



## Drainage of Developed Lung Abscess in Blood System Diseases Using X-Ray Equipment

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**Abstract:** The article analyzes the effectiveness of treatment methods based on many years of experience in helping patients with lung abscesses and gangrene. During the last 42 years (1977-2018), 2492 patients with abscess (2472 (99.2%)) and pulmonary gangrene (20 (0.8%)) were evaluated. diagnostic methods include X-ray examination, computed tomography, rigid and flexible bronchoscopy, bacteriological examination of bronchial secretions. Surgical treatment methods in 268 patients included pleuropulmonectomy, pneumonectomy, pleurolobectomy, atypical lung resection, thoracoabscessostomy, opening of chest phlegmon. minimally invasive methods of treatment consisted of transthoracic (130 patients) or transbronchial (485 patients) drainage of the abscess cavity. analyzed the frequency of postoperative complications and death, depending on the changes in surgical tactics for the treatment of purulent-destructive lung diseases over the decades and in the last 12 years.

**Keywords:** X-ray, lung, blood, bronchopulmonary structures, pyogenic capsule.

### Introduction.

The problem of treating patients with lung abscesses (AL) is still extremely relevant due to significant morbidity, severity, complications, and very significant mortality. In almost all publications related to purulent-destructive diseases, apparently, with the “light hand” of F. Sauerbruch, abscess and gangrene of the lung are presented in a single contingent of patients, however, even r. Laennec in 1819. For the first time he established the difference between purulent bronchitis, pleurisy, abscesses and gangrene of the lungs and gave the morphological and clinical concept of abscesses and gangrene of the lungs [5].

Obviously, common sense suggests the expediency of distinguishing between these diseases, which are completely different in origin, course and outcomes. suffice it to recall that al is characterized as local suppuration with the formation of a cavity in the lung parenchyma, while gangrene is a putrefactive fusion of all lung structures without a demarcation zone. true gangrene of the lung is almost always fatal. the so-called gangrenous abscesses are another matter, which, although they

sometimes reach significant sizes, are still prone to delimitation, but even this designation, due to the combination of terms, is not entirely correct, it is probably more correct to call them giant abscesses. it makes no sense to describe the etiology and pathogenesis of al, as well as classifications that do not fundamentally differ from one another, exhaustively presented in works devoted to this problem [1, 6]. There is no doubt that one of the leading causes of purulent-destructive diseases is pneumonia [1, 3], and the causes of an unfavorable course of abscesses that negatively affect the effectiveness of therapy are impaired patency of the bronchial tree with the formation of atelectasis, as well as circulatory disorders in the bronchial tubes. and pulmonary vessels with the development of ischemia of bronchopulmonary structures [6, 7] together with concomitant diseases, smoking, alcoholism and immunosuppression. The incidence of AL over the past decades does not tend to decrease, which is confirmed by existing publications.

The leading role in the diagnosis of al belongs to radiography. The work of L.S. Rosenstrauch et al. [9]. thanks to them, the X-ray semiotics of this disease has been developed quite fully, although computed tomography, which has appeared in recent decades, undoubtedly has significantly higher diagnostic characteristics with the ability to clarify the localization and size of al, the thickness of the pyogenic capsule, the nature of the contents and concomitant changes in the parenchyma. . The basis of the pathogenetic treatment of AL is the earliest sanitation of the abscess, the only question is which of the sanitation methods is the most effective and least dangerous [6]. the leading role in this, obviously, belongs to bronchoscopy, which is primarily one of the few diagnostic methods that often allows you to quickly find out the true nature of bronchopulmonary pathology, given that al often have a retrostenotic origin. the theoretical foundations of “bronchoscopy therapy” are exhaustively reflected in the fundamental work of G.I. Lukomsky et al. [7], which allows not to delve into the history of its development and basic principles. one of the methods of bronchoscopic treatment, prolonged transnasal catheterization (tnc) al, was developed in 1986 in our clinic. in the arsenal of surgical treatment, there are drainage operations, such as pneumotomy and thoracoabscessostomy with the formation of a thoracostomy. thoracoabscessostomy turned out to be an alternative to thoracoabscessostomy, a method that does not claim to replace radical intervention, but is very useful where the operation is extremely dangerous due to the low functional reserves of the patient [7].

