



# Successful Surgical Treatment of "Complex" Abdominal Echinococcosis

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**Aim:** to present the difficulties of surgical treatment of patients with multiple and combined echinococcal lesions.

**Key points.** A 47-year-old patient who lived in Central Asia for up to 29 years of age was diagnosed with multiple echinococcosis of the abdominal cavity (CE1-2): II, IVb, V, VI, VII segments of the liver, upper and lower poles of the spleen, lesser and greater omentum, small intestine, subphrenic space, area of the hepatoduodenal ligament, gastrotocolic ligament. Surgical intervention was performed: atypical resection of liver segments V, VI, VII, subtotal pericystectomy, cholecystectomy, subtotal pericystectomy of cysts of II and IVb liver segments, subtotal pericystectomy of splenic cysts, resection of the greater omentum, echinococectomy of the lesser omentum, mesentery of the small intestine, hepatoduodenal ligament, gastrotocolic ligament, drainage of the abdominal cavity. Pericystectomy was carried out according to the technique of the National Medical Research Center of Surgery named after A. Vishnevsky.

**Conclusion.** Due to the peculiarities of the course of helminthiasis and the pronounced variability of the lesion, it is extremely difficult to develop universal and effective treatment algorithms. The presented clinical observation demonstrates an example of the successful use of special surgical tactics for the treatment of "complex" echinococcosis of the abdominal cavity with good long-term follow-up results.

**Keywords:** echinococcosis, "complex" echinococcosis, "combined" echinococcosis, "multiple" echinococcosis, diagnosis, treatment tactics

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## Успешное хирургическое лечение «сложного» эхинококкоза брюшной полости

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**Цель:** представить сложности хирургического лечения пациентов с множественным и сочетанным эхинококковым поражением.

**Основные положения.** Пациентке 47 лет, до 29 лет проживавшей в Средней Азии, установлен диагноз множественного эхинококкоза брюшной полости (CE1-2): II, IVb, V, VI, VII сегментов печени, верхнего и нижнего полюсов селезенки, малого и большого сальника, тонкой кишки, поддиафрагмального пространства, области гепатодуоденальной связки, желудочно-ободочной связки. Выполнено оперативное вмешательство: атипичная резекция V, VI, VII сегментов печени, субтотальная перицистэктомия, холецистэктомия, субтотальная перицистэктомия кист II и IVb сегментов печени, субтотальная перицистэктомия кист селезенки, резекция большого сальника, эхинококкэктомия из малого сальника, брыжейки тонкой кишки, гепатодуоденальной связки, желудочно-ободочной связки, дренирование брюшной полости. Перицистэктомия осуществлена по методике НМИЦ хирургии им. А.В. Вишневского.

**Заключение.** Ввиду особенностей течения гельминтоза и выраженной вариабельности поражения разработать универсальные и эффективные лечебные алгоритмы крайне сложно. Представленное клиническое

наблюдение демонстрирует пример успешного применения специальной хирургической тактики лечения «сложного» эхинококкоза брюшной полости с хорошим отдаленным результатом наблюдения.

**Ключевые слова:** эхинококкоз, «сложный» эхинококкоз, «сочетанный» эхинококкоз, «множественный» эхинококкоз, диагностика, тактика лечения

**Конфликт интересов:** авторы заявляют об отсутствии конфликта интересов.

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## Introduction

Echinococcosis is a severe parasitic disease, the causative agent of which is the helminth *Echinococcus granulosus sensu lato* from the genus *Cystodes*. The main hosts of the parasite are mammals of the order of dogs, both wild (wolves, foxes) and domestic individuals. The main routes of infection with echinococci are alimentary and household. Infection occurs by accidental ingestion of parasite eggs, oncosphere is formed, it penetrates through the wall of the small intestine into the portal vein system, from where it is transported with the blood stream and can affect various organs, mainly the liver and lungs [1]. Hydatid cysts are formed in these organs, inside which the rudiments of new parasites form. The outer shell of the cyst is represented by a fibrous capsule, a pericyst, which is the result of reactive inflammatory processes in the affected organ; the middle layer is an ectocyst, the chitinous shell formed by the parasite; the inner layer is an endocyst, the growth layer from which new viable scoleces and daughter cysts bud off. The mass of new scoleces and small daughter cysts floating freely in the main parasitic cavity are called echinococcal sand — due to the characteristic picture obtained by ultrasound or radiation diagnosis. One cubic millimeter of such echinococcal sand contains more than 400,000 scoleces. When a daughter bladder bursts, they can implant and form many new cysts similar to the mother cyst. Usually, the hydatid cyst shell is impermeable and daughter parasites cannot penetrate into the organ parenchyma; however, dissemination of scoleces is possible in case of cyst suppuration or calcification of the capsule in case of parasite death [2].

