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REMOTE RESULTS OF VIDEO-ASSISTED THORACOSCOPIC AND THORACOTOMY OPERATIONS FOR PULMONARY ECHINOCOCCECTOMY.

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Resume: Without detracting from the advantages of traditional echinococcectomies, we believe that the approach to choosing a surgical method should be strictly differentiated. Echinococcal cysts with a diameter of more than 50 mm, as well as recurrent cysts complicated by suppuration, as we gain experience, we allowed ourselves to interpret as “relative” contraindications to videothoracoscopic echinococcectomy of the lung; in the treatment of pulmonary echinococcosis, endovideosurgical echinococcectomy is and should be a priority.
Key words: Echinococcal cysts, modern approaches to surgical treatment, lung echinococcectomy in children

Despite the achievements in the diagnosis and treatment of pulmonary echinococcosis, many issues remain unresolved and require new approaches. In recent years, a new technology has been introduced for the treatment of echinococcosis, particularly of pulmonary localization, namely video-endoscopic echinococcectomy, especially in complicated forms of the disease.

The polymorphism of clinical manifestations of pulmonary echinococcosis (PE) creates significant difficulties in the timely identification of this category of patients. This leads to a considerable number of diagnostic errors and complications, the incidence of which ranges from 26% to 52% [1,2].

However, in many cases the trauma associated with the surgical approach exceeds that of the cyst removal itself. A pulmonary echinococcal cyst measuring 3–4 cm often forces the surgeon to perform a thoracic incision 15–20 cm in length. Wound retraction using rib spreaders frequently results in rib fractures. In the postoperative period, a pronounced pain syndrome leads to impaired pulmonary ventilation, lung atelectasis, and postoperative pneumonia. Suppuration of the surgical wound, chondritis, and rib osteomyelitis, although relatively uncommon, may nevertheless result in prolonged loss of working capacity and even disability [3].

Therefore, video-assisted thoracoscopic removal of pulmonary echinococcal cysts has a clear advantage over traditional thoracotomy in terms of surgical trauma. To assess the advantages of videothoracoscopic procedures over conventional thoracotomy, we compared operative time and the postoperative course, including the volume of drainage exudate, duration of pleural cavity drainage, the amount of analgesics administered postoperatively, and the length of hospital stay.

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Materials and Methods. From 2005 to 2023, 72 children aged 2 to 16 years with pulmonary echinococcosis were operated on at the Republican Scientific and Practical Center for Minimally Invasive and Endovisual Surgery in Children. Most patients were older than 10 years (48.6%). There were 49 boys (68.1%) and 23 girls (31.9%).

According to the above parameters, we compared intraoperative and postoperative outcomes in patients who underwent echinococcectomy for pulmonary echinococcosis. Of these, 41 procedures were performed using a videothoracoscopic approach (Group I), and 31 via thoracotomy (Group II).

The duration of thoracotomy echinococcectomy ranged from 70 to 180 minutes (mean 101.11 ± 6.90 min), whereas videothoracoscopic procedures lasted from 60 to 120 minutes (mean 80.46 ± 3.63 min).

The severity of postoperative pain was assessed based on the number of narcotic analgesics administered for pain relief and on patient complaints.

In the postoperative period, all patients who underwent thoracotomy assessed the pain syndrome as “severe” during the first two days. On the third postoperative day, 26 patients reported severe pain, while 5 patients reported less intense pain. On the fourth postoperative day, 25 patients (50%) assessed the pain as “less intense,” and 5 patients reported no pain.

After video-assisted thoracoscopic (VATS) procedures, all patients assessed the pain syndrome as less intense on the first postoperative day. On the second day, only 14 patients experienced pain, while 17 patients reported no pain. By the third postoperative day, none of the patients experienced pain.

Thus, based on patient interviews, we established that patients who underwent videothoracoscopic surgery experienced a less pronounced pain syndrome throughout the entire early postoperative period compared with patients who underwent thoracotomy.