Target. to analyze the effectiveness of treatment methods based on many years of experience in helping patients with abscesses and gangrene of the lung.

### **Material and methods.**

The study is based on the results of treatment of 2492 patients with abscesses and gangrene of the lung, hospitalized in the thoracic department of the University Clinical Hospital No. 4 of the First Moscow State Medical University (formerly the City Clinical Hospital No. 61 in Moscow) over the past 42 years (1977-2018). ), aged 18 to 85 years, among which men predominated - 2118 (85%). the vast majority of patients (2118 (85%)) were transferred from therapeutic hospitals at various times from the onset of the disease due to treatment failure. acute AL was observed in 2023 (81.1%) patients, chronic - in 449 (18.0%), lung gangrene - in 20 (0.80%). 2342 patients (94%) had a unilateral lesion, 1620 (65%) had a right-sided lesion, and 1744 (70%) had AL localized in the upper lobes. in 996 (40%) patients, al dimensions were more than 5 cm. Gastroesophageal reflux disease, chronic obstructive pulmonary disease, coronary heart disease, pancreatic necrosis, diabetes mellitus, and alcoholism were noted as concomitant diseases. in 1370 (55%) patients, the course of the disease was characterized by moderate severity, in 747 (30%) - severe, in 137 (5.5%) - extremely severe. 236 patients (9.5%) were admitted in a satisfactory condition. an extremely serious condition was observed mainly in patients with lung gangrene and with bilateral lesions. the most common complications, pyopneumothorax or limited pleural empyema, were in 361 (14.5%) and 249 (10%) patients, respectively. hemoptysis, including recurrent, was observed in 450 patients (16%), pulmonary hemorrhage - in 64 (2.6%).

X-ray and fluoroscopic examination of the chest was performed repeatedly in all patients. in total, more than 6,000 studies have been conducted. Computed tomography of the chest was performed in

230 patients. This method made it possible to clarify the size and localization of al, the thickness of the pyogenic capsule, the nature of the contents and concomitant changes in the lungs.

Therapeutic bronchoscopy. During the entire observation period, all patients repeatedly underwent diagnostic and therapeutic bronchoscopy with either a rigid or flexible device, the technique of which is described in detail in a well-known manual. the only obstacle was the extreme degree of severity or the patient's refusal to perform manipulations. Therapeutic fibrobronchoscopy (FBS) included various methods of AL drainage, the choice of which depended on the anatomical features of the bronchi in the zone of its localization. non-invasive method - jet fractional injection of a 0.05% dioxidine solution into the draining bronchus followed by aspiration and sanitation of the bronchial tree was performed in all patients. prolonged TNC of the purulent cavity in one form or another was performed in 485 patients (19.4%) with acute and chronic al dimensions of 5 cm or more. The procedure was performed under local anesthesia (10% lidocaine solution) using Olympus fiber bronchoscopes with polypositional X-ray control. tnk al was carried out in four modifications: insertion of a catheter with a string into the abscess cavity and its subsequent extraction; the introduction of a catheter along a string previously inserted into the cavity of the abscess; puncture transnasal drainage with perforation of the abscess wall from the lumen of the bronchus with biopsy forceps, followed by endoscopic sanitation through the formed fistula. Omnipaque was used to contrast abscess cavities during treatment. the duration of TNC varied from 3 to 9 days and depended on the dynamics of the clinical and radiological picture: the amount and nature of sputum, the size of the cavity, the presence of fluid and the severity of perifocal infiltration. the catheter was removed after the cessation of discharge or a significant decrease in the amount of purulent or mucopurulent sputum, normalization of body temperature, almost at "dry" cavity against the background of a decrease in the size and intensity of infiltration of the lung tissue.

