



# Destructive Pneumonia In Children: Complex Issues Of Diagnosis And Choice Of Individual Etiopathogenetic Therapy

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## ABSTRACT

A review of literature data on the issues of diagnosis and selection of individual etiopathogenetic therapy for destructive pneumonia in children was carried out. The most common classifications and regulatory documents describing the procedure for diagnosis and choice of therapy for this pathology are presented. The main pathogens and means of antibacterial therapy necessary for treatment are characterized. A clinical case is described demonstrating diagnostic and therapeutic approaches for destructive pneumonia.

### Keywords:

etiopathogenetic therapy, destructive pneumonia, children

## Introduction

In ancient times, at the dawn of the study of surgery, Hippocrates pointed out that if pneumonia does not resolve within 14–18 days, it ends in the formation of an abscess.

The main trends in surgery in this area over the past decades have focused on the development of video-assisted thoracoscopy techniques. Thoracoscopic operations in the 1970s. were based on the use of rigid endoscopes without the use of fiber illumination and video technology. In subsequent years, video technology for thoracoscopic operations was improved [4]. The technique of thoracoscopy using a trocar with a diameter of 5 mm was described in detail, which allows determining further tactics of surgical treatment of the patient. The point for insertion of the first thoracoport is in the area of the angle of the scapula with the arm abducted upward at the level of the 4th–5th intercostal space along the posterior axillary line. An instrumental thoracoport with a diameter of 3 mm must be inserted under visual control. For young children, sanitation of the pleural cavities is performed from two approaches, which makes it possible to reduce the size of the surgical wound. When sanitation of the pleural cavities,

adhesions are separated and the abscess is drained. In case of gangrenous destruction, necrotic masses are removed using soft endosurgical clamps. At the end of the operation, rinse with antiseptic solutions from 300 to 1000 ml. The operation ends with inflating the lung until it is completely expanded [1]

## Materials And Methods

When treating destructive pneumonia, the question always arises about the need for repeated sanitation of the pleura. In the work of A.S. Kashin et al. (2009) developed indications for repeated interventions with assessment of the condition of the pleura, lung tissue, and intrapleural contents [2]. When assessing the condition of the parietal (costal) pleura, its diffuse thickening of 2 mm or more is taken into account; on instrumental palpation there is a woody density. Visually, the vascular pattern is not visible, the pleura is gray-whitish in color, and when fibrin is removed, diffuse bleeding occurs. The visceral pleura is dense, has dense adhesions with fibrin in the form of moorings. When assessing the condition of the lung tissue, diffuse or local compactations and intrapulmonary abscesses are observed (with

the exception of subpleural abscesses without deep damage to the lung tissue, areas of gangrenous-necrotic tissue). When assessing intrapleural contents, it is possible to identify a dense fibrinous layer with multiple delimited cavities containing purulent effusion and fibrin at different stages of different density; dense fibrinous moorings in the interlobar grooves. The average duration of video-assisted thoracoscopic sanitation of the pleural cavity for pleural empyema in children is  $64.4 \pm 15.3$  minutes. The length of stay in intensive care is 1–2 days, in post-resuscitation departments –  $32.2 \pm 2.46$  days [4]. Thus, today surgeons have proposed organ-preserving methods of endoscopic surgery.

## Results And Discussion

Destructive pneumonia today refers to an interdisciplinary problem, because in addition to surgeons, specialists from other medical professions take part in its treatment: pediatricians, infectious disease specialists, pulmonologists. The outcome of the disease largely depends on the close interaction between surgeons and pediatricians. It is no coincidence that for more than 60 years, pediatricians have also been actively developing this topic [3]. The main efforts of pediatricians were focused on studying the nature of the microflora and the choice of antibacterial therapy, studying microcirculatory hemostasis, the immune system - for immunocorrection, as well as other treatment methods, such as enzyme therapy.

Thanks to the development of antibiotic therapy, many severe forms of community-acquired pneumonia, in the absence of indications for surgical intervention, are no longer treated in surgical departments, but in pediatric departments. However, the mortality rate from destructive pneumonia, according to literature data, ranges from 3 to 15%. According to the Morozov Children's City Clinical Hospital, in recent years the number of destructive forms has increased significantly - from 2.6 to 14%.

For community-acquired pneumonia (CAP) there is the following classification.

In accordance with ICD-10 and the Classification of Clinical Forms of

Bronchopulmonary Diseases in Children, the following forms of pneumonia are distinguished [2]:

- by etiology: bacterial, viral, fungal, parasitic, chlamydial, mycoplasma, mixed (J12–J18);
- by morphological forms: focal, focal-confluent, segmental, polysegmental, lobar (lobar), interstitial;
- according to the course: acute (duration up to 6 weeks), prolonged (duration more than 6 weeks); the chronic course of pneumonia is not included in the classification and is not considered;
- by severity: moderate, severe.
- according to developed complications: pleural (pleurisy), pulmonary (cavity formations, abscess), pulmonary-pleural (pneumothorax, pyopneumothorax), infectious-toxic (bacterial shock).

As can be seen from this classification, there is no destructive pneumonia in ICD-10. However, it is presented in ICD-10 as various complications.

There is a classification of destructive pneumonia used in surgical practice.

### I. Intrapulmonary:

A. Abscesses (draining, non-draining, giant ("sagging")).

#### B. Bulls.

II. Progressive emphysema of the mediastinum, which can be combined with pneumothorax and pyopneumothorax.

### III. Pulmonary-pleural:

#### A. Pleural empyema:

- pyothorax;
- pyopneumothorax:
  - a) relaxed
  - b) tense.

Abscesses arise at the site of drainage or focal drainage infiltrates in 1.5% of cases with destructive pneumonia. Evacuation of exudate occurs through the bronchus (partially). With a wide lumen of the latter, the abscess is almost completely drained. If it is narrow, evacuation is difficult. "Sagging" abscesses are difficult, especially in children in the first months of life.

Antibacterial therapy plays a leading role in the treatment of severe forms of pneumonia. In this regard, "protected" aminopenicillins,

cephalosporins of III–IV generations, carbapenems, macrolides, linezolid, and antifungal drugs are used for children. A combination of antibiotics is recommended, especially if treatment was started on an outpatient basis (for example, third generation cephalosporin + clarithromycin as initial therapy). Of the entire group of macrolides, only two were recommended for the treatment of pneumonia: azithromycin and clarithromycin, and there is an explanation for this circumstance.

## Conclusion

Destructive pneumonia in children is an interdisciplinary problem, the success of treatment of which depends on the coordinated work of a team of surgeons, pediatricians and doctors of other specialties. To diagnose destructive pneumonia, along with well-known traditional laboratory and radiological research methods, ultrasound examination of the pleural cavities, CT lungs, microbiological and serological blood tests, cultures and PCR diagnostics - pneumopanel (pleural fluid, urine, saliva), inclusion of express -methods, latex tests. Individual etiopathogenetic therapy, carried out taking into account the identified main pathogens, prescribed in the early stages of the disease, which will avoid severe complications, will have a huge role in the positive outcome of the disease. After discharge from the hospital, depending on the characteristics of the course of destructive pneumonia, a period of outpatient observation follows, as well as prevention of possible complications.

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