Geographically, echinococcosis is widespread, and it is difficult to identify specific endemic regions due to the lack of diagnostic tools in some regions [1, 3]. According to the World Health Organization, echinococcus is most common in Argentina, Peru, Eastern Africa, Central Asia and China. In these regions, the incidence of echinococcosis can exceed 50 per 100,000 people per year. On the territory of the Russian Federation, the average primary incidence is 0.37–0.39 per 100,000 population per year, but in some endemic regions, the incidence rates can reach 10 % of the total population per year [4]. At the same time, postoperative mortality and the risk of recurrence are at the level of 2.2 and 6.5 %,

respectively, which makes the treatment of echinococcosis an urgent problem of modern medicine [5].

The organs that are most often affected in echinococcosis are liver (75 % of cases) and lungs (15 %). Only 10 % of cases occur in the rest of the body [6]. Spleen, kidneys, heart, and brain are affected much less frequently [7]. Rare localizations of the parasite in the submandibular, pancreas and thyroid glands, adrenal glands, cavernous sinus, wing palate fossa, nasopharynx, skull base, pleura, anterior chest wall, gallbladder, tibia, inguinal canal, ovaries, spine, bones and other organs and tissues have been described in the literature [8–12]. Detection of cysts usually occurs incidentally during ultrasound, tomography, or X-ray examination.

The term “combined echinococcosis” is applied in case of localization of echinococcal cysts in more than one organ: in two, rarely — in three organs in various combinations. Localization of echinococcal cysts can be in various organs of the abdominal cavity, abdominal and thoracic cavity, as well as with remote localizations relative to the main lesion [13–18]. Polyorganic echinococcosis is an extremely serious form of the disease, which can be potentially fatal. Often, combined echinococcosis is recognized late because other organs are not fully examined after initial diagnosis.

The term “multiple echinococcosis” is used when describing several cysts within one organ; it is a fairly common form of this disease. According to various authors, multiple echinococcosis of the liver ranges from 4.15 to 63.2 % [19–23].

Thus, since combined echinococcal lesions are not uncommon, a targeted search for echinococcal cysts of the thoracic and abdominal organs is important in the examination and diagnosis.

Diagnosis of hepatic echinococcosis is complicated by the absence of specific clinical symptoms or syndromes of the disease: hydatid cysts can develop in the host organism for years without causing significant complaints [5, 24]. Full-fledged diagnosis is possible if modern radiotherapy and ultrasound diagnostics equipment is available, as well as if specific vigilance is displayed. Currently, the following diagnostic classification of echinococcal cysts is used, proposed by the WHO informal working group on echinococcosis (WHO-IWGE) in 2001 [25].

At present, the tactics of radical surgical intervention by pericystectomy or resection of the affected

**Table 1.** WHO-IWGE classification of ultrasound images of cystic echinococcosis**Таблица 1.** Классификация WHO-IWGE УЗИ эхинококковых кист

Cyst type <i>Тип кисты</i>	Status <i>Статус</i>	Characteristics / <i>Характеристика</i>
CL	—	Single-chamber cystic formation, the contents are homogeneous, without internal partitions <i>Однокамерное кистозное образование, содержимое однородно, без внутренних перегородок</i>
CE1	Active <i>Активна</i>	As a rule, a single-chamber cystic formation with homogeneous anechoic content. When the patient's body position changes, hydatid sand (protoscolex) can sometimes be visualized <i>Как правило, однокамерное кистозное образование с однородным анэхогенным содержимым. При смене положения тела пациента порой можно визуализировать гидатидный песок (протосколексы)</i>
CE2	Active <i>Активна</i>	Cystic formation with internal septa. Daughter cysts do not have a clear division structure and can completely fill the maternal one <i>Кистозное образование с внутренними перегородками. Дочерние кисты не имеют четкой структуры деления и могут полностью заполнять материнскую</i>
CE3a	Transitional form	Daughter cysts have peeled membranes, a sign of "water lily" <i>Дочерние кисты имеют отслоившиеся мембраны, признак «водной лилии»</i>
CE3b	Переходная форма	Daughter cysts in hard matrix <i>Дочерние кисты в твердом матриксе</i>
CE4	Inactive <i>Неактивна</i>	Absence of daughter cysts. The cystic contents have heterogeneous echogenicity and may resemble a bull's eye <i>Отсутствие дочерних кист. Кистозное содержимое неоднородной эхогенности, может напоминать «бычий глаз»</i>
CE5	Inactive <i>Неактивна</i>	The cyst wall resembles an arch and is partially or completely calcified <i>Стенка кисты напоминает арку, частично или полностью кальцинирована</i>

organ prevails in the surgical treatment of echinococcosis; this approach significantly reduces the risk of postoperative complications and recurrences of the disease [26].

