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**ТИББИЁТДА ЯНГИ КУН
НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE**

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TACTICS AND SURGICAL TREATMENT OF PLEURAL EMPYEMA

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✓ *Resume*

The article discusses the surgical problems of modern treatment of pleural empyema. The results of treatment of 250 patients with this pathology are presented. The great clinical effectiveness of minimally invasive interventions in comparison with traditional methods of treatment is emphasized, which consists in reducing the trauma of surgery and reducing the duration of treatment

Key words: empyema of the pleura, pyopneumothorax, videothoracoscopy, thoracotomy

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✓ *Rezyume*

Maqolada plevra empiyemasini zamonaviy davolashning jarrohlik muammolari ko'rib chiqiladi. Ushbu patologiyaga ega bo'lgan 250 bemorni davolash natijalari keltirilgan. Minimal invaziv aralashuvlarning an'anaviy davolash usullariga nisbatan katta klinik samaradorligi takidlangan, bu jarrohlik jarohatlarini kamaytirish va davolash vaqtini qisqartirishdan iborat

Kalit so'zlar: plevra empiyemasi, piopnevmotoraks, videotorakoskopiya, torakotomiya

ТАКТИКА И ХИРУРГИЧЕСКОЕ ЛЕЧЕНИЕ ЭМПИЕМЫ ПЛЕВРЫ

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✓ *Резюме*

В статье рассматриваются хирургические проблемы современного лечения эмпиемы плевры. Приводятся результаты лечения 250 пациентов с данной патологией. Подчеркивается большая клиническая эффективность малоинвазивных вмешательств по сравнению с традиционными методами лечения, заключающаяся в уменьшении травматизма операции и сокращения сроков лечения

Ключевые слова: эмпиема плевры, пиопневмоторакс, видеоторакоскопия, торакотомия

Relevance

A significant problem in thoracic surgery is the improvement of methods for treating pleural empyema and pneumothorax [4].

The practical relevance of the study is due to the prevalence of this pathology, the possibility of recurrence and the development of complications, often threatening the lives of patients [8]. RW Light (1995) identifies three phases of the course of the suppurative process in the pleural cavity:

1) secretion - 1-2 weeks, characterized by increased permeability of the visceral pleura and sterile effusion in the pleural cavity;

2) fibrinous purulent - up to 6 weeks, developing into infection of effusion with fibrin deposits on both pleural layers and with formation of adhesions and formation of separate chambers with purulent contents;

3) fibrous - after 6 weeks, characterized by an increase in the number of fibroblasts and formation of "armored lung", transformation of pleural effusion into a "jelly-like mass" [6]. Most often, the inflammatory process in the pleural cavity occurs as a result of pneumonia, lung abscess or bronchiectasis. Rarer cases of empyema are post-traumatic, as well as those arising as complications of subdiaphragmatic abscesses. Many authors indicate that the causes of these diseases are factors that worsen immunity - diabetes mellitus, malignant tumors, use of immunosuppressants, chemotherapy or radiation, as well as an asocial lifestyle, excessive alcohol consumption and drug addiction. In this regard, 5-20% of hydrothoraces in such patients turn into empyema [9]. Treatment of patients with empyema and pyopneumothorax is long and expensive [2].

The main principles of treating pleural empyema and pneumothorax are adequate drainage of the abscess in the pleural cavity, straightening the lung and preventing relapse of the disease by destroying the pathogen [4]. Traditionally, surgeons use pleural puncture, transthoracic drainage and thoracotomy with simultaneous general and local administration of antibacterial agents [4]. Currently, the issue of intrapleural administration of fibrinolytics remains controversial [9]. The possibilities of diagnosing and treating pleural empyema and pneumothorax have increased significantly due to the use of minimally invasive interventions, i.e. videothoracoscopy [1, 7].

In this regard, we set the following task: to clarify the main stages of treatment of patients with pleural empyema using modern minimally invasive treatment methods, to assess the functional capabilities of the body in patients with pleural empyema to develop optimal treatment tactics; to study the results of treatment of pleural empyema based on the analysis of the outcomes of both traditional surgical and minimally invasive interventions [3, 5].

Materials and methods

Over a period of ten years, the Department of Faculty and Hospital Surgery " Bukharsky regional multidisciplinary medical center » 250 were treated patients with pleural empyema. Of these, 20 (8%) were women and 230 (92%) were men. The average age was 56.4 years.