Severe pain was relieved by the administration of narcotic analgesics (promedol 2% – 1.0 ml or its analogues) 2–3 times per day. Less intense postoperative pain was managed with 1–2 administrations of narcotic analgesics. In the remaining patients, prophylactic analgesia was provided using non-narcotic analgesics.

Any surgery on the organs of the thoracic cavity is accompanied in the postoperative period by increased exudation of fluid by the pleural layers. Moreover, the more traumatic the intervention, the more intensive the accumulation of fluid in the pleural cavity. Both pleural exudation and the duration of drainage were significantly greater after echinococcectomies performed via thoracotomy compared with VATS. Thus, after VATS echinococcectomy, exudation amounted to 65.63 ± 9.88 ml on the first day, 45.00 ± 10.54 ml on the second day, and 35.38 ± 3.03 ml on the third day. In contrast, after thoracotomy, exudation was 85.40 ± 10.15 ml on the first day, 75.50 ± 8.21 ml on the second day, 45.75 ± 7.80 ml on the third day, and 25.65 ± 8.2 ml on the fourth day. On average, the duration of pleural cavity drainage after VATS echinococcectomy was significantly shorter (3.16 ± 0.15 days) compared with thoracotomy (4.30 ± 0.31 days).

Thus, during the first 1–3 postoperative days, pleural drainage output after thoracotomy was approximately twice as high.

Starting from the second day after thoracoscopic surgery, exudation became minimal, which allowed removal of the drainage tube on the second postoperative day. After thoracotomy, drainage tubes were removed on postoperative days 3–4 and, in some cases, on days 6–7 (in 4 patients).

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After surgery, patients in Group I were discharged from the hospital on postoperative days 4–10 (mean 7.43 ± 0.83), whereas patients in Group II were discharged on days 7–20 (mean 11.58 ± 0.69).

Summarizing the above, it should be noted that the severity of postoperative pain, the amount of narcotic analgesics administered, pleural exudation, duration of pleural drainage, and length of hospital stay after thoracoscopic surgery for pulmonary echinococcosis are lower than after comparable interventions performed via thoracotomy.

Among the operated patients treated using thoracoscopic methods, complete recovery was achieved in 41 cases, and the use of traditional surgical interventions was not required.

In the main group, echinococcectomy according to A.A. Vishnevsky predominated and was performed in 25 patients; the Delbet technique was used in 12 patients; the A.T. Pulatov method in 5 patients; a combination of several techniques in 4 patients; atypical lung resection in 3 patients; and decortication with pleurectomy and elimination of the residual cavity in 1 patient with chronic pleural empyema, in whom fibrotic changes of the lung parenchyma predominated.

In the control group, echinococcectomy according to the Delbet method predominated (21 cases). However, indications for this procedure were broader, and it was performed more frequently than in the main group. The number of operations performed using the A.A. Vishnevsky method was 3 and was higher than in the main group. In patients with infected echinococcal cysts, this method was used more frequently.

The lack of a differentiated approach to the choice of surgical technique and targeted preoperative preparation in patients of this group was clearly evident from the analysis of medical records. In particular, Delbet capitonnage was frequently performed for large echinococcal cysts, in cases where the techniques of A.A. Vishnevsky and A.T. Pulatov could have been used, which allow avoidance of gross deformation of the lung. The inability to achieve adequate sanitation of echinococcal cysts using conventional preoperative preparation measures led to an increased number of organ-removing operations. Among combined surgical techniques, 6 patients underwent a combination of the Delbet and A.A. Vishnevsky methods, while in 7 patients one of these techniques was combined with atypical lung resection.

Thus, the analysis of surgical interventions performed in the main and control groups confirms that the use of a differentiated approach to the selection of the surgical method, together with targeted preoperative preparation and postoperative management of patients with pulmonary echinococcosis using endoscopic techniques, makes it possible to significantly increase the number of organ-preserving operations, reduce postoperative complications, and shorten the length of hospital stay.

Long-term outcomes up to 5 years were studied in 59 (53.6%) of the 72 observed patients. Long-term results in the control group were not evaluated. Under clinical conditions, patients underwent physical examination, fluoroscopy and radiography of the chest organs, as well as assessment of pulmonary function. In all cases, the comprehensive examination was supplemented with ultrasound scanning of the lungs and liver.

