

Why is vaccination against pneumonia not impressive?

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Abstract

The article provides an argument for the reasons for insufficient effectiveness of vaccination against pneumonia.

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Opinion

Among the methods of prevention, vaccination plays a leading role in countering infectious diseases. Thanks to this aid line, epidemics of many dangerous infections, such as diphtheria, polio, or smallpox, have virtually disappeared. Having a fairly long history of its existence and undeniable successful results in the prevention of many infectious processes, vaccination is rightfully included in the Golden Fund of medical achievements.

The above brief assessment of the place of vaccination in the health system is well known and is unlikely to raise reasonable objections. However, in recent years, not only among the population of many countries, but also among medical personnel, a wave of negative attitude to vaccination has begun to grow, which has generated broad discussions in the press and media space.

The reason for forming an unfavorable opinion may well be new areas of vaccination, which have been launched into widespread practice in recent decades. Among such implementations, from my point of view, pneumonia vaccinations stand out. On the one hand, this area of vaccination has received and continues to receive wide advertising support, surpassing the popularization of other types of this prevention in terms of activity. On the other hand, the results of prevention of acute inflammation in the lungs were very far from the

usual expected by analogy with vaccination for many defeated infections.

One of the last major reviews of the state of anti-pneumococcal prevention of pneumonia in the UK and an editorial comment to it [1,2] again show the author's concern about the lack of effectiveness of the ongoing vaccination program, which does not have time to protect against the emergence of new etiological trends in the group of patients with acute inflammation in the lungs. In this regard, it is very significant that the authors determined the pneumococcal etiology of pneumonia only in 36.6% of patients, but they see prospects for improving the results of prevention in the further expansion of the spectrum of action of the anti-pneumococcal vaccine.

It is obvious that such paradoxes can arise only on the basis of the existing ideology of the disease. Modern ideas about the nature of acute pneumonia as an infectious process determine the microbial factor as the main cause of the disease and suggest making appropriate decisions. Therefore, when it comes to ineffective treatment, the main way out of this situation is considered to be the release of new antibiotics, and to improve the quality of prevention, the development of new vaccines is proposed. At the same time, no one questions or suggests reconsidering the essence of such decisions, although everyone knows that the development and production of new antibiotics continues throughout the entire period of their use,

and the "pneumonia vaccine" has already changed significantly in recent years.

When analyzing the results of pneumococcal vaccination, it is not correct to take into account the aggregate data of this company for other processes of the same etiology. For example, this type of vaccination significantly reduced the number of cases of pneumococcal meningitis. However, vaccination against pneumonia does not bring the expected results, as happened with many actually defeated infections, which means that sooner or later we will have to analyze the facts and look for reasons for possible miscalculations and misunderstandings. To date, there are enough facts and evidence that have not been subjected to a deep critical assessment, but which can shed light on the reasons for the lack of effectiveness of preventive vaccination against pneumonia.

For example, it is not difficult to trace the dynamics of the etiology of acute pneumonia (AP) over the past few decades. Just over half a century ago, medicine faced the so-called staphylococcal disaster, during which the detection of *Staphylococcus aureus* in patients with AP reached, according to some statistics, 100%. Despite the absence of any special anti-staphylococcal measures, except for traditional antibacterial therapy in patients, the frequency of detection of this pathogen in AP began to decrease and soon it began to appear as one of the outsiders in the etiological list.

In parallel with the loss of *Staphylococcus* their positions began to increase the role of *Streptococcus pneumoniae*, which not so long ago occupied an undoubted leading position among the pathogens of AP. However, today its leadership is largely lost, and many experts express reasonable concern about the growing number of diseases of viral etiology.

Already a superficial historical digression allows us to note that the etiology of AP is characterized by impermanence and periodic change of leaders among its pathogens. However, when conducting such an analysis of the etiology of AP, due attention should be paid to the diagnostic method. The undeniable result of determining the pathogens of AP, from my point of view, can be the study of material directly from the zone of inflammation. However, this possibility is even theoretically difficult to solve and usually occurs only in a small

group of patients in the case of purulent complications and drainage procedures, and even then at the later stages of the disease. Therefore, the modern ideology of AP, representing the disease in full dependence on the microbial factor, and the logical desire to recognize this cause naturally led to the use of methods of indirect detection of pathogens, including in the nose and oropharynx, as well as on the basis of various laboratory and immunological methods. The practical value and reliability of various indirect methods for determining the pathogens of AP should be very doubtful based on the following well-known information.

First, the detection of pathogenic strains in the body does not necessarily mean the development of the disease. Microorganisms, according to the etiological list of pathogens of banal pneumonia, do not have the ability to necessarily cause disease when ingested, as is the case with many dangerous infections. Therefore, long-term carriage of aggressive symbionts, including antibiotic-resistant strains, by healthy people has long been known. In this regard, detection of indirect signs of the presence of certain strains in the body can not, in my opinion, be an absolute proof of the participation of these microorganisms in the focus of lung inflammation.