Endoscopic treatment of bronchopleural fistulas was performed in 28 patients. it included submucosal administration of sterile vaseline oil to bring the edges of the fistula closer together, its treatment with argon plasma coagulation or the application of 10% silver nitrate solution to destroy the epithelial lining and stimulate the growth of granulations. Bacteriological examination of sputum and sputum content in significant groups of patients was performed in the second and third decades (122 and 149 patients, respectively). The material was taken using a cased telescopic brush-scarifier during bronchoscopy. Surgical treatment was performed in 268 patients (11%). 68 (24.9%) patients were operated on for acute AL; 192 (7.7%). Absolute indications for surgery were profuse pulmonary bleeding or intense recurrent hemoptysis. The range of operations included pleuropneumonectomy, pneumonectomy, pleurolobectomy, lobe-bilobectomy, atypical lung resection, thoracoabscessostomy. The development of postoperative complications, opening of phlegmon of the chest and cervical-mediastinal reocclusion of the stump of the main bronchus were performed. postoperative complications developed in 73 patients (27.2%), of which 34 died (12.7%). Surgical treatment was performed against the background of general drug therapy, which included the correction of protein-volemic disorders.

## Results and discussion.

The results of therapeutic bronchoscopy. studies of the effectiveness of certain methods of bronchoscopic treatment were carried out in the clinic in the 80s of the last century [6] on significant groups of patients with al. at the same time, the following outcomes were determined: complete recovery - the disappearance of the clinical manifestations of the disease and endoscopic signs of bronchitis, radiological changes at the site of the former abscess either completely disappeared or remained in the form of focal fibrosis; clinical recovery - with the complete disappearance of the symptoms of the disease, a thin-walled "dry" cavity without perifocal infiltration was determined radiographically in the lung; transformation into a chronic abscess with the preservation of relevant clinical, radiological and endoscopic signs; progressive course of the disease with deterioration in all parameters. The results of prolonged TNC and puncture transnasal drainage with perforation of the wall with biopsy forceps and subsequent endoscopic sanitation through the formed fistula were successful in 437 patients (90.2%). in chronic al, clinical remission with the formation of a "dry" cavity was achieved in 129 (50%) patients. complications associated with prolonged TNC were

observed in 9 (0.3%) patients (2 had bleeding, 3 had hemoptysis, 1 had pneumothorax, 1 had progression of the process, 1 had laryngospasm, and 1 had pleural empyema), and in 4 of them complications occurred at the stage of transbronchial lung biopsy and were not fatal. most patients with signs of process progression were operated on at different times.

The results of bacteriological research. when studying the nature of the microflora, the predominance of microbial associations of 2 or more microbes was established (192 patients (70.8%)). Staphylococcus was found most often in associations in combination with gram-negative bacteria - Escherichia and Pseudomonas aeruginosa. in 79 patients (29.2%), bacterial growth was not detected, which was apparently due to the presence of anaerobic flora.

Analyzing the results of surgical treatment of patients with al and gangrene over a 42-year period, first of all, it should be noted a decrease in overall mortality from 15.9% over the period from 1977 to 1986 to 6.8% over the period from 2007 to 2018. mortality reduction was achieved primarily through the introduction of minimally invasive methods of drainage of the purulent cavity, the main of which is TNC [10].

Two modifications of tnc are known. Initially, the technique was less specific and included rigid bronchoscopy followed by insertion of a plastic catheter into the intended draining bronchus using biopsy forceps [1,7]. in recent years, thanks to modern flexible bronchoscopes, a draining catheter can be passed directly into the purulent cavity. the technique involves the use of a metal conductor and is performed under X-ray control [11, 12]. with a very dense and thick abscess wall, local laser or argon plasma coagulation is performed before insertion of the catheter, which facilitates the subsequent insertion of the catheter into the purulent cavity. Currently, selective TNC is the method of choice in the treatment of al. however, due to the displacement of small bronchi by the cavity, this technique can technically be implemented only in 80% of patients [2, 12]. in such cases, insertion of a catheter into the draining bronchus as close as possible to the al, in combination with modern complex drug therapy, also gives a positive effect, but only requires longer treatment. The widespread use of TNC in recent years has allowed us to completely abandon the surgical treatment of al.

### Conclusion.

Thus, based on the experience of the clinic, we believe that, first of all, it is necessary to improve the known methods "bronchoscopy therapy", which is the main component of the complex treatment of patients with lung abscesses. analysis of the results of the study gives a very clear idea of the dynamics of radical interventions, the number of complications. Thanks to the more active use of endoscopic methods of treatment (extended transnasal catheterization in any variant), over the past 22 years, it has been possible to minimize the number of traumatic, sometimes fatal operations, including in patients with abscesses complicated by bleeding.

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