Of the 59 operated patients with pulmonary echinococcosis, 38 were examined at follow-up periods ranging from 3 months to 3 years, and 21 from 3 to 5 years. Sixteen patients reported no complaints. Reported symptoms included chest pain and dry cough, especially after hypothermia (3 cases), dyspnea on mild physical exertion (3 cases), and in one patient hemoptysis persisting for one year after surgery.

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Physical examination revealed no abnormalities in 39 patients. Mild attenuation of vesicular breathing was noted in 9 patients, predominantly in those who had complications either before or after surgery.

Chest radiography revealed fibrosis of the lung tissue in the area of the former cyst cavity in 5 cases, deforming bronchitis in 4 cases, deformation of the diaphragmatic dome in 4 cases, and pronounced pleural adhesions in 2 cases.

Thus, the study of long-term outcomes of endosurgical treatment of pulmonary echinococcosis demonstrated that good results were achieved in 78.8% of patients regardless of the nature of the lesion and the surgical technique used, satisfactory results in 15.6%, and unsatisfactory results in 5.6%. The best outcomes were observed after videothoracoscopic echinococcectomy and with the use of video-assisted echinococcectomy techniques. Unsatisfactory outcomes were mainly due to complications associated with extensive lung tissue involvement, leading to irreversible changes in the respiratory system with subsequent involvement of the cardiovascular system. A number of complications were related to the severity of the surgical intervention and non-compliance with postoperative management measures. Severe complications such as pleural empyema and bronchial fistulas were characteristic of more advanced forms of pulmonary echinococcosis, including rupture of a suppurated cyst into the pleural cavity or drainage of a cyst into the bronchus with delayed presentation, as well as pulmonary hemorrhage resulting from cyst suppuration, when, due to the severity of the patient's condition and the urgency of the situation, adequate preoperative preparation could not be performed.

Thus, video-assisted thoracoscopic surgery in pulmonary echinococcosis complicated by rupture into the pleural cavity with the development of pleuritis or pleural empyema is a highly informative method. It not only уточняет диагноз but also allows an objective assessment of the severity and nature of inflammatory changes with morphological verification of the pleura and lung tissue. In addition, videothoracoscopy enables therapeutic interventions aimed at eliminating the pathological process.

One of the most important conditions for favorable outcomes of surgical treatment in pulmonary echinococcosis is targeted and differentiated preoperative preparation, as emphasized by many authors [4,5].

Along with drug therapy aimed at correcting the function of vital organs, restoring homeostasis, suppressing or eliminating symptoms of allergy and intoxication, preventing and treating infectious complications, and improving bronchial drainage function, the duration of preoperative preparation was determined by the nature and severity of complications, as well as by the effectiveness of the measures taken in each individual case. In cases of tense echinococcal cysts and rupture of a non-infected cyst into the bronchus or pleural cavity, preoperative preparation lasted from 3 to 10 days. In the chronic course of complications, such as rupture into the bronchus or pleural cavity with the development of pleural empyema, preoperative preparation was longer and ranged from 2 to 6 weeks.

Comparative analysis of the obtained data allows us to conclude that the severity of postoperative pain, the amount of narcotic analgesics administered, pleural exudation, duration of pleural drainage, and length of hospital stay after thoracoscopic and bronchoscopic interventions for pulmonary echinococcosis are lower than after comparable procedures performed via thoracotomy.

Conclusion.

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1. Video-assisted thoracoscopic treatment of pulmonary echinococcosis can be performed in patients with pronounced symptoms of intoxication and severe comorbidities, low functional reserves, and a high risk of fatal complications, in contrast to traditional surgical interventions.
2. Indications for therapeutic videothoracoscopy include rupture of an echinococcal cyst into the pleural cavity; suppurated cysts ruptured into the bronchus, poorly draining and peripherally located cysts; as well as suppuration of echinococcal cysts without perforation.

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