Secondly, the list of bacterial pathogens of banal forms of AP, which is standardly duplicated not only in monographs, but also in review articles, does not contain any specific agents, and these microbes with different degrees of probability can occur among symbionts in healthy people.

No one knows for sure about the true coincidence of the bacteria found in the area of inflammation and the microflora of the upper respiratory tract. By the way, during our previous studies in patients with AP, we started comparing the pleural microflora of each patient with empyema and the bacterial spectrum of smears from the nose and oropharynx. The first results of this comparison showed a discrepancy between the microflora of the upper respiratory tract and the area of inflammation, so further data collection was discontinued and now we can only regret the incompleteness of this test.

Third, the modern interpretation of AP as an infectious process is a continuation of the "microbial" ideology of the disease and has the

character of a Declaration that does not imply mandatory isolation of such patients and other precautions, as in true infectious diseases.

Finally, today it is generally recognized that the pathogen of AP in the vast majority of cured patients remains unknown. Moreover, more recently, a group of leading American experts on this problem concluded that attempts to identify the pathogen do not significantly affect the results, and the leading principle of choosing antibiotics remains empirical [3]. In other words, many years of attempts and calls for the development of methods of bacteriological rapid diagnosis ended in vain, and the principles of antibacterial therapy remained the same as in the initial period of their use, when penicillin was prescribed for a clinical, not a bacteriological diagnosis.

Not so long ago, AP was interpreted in scientific and educational literature as an acute inflammation in the lungs of a non-specific etiology. In this terminology, the word "non-specific" denoted the absence of a single pathogen specific only to AP. Moreover, more than 100 microorganisms have already been described that can act as a pathogen for AP [4]. However, persistent attention to the microbial factor, assumptions about its exclusive role in the development of the disease and an exaggerated belief in antibiotics as a panacea have led to a distortion of views on the nature of AP. The result of this transformation, from my point of view, and there was the appearance of a pneumococcal vaccine.

In this regard, it is not clear why only streptococcal pneumonia was chosen as a target for prevention? And how to prevent the participation of other microorganisms those are not only included in the list of pathogens of AP, but are also found in purulent complications? For example, *Staphylococcus aureus*, which is still one of the common pathogens of AP.

It should be recalled that at the beginning of the last decade, the analysis of vaccination against pneumonia, based on General material in the United States and Australia, gave unexpected results that did not receive a reasoned explanation [5,6]. Further attempts to prevent possible scenarios by improving vaccines have not led to drastic changes in results, which are still markedly different from the success of vaccination against specific monoetiological infections.

The dynamics of AP etiology observed over the past decades is, in my opinion, a consequence of the widespread use of antibiotic therapy and its impact on the accompanying microflora. The change of leadership among AP pathogens fully corresponds to the realities of the biological world and will continue in parallel with antimicrobial effects [7]. Given the polyetiology of AP and the complexity of its bacteriological diagnosis, it is impossible to predict further permutations in the list of pathogens, but we can almost say with certainty that it will be impossible to avoid this evolution.

Thus, information reflecting the non-specific etiology of AP and the results of long-term prevention of the disease by vaccination of the population indicates that specific pneumococcal vaccines can bring only partial benefit but, even theoretically, such efforts can not radically reduce the incidence. At the same time, the increase in the number of purulent complications [5,6] is not directly related to vaccination, and the causes of this phenomenon should be considered primarily in the defects of treatment. Such disadvantages, in my opinion, are less associated with a decrease in the effectiveness of antibiotics, since a fairly high percentage of the so-called sterile pleural empyema in regularly published materials indicates the opposite.

In connection with the last remark, it is necessary to pay attention to the results of the work started during the so-called "Staphylococcal disaster". This work was performed and tested in clinical conditions in 1976-1985 in the clinic of pediatric surgery of the state Institute of advanced training (Novokuznetsk, USSR). The peculiarity of this material was that the most severe patients with initial forms of AP were concentrated in the surgical Department. The results of observation and treatment of 994 children with AR and its various destructive and pleural complications were analyzed. Summing up the results of this study, it can be noted that the microbial factor in the development of AP is only one of the starting mechanisms of this process, but not the main and not the only reason for it [8]. A critical re-evaluation of the disease doctrine and the use of pathogenetic approaches in treatment allowed us to talk about the possibility of guaranteed prevention of complicated course of AP.

In fairness, it should be noted that, despite the excellent results of treatment of the most aggressive forms of AP, 40 years ago there were enough skeptics and opponents of a different solution to the problem. However, over the past period, there have been enough changes that clearly demonstrate the declarative nature of the infectious concept of AP and expand the audience of specialists who have lost faith in the panacea of antibiotics. Therefore, the urgent need for a critical reassessment of the nature of the disease [9] will allow for a more rational use of care and not expect much success when continuing vaccination against pneumonia.

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