Due to late diagnosis, in 60 % of cases various technical difficulties arise during surgical treatment, which led us to introduce the term "complex" hepatic echinococcosis. "Complex" echinococcosis implies such criteria as multiple bilobar liver lesions with cysts located intraparenchymatously and/or one or more cysts > 7.5 cm; large ( $\geq 7.5$  cm) centrally located cysts (SI, SII, SIV, SVIII); proximity to large tubular structures of the liver, as well as residual hepatic echinococcosis after multiple repeated operations; multiple echinococcosis of abdominal cavity organs, complicated hepatic echinococcosis: the presence of fistulas, strictures of bile ducts, cirrhosis of the liver, scar deformation of the anterior abdominal wall, firm fusion with the diaphragm, retroperitoneal organs, involvement of the hepatic-duodenal ligament [27]. M. Kilic et al. determined that there is a direct dependence of biliary fistula occurrence in the postoperative period on the cyst size. At the threshold value of cyst diameter of 7.5 cm, sensitivity and specificity were 79 % and 73 %, respectively [28].

The following method of surgical aid has been developed and successfully applied in the National Medical Research Center of Surgery named after A. Vishnevsky [27]:

1. After forming the access, the area of surgical intervention is carefully delineated with tissues containing 20 % NaCl solution to prevent implantation spread of the parasite.

2. The operated cyst is punctured, evacuating the contents with a large diameter aspirator.

3. After aspiration of the fluid, the cyst cavity is filled with hypertonic solution, then treated with ultrasonic cavitation with Harmonic type apparatuses for 3 minutes, which allows to destroy possible remaining scolexes in the walls of the cyst.

4. After careful revision and treatment of the cyst cavity, excision of the fibrous capsule to the liver tissue is performed.

The use of this technique effectively protects against possible recurrence of echinococcosis and allows to perform surgical interventions in a more sparing manner.

It is not uncommon to observe that after removal of hydatid cysts, residual fluid cavities are formed in their place. Surgical tactics for such masses are non-standardized and decision-making is based on dynamic follow-up data [27, 29, 30].

Cases of combined echinococcosis were analyzed at the National Medical Research Center of Surgery named after A. Vishnevsky. Cases of combined echinococcosis were analyzed for the total proportion of admitted patients with this pathology for the period 2012–2022 (Table 2). The number of such patients per year is quite stable (from 10 to 37.5 %).

**Table 2.** The proportion of combined (multiorgan) cysts in the treatment of patients with echinococcosis at the National Medical Research Center of Surgery named after A. Vishnevsky in 2012–2022

**Таблица 2.** Доля сочетанного (мультиорганного) поражения при лечении больных с эхинококкозом в НМИЦ хирургии им. А.В. Вишневского за период 2012–2022 гг.

Year Год	Total number of patients Общее число больных	Combined (multiorgan) damage Сочетанное (мультиорганное) поражение
2012	16	2 (12.5 %)
2013	16	3 (18.75 %)
2014	18	5 (27.8 %)
2015	10	1 (10 %)
2016	16	6 (37.5 %)
2017	19	4 (21.05 %)
2018	13	0 (0)
2019	25	7 (28 %)
2020	11	1 (9.09 %)
2021	20	4 (20 %)
2022	11	4 (36.4 %)
<b>Total /Всего</b>	<b>175</b>	<b>37 (49.3 %)</b>

**Table 3.** The proportion of multiple echinococcal cysts in liver damage (data obtained at the National Medical Research Center of Surgery named after A. Vishnevsky in 2012–2022)

**Таблица 3.** Доля множественных эхинококковых кист при поражении печени (данные НМИЦ хирургии им. А.В. Вишневского за период 2012–2022 гг.)

Year Год	Total number of patients Общее число больных	Multiple cysts Множественные кисты
2012	16	5 (31.25 %)
2013	16	9 (56.25 %)
2014	18	7 (38.88 %)
2015	10	5 (50 %)
2016	16	5 (31.25 %)
2017	19	8 (42.11 %)
2018	13	4 (30.76 %)
2019	25	15 (60 %)
2020	11	4 (36.36 %)
2021	20	10 (50 %)
2022	11	3 (27.27 %)
<b>Total /Всего</b>	<b>175</b>	<b>75 (42.85 %)</b>

Echinococcal lesions of the liver were the most frequently observed. Data analysis of the number of echinococcal cysts in liver lesions for the period from 2012 to 2022 is presented in Table 3. In general, for the period of 10 years, the number of such patients was not less than 27.27 % and reached 50–60 %.

We present a clinical observation illustrating the technique of surgical intervention, describing the clinical picture and long-term results in “complex” echinococcosis (combined lesion of abdominal cavity organs with extra-organic localization, multiple liver lesions).