Before hospitalization in specialized department patients received therapeutic treatment for an average of 24.2 days. Diagnosis was established on the basis of anamnesis, physical assessment of the respiratory system, standard methods for studying the function of external respiration, as well as a system of tests that made it possible to determine the increased likelihood of deterioration in external respiratory function after active surgical tactics treatment of this group of patients, laboratory data, bronchological, ultrasound and X-ray studies (multi-positional radiographs and computed tomography of the lungs), examination (including microbiological) of the pleural cavity puncture.

The pathological process was localized on the right in 120 (48%) patients, moreover, it was total in 35 (29.2%) and limited in 85 (70.8%) patients. On the left, there is pleural empyema and pyopneumothorax diagnosed in 98 (39%) patients, total – in 40 (40.8%), limited – in 58 (59.2%). In 32 (13%) patients, the suppurative process in the pleural cavities was bilateral. The choice of treatment method depended on the stage of the disease, the general condition of the patient, concomitant pathology, and the localization of the pathological process. in the pleural cavity: unilateral or bilateral, single- or multi-chamber.

The indication for drainage of the pleural cavity was single-chamber abscess found during pleural puncture cavity (stages one and two according to Light). Drainage in the pleural cavity was maintained until straightening lung and was removed when secretion from the pleural cavity was less than 80-100 ml of serous -fibrinous discharge per day. Indications for videothoracoscopic surgery were a multi-chamber abscess, purulent-necrotic changes in the pleural cavity, and the patient's severe condition. (stage two, according to Light). Videothoracoscopic The intervention in this case consisted of pneumolysis and sanitation of the pleural cavity.

Indication for video assisted thoracoscopic operations, or thoracotomy, were phlegmon of the chest wall, the presence of persistent ronchopleural fistula, fibrous stage of empyema (stage three, according to Light). In the second and third stages, according to Light, video-assisted thoracoscopic operations were performed using the author's method (patent for invention No. a 20091147 dated 28.07.09.) [3].

The method was implemented as follows. A mini-thoracotomy was performed along the intercostal space closest to the pathologically altered lung or pleura. Local pneumolysis with creation space for inserting the thoracoscope into the pleural cavity.

Then the thoracoscope was inserted into the pleural cavity through a separate puncture of the soft tissue's chest in the intercostal space, located on 1-2 ribs below the mini-thoracotomy, and through the mini- thoracotomy access - the necessary manipulation instruments. This access made it possible to visualize pathological changes well and easily manipulate endo instruments in the area of pathologically altered lungs and pleura. the need to eliminate the empyema cavity in under conditions of rigid lung, partial thoracoplasty – resection of 1 or 2 ribs above the empyema cavity. The intervention ended with a hermetic suturing of surgical wounds with the placement of drains for active washing and aspiration from the surgical intervention area. After the intervention, the hemithorax was drained with two drains in the areas where thoracoports were formed. In the postoperative period, the drains operated in active aspiration mode with a vacuum of up to 20 cm H₂O.

The presence of persistent bronchopleural fistula in patients was an indication for endoscopic bronchoblockades using a Russian-made endobronchial valve (patents for inventions No. 2244517 dated 20.01.2005 and No. 58898 from 10.12.2006 and registration certificate of the Federal Service № 01032006/5025 – 06 from 21.12.2006). The valve is a hollow rubber cylinder ending with a collapsible petal valve, installed endobronchially. The valve allowed the passage of from the lesion to air, sputum, bronchial contents during exhalation and coughing. At the same time, there was no reverse flow, which allowed gradually achieve a state of healing hypoventilation and atelectasis of the affected area of the lung [2]. To assess the functional capabilities of the body in patients with pleural empyema, a system of tests was used that made it possible to determine the increased likelihood of deterioration of the condition after active surgical tactics of treating patients of this group. These are the stair test (<2 flights of stairs), the degree of dyspnea (grade 2-3), FVC (<50% of predicted values), FEV1 (<50% of predicted values), FEV1/FVC (<60% of predicted values), where FVC is the vital capacity of the lungs; FEV1 – the volume of exhaled air per second (Table 1).

