Hydatidosis is a worldwide public health problem characterized by significant postoperative morbidity and mortality in endemic areas, including children [1, 2]. The negative intrathoracic pressure combined with the high elasticity of the lung parenchyma in children and adolescents, against the background of a not fully developed immune system, causes the rapid asymptomatic growth of hydatid metacestode to impressive sizes [3, 4]. Although there is no standard size to define a traditional "giant" hydatid cyst, parasitic cystic formations with a diameter greater than 10 cm are considered giant hydatid cysts, which represent a special clinical entity in children, determined by some technical difficulties of surgical treatment, which often requires lung resection and is significantly prolonged the hospital stay and increase costs [5, 6]. At the same time, giant lung cysts are likely to be complicated by rupture, endangering the life of the child [7]. In this context, we report a clinical case of a patient with a giant pulmonary hydatid cyst that was diagnosed after rupture and successfully operated.

**Patient C.**, 15 years old, was urgently hospitalized in our institution by air ambulance, the patient suffered an insignificant trauma during physical education. At the time of admission, the patient’s condition was serious, with fatigue, severe pain in the right hemithorax, severe cough with poor expectoration, dyspnea and mild hemoptysis. About 4 hours ago, after a short period of time from the trauma of being hit with the ball, she vomited profusely with a large amount of colorless liquid. Heredocollateral antecedents were insignificant.

General examination revealed a normosthenic constitution, significantly reduced excursion of the right hemithorax, auscultatory breathing only in the apical regions on the right side, contralateral ragged breathing. Pulse – 95-100 beats/min, blood pressure – 90/60. Routine laboratory tests showed leukocytosis (18.2x10⁹l), increased ESR.

The chest x-ray showed a large cystic formation located in the middle and lower lung with a well-defined internal contour, with a horizontal hydro-aerial plane, the external contour being obliterated; massive perifocal pneumonia and areas of pneumoniosis (Fig. 1). Computed tomography allowed to establish with certainty the diagnosis of pulmonary hydatid cyst complicated by endobronchial rupture with subtotal involvement of the right lower lobe (Fig. 2).

In the projection of the lower lobe of the right lung, a solitary massive hydroaerial cystic formation, well outlined, with dimensions of 10.3x8.0x9.0 cm is visualized. The floating membrane sign ("Camelot sign") is clearly highlighted. On the posterior wall of the cavity, the presence of some linear structures with a tortuous path determined by the collapse of the hydatid larvocyst can be observed. There is hyperattenuation of the adjacent lung parenchyma determined by consolidation with involvement of the lower and middle lobe on the right. Pleural effusion is present on the right (18-20 UH) with a maximum thickness of 4.0 cm.

After preoperative preparation, a right lateral posterior thoracotomy was performed. During the revision, a cystic formation of large dimensions was found, occupying almost the entire lower lobe, with significant compression of the adjacent lung segments and the middle lobe. After opening the formation, the ruptured hydatid larvocyst was found, which had a thin wall and was floating in a small residual amount of hydatid fluid (Fig. 3).
Fig. 1. Patient C., 15 years old. Preoperative chest X-ray (explanation in text)

Fig. 2. Patient C., 15 years old. Preoperative CT.

Fig. 3. Intraoperative appearance of pulmonary hydatid larvocyst complicated by endobronchial rupture after opening the fibrous capsule (A) and after removal of the parasitic agent (B)
After extraction of the parasitic formation and aspiration of the fluid content, a bronchial communication of about 3-4 mm in diameter was observed. The residual cavity was treated with silver nitrate as a scolicidal agent, after which the bronchial fistula was liquidated. After placement of an intracavitary drain, the residual cavity was filled post-technically by suturing through meridional puncture in the superimposed bursae plan-on-plan with absorbable wires and a final “round-trip” suture, completing the operation with drainage of the pleural cavity and restoration of the anatomical plan. The intrapleural drain was removed on postoperative day 5, and the patient was discharged in satisfactory general condition on postoperative day 14.

In the postoperative period, the partial insufficiency of the padding sutures was associated (Fig. 4A, B), the intracavitary drain being removed 3.2 months postoperatively. However, the development of serious complications, which would have required some surgical interventions, was not noticed, the remaining cavity gradually disappearing completely (Fig. 4C, D, E, F).

Fig. 4. Patient C., 15 years old. Chest X-ray in 2 incidences (right profile) taken 1.2 months (A, B), 3.4 months (C, D), and 12 months (E, F) from the time of surgery. The presence of a small cavity with drained hydro-aerial content, located in the lower lobe of the right lung, is determined, which gradually decreases in size until it disappears completely.
The morphopathological examination revealed complicated necrolytic and proliferative changes with supplicative erosive-ulcerative lesions in the fibrous capsule, associated with pseudofollicular and perivascular inflammatory reaction, cystic reorganization of the bronchiolo-alveolar component with proliferative-polypous alveolitis of the pericystic lung tissue (Fig. 5).

Discussions. Giant pulmonary hydatid cyst in children represents a special clinical entity, characterized by delayed onset of clinical symptoms due to high elasticity and compliance of the lung [1], which determines the expansion of the parasitic formation, the rupture of the parasitic larvocyst contributes to the development of serious consequences [5, 8]. The incidence of pulmonary hydatid cyst complicated by rupture is 34.2-39.5% [9].