### Clinical observation

Patient D., 47-years-old female, lived in Central Asia until the age of 29. The presence of echinococcal

lesions was suspected in 1997, when she underwent inpatient treatment for hepatitis B. After discharge from the hospital, she did not receive specific anti-parasitic treatment. She noted spastic pain with a frequency of about once every two weeks. According to the patient, she was treated by a gastroenterologist on suspicion of gastric ulcer, the diagnosis was not confirmed. In 2019, the pains became more frequent, which was the reason for seeking help.

During MRI-study of the abdominal cavity organs, outpatient (May 8, 2019) no free and condensed fluid in the abdominal cavity was detected.

The liver was enlarged, the craniocaudal size of the right lobe was 19 cm, its contour was deformed due to bilobar rounded cystic structures: in segment IV – multichambered, 82 76 66 mm in size; in segments V–VI the largest formation replacing the liver



parenchyma was determined, the structure contained multiple communicating cystic formations, total size  $157 \times 115 \times 137$  mm; subcapsularly in segments II–III four cysts were determined, with diameters up to 22 mm, 39 mm, 32 mm, and 33 mm. The masses were irregularly shaped with uneven internal and external contours, had T2-hyperintense signal and areas of MR-signal dropout in the structure. The capsule of the masses had hypointense signal (Fig. 1).

The liver gate was intact. Intra- and extrahepatic bile ducts were not dilated. The portal vein was 10 mm.

Also, the formations of the above-described structure were determined extraorganically: along the contour of segments II–III —  $75 \times 40 \times 40$  mm in size; along the anterior contour of the liver — small size (up to 10 mm in diameter); at the gate and along

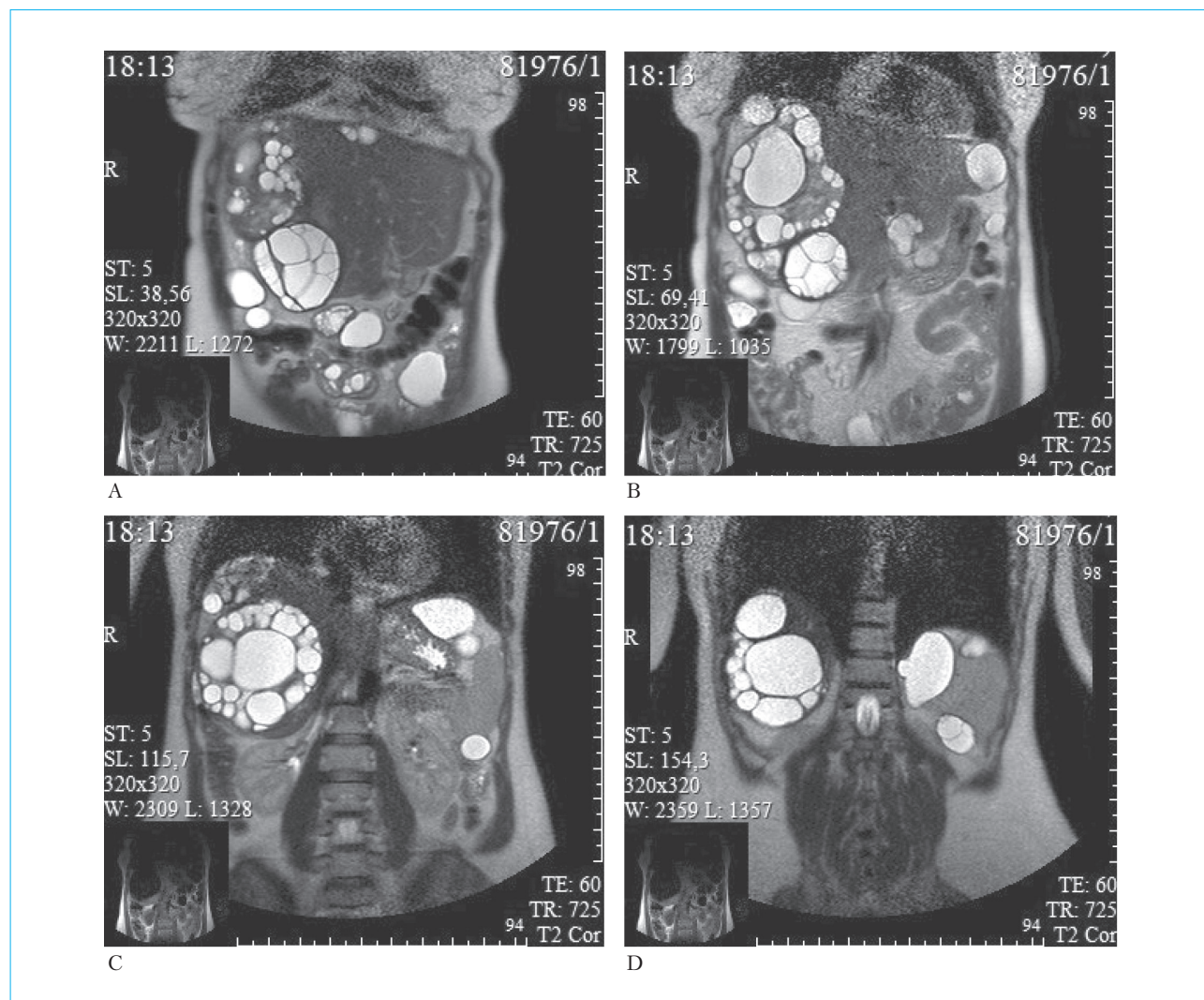
the lower contour of the spleen — 2 cysts, up to  $46 \times 32$  mm and  $1,4 \times 16$  mm in size; along the course of the intestine multiple interloop cysts up to 12 mm in diameter were determined.