Results and discussions

Puncture, drainage, thoracotomy and videothoracoscopy were used to treat patients with pleural empyema and pyopneumothorax. 250 (100%) patients were subjected to them. No growth of pathogenic microorganisms from pus cultures was detected in 57 (22.8%) patients. Pseudomonas aeruginosa was detected in 72 (28.8%), streptococcus in 45 (18%), staphylococcus in 33 (13.2%), and anaerobic flora in 43 (17.2%). Transthoracic puncture was performed in 22 (8.8%) patients, and transthoracic drainage was performed in 84.

Table 1. – System of tests for assessing the functional capabilities of the body

Research	Increased probability manifestations complications	Traumatic operation contraindicated
Staircasetest	<2 stairs spans	<1 staircase flyby
Degree	2-3 degree	3-4 degree
shortness of breath	<50% degrees fromdue quantities	<30%
FVC	<50% degrees fromdue quantities	<30%
FEV1	<60% degrees fromdue quantities	<50% degrees fromdue quantities
FEV1/FVC		
FVC - vital capacity lungs; FEV1 - volume exhaled air V a second		

(33.6%) cases, thoracotomy was performed in 56 (22.4%) cases, videothoracoscopy - in 88 (35.2%) patients. Complete recovery after puncture and drainage of the pleural cavity and drug therapy was noted in 64 patients, which amounted to 61%. The remaining 42 (39%) underwent videothoracoscopic intervention or thoracotomy due to the lack of effect from drainage. Thoracotomy for the treatment of pleural empyema was used in 56 (22.4%) patients with fragmentation and formation of multi-chamber cavities, intrapleural bleeding and in cases requiring massive resection of pathologically altered lung tissue, as well as in 22 patients after unsuccessful transthoracic drainage.

In 6 patients, after transthoracic drainage of pleural empyema, a bronchopleural cutaneous fistula was formed. In 4 cases, thoracotomy, decortication of the lung with closure of the fistula by the mobilized intercostal muscle on the feeding pedicle were performed, and in 2 cases, the mobilized broad muscle of the back was used to close the fistula and eliminate the empyemic cavity. In this group of patients, it was possible to eliminate the empyemic cavity and achieve recovery. In ideothoroscopic pneumolysis and sanitation of the pleural cavity due to a multi-chamber abscess were performed in 88 (35.2%) patients.

Due to persistent bronchopleural fistula, 11 patients underwent endoscopic bronchoocclusion and transthoracic drainage. After stabilization of the condition, radical operations were performed to eliminate bronchopleural fistulas: video-assisted thoracoscopic empyemaectomy, pleurostomy and partial thoracoplasty due to rigid lung. Pneumolysis and partial decortication followed by thoracoplasty of the residual cavity using the author's technique were performed in 77 patients after video-assisted thoracoscopy. The average time between drainage and subsequent surgery was 12.7 days.

The average hospital stay after video-assisted thoracoscopic interventions was 27.2 days, and after thoracotomy - 34.3 days. Five (2%) patients died due to progressive multiple organ failure.

Their functional indices at the beginning of treatment were significantly lower than those stated above: stair test (<1 flight of stairs), dyspnea degree (grade 3-4), FVC (<30% of predicted values), FEV1 (<30% of predicted values), FEV1/FVC (<50% of predicted values). Drug treatment of patients with pleural empyema along with symptomatic therapy drugs included complex antibacterial treatment. In our opinion, the most effective combination of antibacterial drugs was a combination of metronidazole with gentamicin, 2-3 generation cephalosporins; respiratory fluoroquinolones with protected penicillins. β -lactam drugs were used as a reserve antibiotic.

Conclusion

1. The use of an adequate treatment and diagnostic algorithm with the use of minimally invasive surgical interventions reduces the number of postoperative functional disorders of external respiration, allows to reduce the treatment time of patients with pleural empyema.
2. The use of the proposed method for assessing the functional capabilities of the body at the preoperative stage and minimally invasive video-assisted thoracoscopic surgery in patients suffering from pleural empyema allows to use adequate surgical Intervention for each individual patient.
3. Video-assisted thoracoscopic sanitation of the empyema cavity, pleumolysis and decortication of the lung, compared with traditional open surgeries, reduces trauma, reduces the time of the intervention, and shortens the patient's stay in a hospital bed.

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