Modern imaging techniques are quite effective in the diagnosis of pulmonary hydatid cyst. At the same time, in giant forms and those complicated by rupture, the radiological diagnosis of empyema or hydrothorax is often incorrect, but it is precisely in these forms of the disease that the need for prompt surgical treatment as soon as possible after stabilization of the patient is imposed, with the aim of removing the hydatid larvocyst with maximum preservation of lung tissue [6, 10].

Among the options for surgical treatment of large pulmonary hydatid cysts, the Barett/Posadas technique, which consists of cystotomy with closure of bronchopleural fistulas with or without padding, has been widely used [11]. Cystotomy with padding involves aspiration of fluid from the cyst together with removal of the parasitic larvocyst, padding of the residual cavity contributes to the reduction of the risk of infection of the residual cavity and formation of empyema, liquidation of air leaks from the airways with the risk of deformation of the lung parenchyma [12, 13], in this context some modifications of the padding technique have been proposed [14]. It should be noted that the Ugon enucleation technique, which is a surgical procedure that allows the removal of the intact parasitic cyst, can be used primarily in small hydatid cysts with a low risk of rupture [15]. The method of solving the residual cavity without padding may be an alternative to the padding procedure in cases of pulmonary hydatid cyst; proponents of this method claim that padding is not essential in the surgical treatment of pulmonary hydatid cysts, and careful closure of the bronchial orifices should reduce morbidity [16, 17].

Some authors have suggested to perform lung resection in cases of giant pulmonary hydatid cysts as a last option, the rate of these interventions is 6-13% [18, 19]. Some studies have adopted specific criteria for lung resection, such as: severe hemorrhage in the hydatid cyst complicated by rupture, giant pulmonary hydatid cysts with a destructive process exceeding 50% of a lung lobe, suppuration of the cystic cavity, concomitant aspiration with lobe stiffness [19].
Taking into account the high capacity of lung tissue recovery in children, there is a contrary opinion, which suggests that this type of surgery should be avoided, which has high rates of postoperative complications, including: postoperative wound infection (19.4%), pneumonia (11.1%), atelectasis (8.3%), empyema (8.3%), prolonged air leaks (5.5%), etc. [20].

Although surgical procedures have shown satisfactory results in the treatment of hydatid cysts, there is a risk of developing secondary infections, with recurrence rates ranging from 2 to 25% of patients. In this context, particular attention has been paid to scolicidal agents used for intraoperative inactivation of the germinal elements of the hydatid larvocyst and determination of the effective exposure time [21, 22]. In addition to the scolicidal substances known and used in practice [21], several recent studies have reported, as an alternative option, the use of scolicidal agents of plant origin [23, 24], nanoparticles of silver, iron, copper, selenium, etc. [25, 26], the venom peptides of some scorpion species [27, 28], although the results obtained are still in the stage of desideratum.

Conclusions:
1. Filling of the post-techninococcectomy residual cavity in superimposed bursae in giant pulmonary hydatid cyst complicated by endobronchial rupture is an effective technical procedure that allows to reduce postoperative morbidity and length of hospitalization.

2. The morphopathologic changes found in the giant pulmonary hydatid cyst complicated with endobronchial rupture indicate a potential risk of development of insufficiency of padding sutures with development of prolonged air leaks. In this context, with the aim of monitoring and resolving prolonged air leaks that may occur in the postoperative period, the padding procedure can be completed with simultaneous drainage of the residual cavity.

3. The intraoperative use of silver nitrate as an attempt to inactivate the germinal elements of the hydatid larvocyst is based on both the scolicidal and bactericidal action of the substance, which, together with the necrolytic action, ensures favorable conditions for the obliteration of the residual cavity of the post-techninococcectomy and contributes to the prevention of recurrences and postoperative complications.

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References:
18. VİPАДKИ 3 PРАKТИKИ
ПАРЕНХИМОЗБЕРЯЮЩАЯ БЮРГУРА ПРИ ЛИКУВАННІ ГИГАНТСЬКОЇ ГІДАТИДНОЇ КІСТІ ЛЕГЕНІ, УСКЛАДНЕННОЇ ЕНДОБРОНХІАЛЬНИМ РОЗРИВОМ У ДІТЕЙ: КЛІНІЧНИЙ ВИПАДОК

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Комуніальний медико-санітарний заклад Інститут матері та дитини Національний науково-практичний центр дитячої хірургії «Наталія Георгіїв», Державний університет медицини та фармації «Ніколае Тестеміцану»* (м. Кишинів, Молдова)

РЕЗЮМЕ

Автори повідомляють про кінічний випадок 15-річної пацієнтки з гігантською легеневою гідатидною кістю, яка була діагностована лише після розриву, та успішно прооперована. Пациентка отримала легку травму під час заняття фізкультурою і через короткий час після травми у неї виникла сильна рвота вищею кількістю безбарвної рідини. Згодом її стан погіршився, з'явився втома, сильний біль у правій половині грудей, сильний кашель з незначним харканням, задишка, та кровохаркання, у зв'язку з чим її госпіталізували. Після госпіталізації комп'ютерна томографія (КТ) підтвердила діагноз гідатидної кісті легені, ускладненої ендоbronхіальним розривом із субтотальним ураженням правої нижньої частини. Хвора прооперована шляхом правосторонньої латеростонної торакотомії. Після відновлення паразитарної ларвостатії решту госпіталізації відбулись невистематичні зміни.

Ключові слова: гідатидна кістка; легеня; протосколіцидний засіб; хірургія; дитина.


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