The gallbladder was defined with thin walls, no concrements were visualized.

The pancreas was of lobular structure, not enlarged, its contours were clear, its structure — homogeneous. The main pancreatic duct was not dilated, defined throughout. Parapancreatic tissue was not changed.

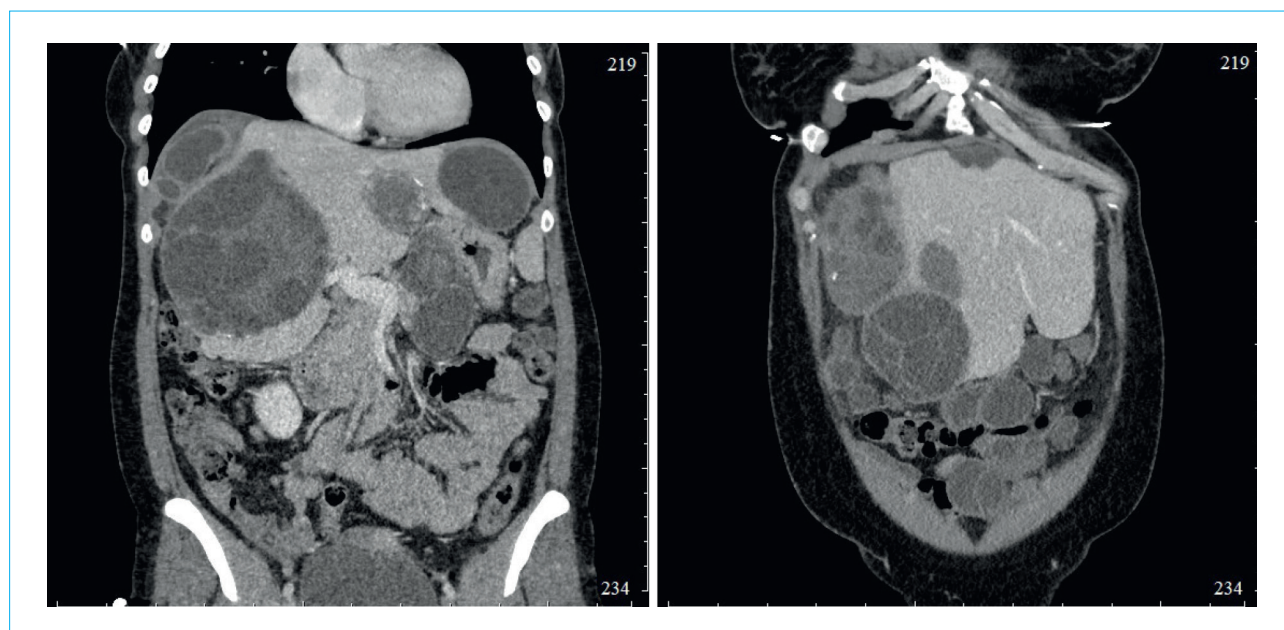
In the structure of the spleen fluid masses of heterogeneous density (similar to those described above) were detected. The largest mass — in the upper pole of the spleen,  $54 \times 41$  mm in size.

The adrenal glands were unchanged, with smooth, clear contours. No focal formations were detected in their structure.



**Figure 1.** MRI images of multiple echinococcosis of the abdominal cavity, T2 cor: A–D — sequential images from front to back

**Рисунок 1.** МРТ-изображения множественного эхинококкоза брюшной полости, T2 cor: A–D — последовательные изображения спереди назад



**Figure 2.** MSCT image before surgery (venous phase): multiple cystic multicavitary lesions of various sizes in the liver, contact of the lesion with the portal vein right branch, cysts along the contour of the spleen, a cyst in the omental sac, a cyst in the structure of the spleen; a few calcifications are determined in the capsule and septa of the cysts

**Рисунок 2.** МСКТ-изображение до операции (венозная фаза): определяются множественные кистозные многополостные образования различных размеров в печени, контакт образования с правой ветвью воротной вены, кисты по контуру селезенки, киста в сальниковой сумке, киста в структуре селезенки; в капсуле и перегородках кист определяются немногочисленные кальцинаты

The kidneys were unchanged, with irregular, clear contours. The pelvicalyceal system and ureters were not dilated. Lymph nodes at the levels of scanning were not enlarged, not changed.

