peripheral blood circulation will inevitably affect its central hemodynamics. Trying to save the lungs from increasing inflammatory edema, the body seeks to reduce venous return, which with rapidly progressing processes can reach a shock reaction. However, experts continue to consider this phenomenon in the new situation as a viral shock, based on the existing system of views and without giving any objective arguments for such a statement [12].

A brief description of the established traditions of AP treatment provides an opportunity to present the initial state of this care at the time of the outbreak of the pandemic. The sudden invasion of the coronavirus and its rapid spread forced to resort to tough anti-epidemic measures, although today many have already become convinced that the very fact of infection does not pose a direct threat and the body of many people does not even respond to the presence of this pathogen. A clear demonstration of the infinite range of individual reactions to the penetration of an identical pathogen is the results of observations of large isolated groups under equal conditions [13,14]. The specific reason for this diversity has not yet been established, but the implementation of this task will improve ways to prevent the disease in the future. Today, emergency care for those who are already ill is one of the top priorities.

The main burden of the current pandemic is lung damage. Clinical, radiological and pathomorphological data confirm the development of viral pneumonia with damage to the same organ structures as in bacterial forms [11,15-17]. Damage to identical structures is accompanied by equivalent functional disorders, regardless of the etiology of the process. This position is not new and reflects the ancient, time-tested characteristic of acute inflammation, which is associated with the inevitable appearance of the 5 classic signs described by Celsus and Galen. Among them, the most specific feature is a violation of function, which depends on the localization of the process and determines its mechanisms of development and clinic.

Special additional studies, objective control of the influence of various factors on the dynamics of the process and successful clinical testing allowed us to note and prove the leading role of circulatory disorders in AP [18]. Respiratory and gas exchange shifts are secondary in nature and are caused by a change in the proportions between ventilation and blood flow in the lung tissue, in which the latter begins to dominate. Some of the planned aspects in this work have not been fully completed for a number of reasons, but the urgent need for a radical revision of the doctrine of the disease is quite obvious and is an inevitable step in solving the problem of AP.

Today, the main problem of the pandemic is associated with a group of hospitalized patients, whose treatment attempts, according to established traditions, persistently, but to no avail, continue using various methods of neutralizing the coronavirus [15,19-25]. In the meantime, a patient with COVID-19, getting to the hospital, can only count on oxygen support with subsequent transfer to auxiliary ventilation [26-31], and medical personnel working on the front line and not able to really influence the dynamics of the process, is subject to psychoemotional stress [19,32-34]. At the same time, the results of inpatient care for COVID-19 patients do not directly depend on the level of development of health systems and training of doctors. Currently, the overall mortality rate among patients hospitalized with COVID-19 is up to 11 - 20% [35-37]. In intensive care units, this indicator reaches 30 - 50% [38-41] and among patients who were on artificial ventilation, it exceeds half of the observations [37,40,41].

This COVID-19 statistic is undoubtedly worrisome and alarming, but its comparison with the AP figures on the eve of the pandemic allows us to assess this problem from a different angle. For example, the annual number of AP diseases in the world ten years ago was estimated at 450 million cases and was an order of magnitude higher than the current number of infected [1] and the number of deaths reached 4 million cases [2-4], which is more than 2 times higher than the current COVID-19 figure. At the same time, mortality among patients with community-acquired pneumonia in intensive care units shortly before the pandemic was the same 30-50% as now [42-46].

Comparison of AP statistics before and during the pandemic does not indicate a sharp deterioration in results, but a number of circumstances have changed the perception and assessment of the surrounding reality. The introduction of strict and broad anti-epidemic measures significantly changed the rhythm of life and the psychological climate in society, although the annual flu epidemics were not inferior to COVID-19 in their spread. As part of these activities, patients with coronavirus pneumonia began to concentrate in specialized departments, which created a new atmosphere for the work of medical personnel. Even for the experienced staff of intensive care units, such a flow of patients with a respiratory catastrophe turned out to be an exorbitant and unexpected overload.

But the main change with the onset of the pandemic is associated with the loss of the universal role of antibiotics and the concept of the adequacy of therapeutic approaches to AP. Two or three patients with respiratory failure always create a stress zone in any hospital, but

when the entire department is completely filled with such patients, and there are no effective means of providing assistance, it is possible to understand and assess the moral burden of medical personnel working in these conditions [32-34]. Such conditions, which the author experienced and remembers well after many years, were the reason for the beginning of the above-mentioned work [18]. The way out of this difficult situation is possible only through a radical revision of the doctrine of the disease, followed by a reassessment of therapeutic efforts. It is impossible to count on success in solving this problem without taking into account the features of inflammatory processes of the lungs, unlike other localizations.

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