**Conclusion.** MR-picture of parasitic lesion of the liver, spleen, with the presence of cysts of extraorganic localization, most likely echinococcosis. Hepatosplenomegaly.

Outpatient MSCT-study of abdominal cavity organs (August 7, 2019) did not detect free and drained fluid in the abdominal cavity.

The liver was enlarged in size, the craniocaudal size of the right lobe was 20 cm, its contour was deformed due to the presence of bilobar rounded cystic masses: in segment IV — a multichamber cyst, 82 × 76 × 80 mm in size; in liver segments V–VI with spreading to VII–VIII the largest formation replacing the liver parenchyma was determined, its structure contained multiple daughter cysts communicating with each other, with total size 167 × 117 × 157 mm; subcapsularly in segments II–III there were 4 cysts, 30 to 39 mm in diameter. The masses were predominantly of irregular ovoid shape with irregular internal and external contours (wavy), had thick, partially calcified walls up to 4.5–5 mm thick. The density of the fluid component of the masses was from –5 to 5 HU, contrast agent was not accumulated in any of the phases of the study (Figs. 3, 4).

Intra- and extrahepatic bile ducts were not dilated. The portal vein was defined with a diameter of 10 mm.

Some of the masses were located extraorganically: a cyst with the size of 92 × 55 × 65 mm was detected along the contour of segments II–III; extraorganic cysts of small size (up to 10 mm in diameter) were determined along the anterior contour of the liver; three cysts with the size up to 50 × 33 mm, 14 × 16 mm and 54 × 37 mm were differentiated at the gate, along the lower contour of the spleen; multiple cysts with the diameter up to 30 mm were localized between the intestinal loops (Figs. 2, 3).

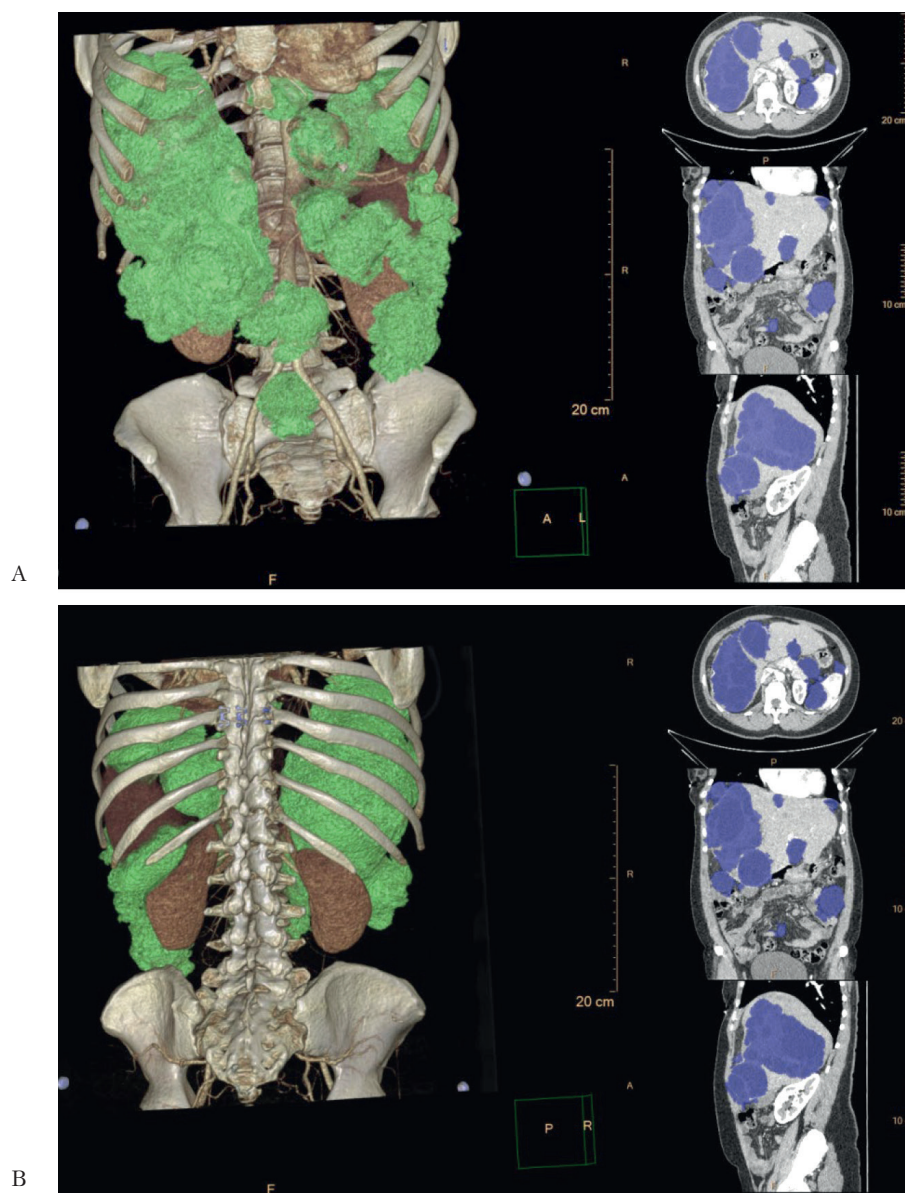
The gallbladder was typical in shape, with thin walls, no radiographic contrast concretions were visualized.

Pancreas was of lobular structure, not enlarged, its contours were clear. The structure was homogeneous. The main pancreatic duct was not dilated, defined throughout. Parapancreatic cellular tissue was not changed.

The spleen was enlarged, fluid masses of heterogeneous density were detected in the structure. The largest mass was in the upper pole of the spleen with the size of 61 × 49 mm. An extra-organ cyst with the dimensions of 32 × 48 mm was visualized at the spleen gate.

Adrenal glands had even, clear contours. There were no focal masses.





**Figure 3.** Three-dimensional reconstruction of MSCT images of multiple echinococcosis of the abdominal cavity (hydatid cysts are marked in green: A — front view; B — rear view)

**Рисунок 3.** Трехмерная реконструкция МСКТ-изображений множественного эхинококкоза брюшной полости (зеленым помечены эхинококковые кисты: А — вид спереди; В — вид сзади)

Kidneys were with irregular, clear contours. The pelvicalyceal system and ureters were not dilated. The excretory function was without peculiarities. X-ray contrast concretions were not revealed.

Lymph nodes at the levels of scanning were not enlarged, not changed.

The stomach was located normally, not spread. Paragastric tissue was not changed. The loops of the small intestine were not dilated. Small intestine loops, sections of the colon — usually located. The large intestine was moderately pneumatized, no

organic pathology on the part of the large and small intestine was revealed.

When viewed in the bone window, no bone-destructive, bone-traumatic changes were detected.

Conclusion. CT-picture of parasitic lesion of the liver, spleen, with the presence of cysts of extraorganic localization, most likely echinococcosis, in comparison with the data of MRI study dated as of May 8, 2019 — without signs of growth. There were no convincing data for cysts wall integrity violation at the moment of the study. Hepatosplenomegaly.

On August 21, 2019, the patient was hospitalized to the National Medical Research Center of Surgery named after A. Vishnevsky for surgical treatment.

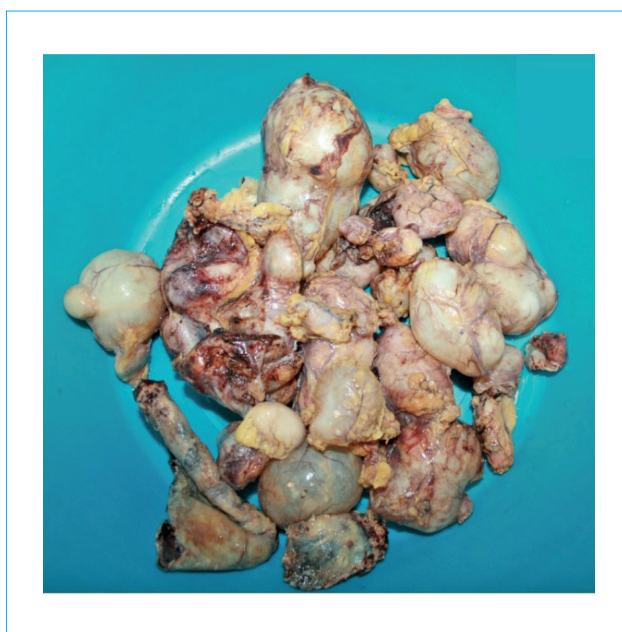
On admission, blood tests showed no clinically significant deviations from reference values.

MSCT of the head and chest organs revealed no pathologic changes in the brain substance, no evidence of parasitic lesions of the chest organs. Fibrous changes in both lungs. Calcinate in the left lung. Infiltrative changes in the lung parenchyma were not revealed.

Based on the data of preoperative examination on August 26, 2019, surgical intervention was performed: atypical resection of liver segments V, VI and VII, subtotal pericystectomy, cholecystectomy, subtotal pericystectomy of cysts of liver segments II and IVb, subtotal pericystectomy of spleen cysts, resection of the greater omentum, echinococcectomy from the small omentum, small intestine mesentery, hepatoduodenal ligament, gastrocolic ligament, drainage of the abdominal cavity (pericystectomy according to the method of the the National Medical Research Center of Surgery named after A. Vishnevsky).

Intraoperative diagnosis: Multiple echinococcosis of the abdominal cavity (CE1-2): II, IVb, V, VI, VII segments of the liver, upper and lower poles of the spleen, small and large omentum, small intestine, subdiaphragmatic space, hepatoduodenal ligament area, gastric-obstetric ligament (Fig. 4).

The early postoperative period was uneventful: the patient complained of moderate pain in the area of the postoperative wound. Blood tests showed increased ALT (164 U/L) and AST (151 U/L), slight neutrophilic leukocytosis. The patient was activated on the first day after surgical intervention. At

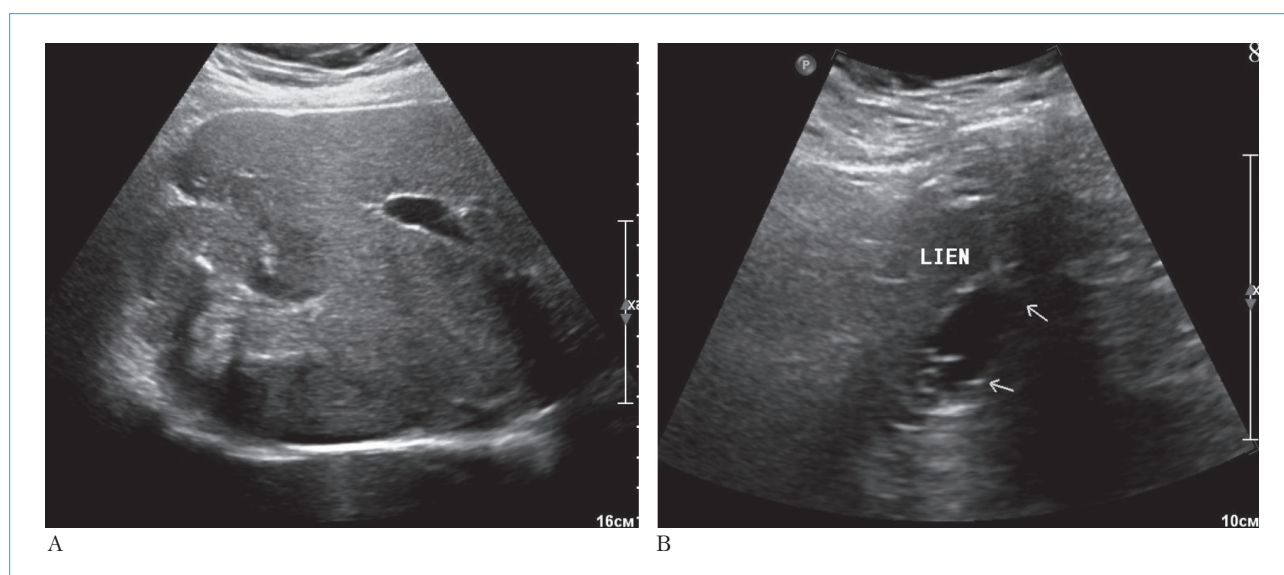


**Figure 4.** Macropreparation of removed echinococcal cysts

**Рисунок 4.** Макропрепараты удаленных эхинококковых кист

the control ultrasound no fluid accumulations were detected in the area of liver resection, parenchyma was of uneven echo density, vascular pattern was preserved (Fig. 5A).

At the lower pole of the spleen, a fluid accumulation/formation of elongated shape with single thin hyperechogenic septa,  $35.8 \times 20.8 \times 30.3$  mm, was detected on the inner surface (Fig. 5B). A collection of similar structure with diffusely heterogeneous



**Figure 5.** Ultrasound images after surgery: A — area of liver resection; B — fluid accumulation (indicated by arrows) in the area of intervention near the spleen (LIEN)

**Рисунок 5.** УЗИ после оперативного вмешательства: А — зона резекции печени; В — жидкостное скопление (указано стрелками) в зоне вмешательства у селезенки (LIEN)



contents, measuring  $42.7 \times 32.5$  mm, was determined between the uterus and bladder along the left contour.

Control MSCT showed the liver stump with  $19 \times 9$  cm of size, contours were smooth and clear, parenchyma density was unchanged (60 HU). Calcium inclusions were determined along the resection margin (Fig. 6A). Intra- and extrahepatic bile ducts were not dilated, hepaticocholedochus — up to 5.5 mm. The gallbladder was not visualized. Portal vein — up to 16 mm, splenic vein — up to 10 mm, superior mesenteric vein — up to 12 mm.

The pancreas was correctly located, not enlarged in size. Parenchyma density — not changed (44 HU). There were no focal formations. The main pancreatic duct is not dilated, thread-like. The parapancreatic tissue was not changed. Parapancreatic lymph nodes were not enlarged.

Spleen of normal shape with smooth contours, not enlarged (spleen index — 200). The parenchyma

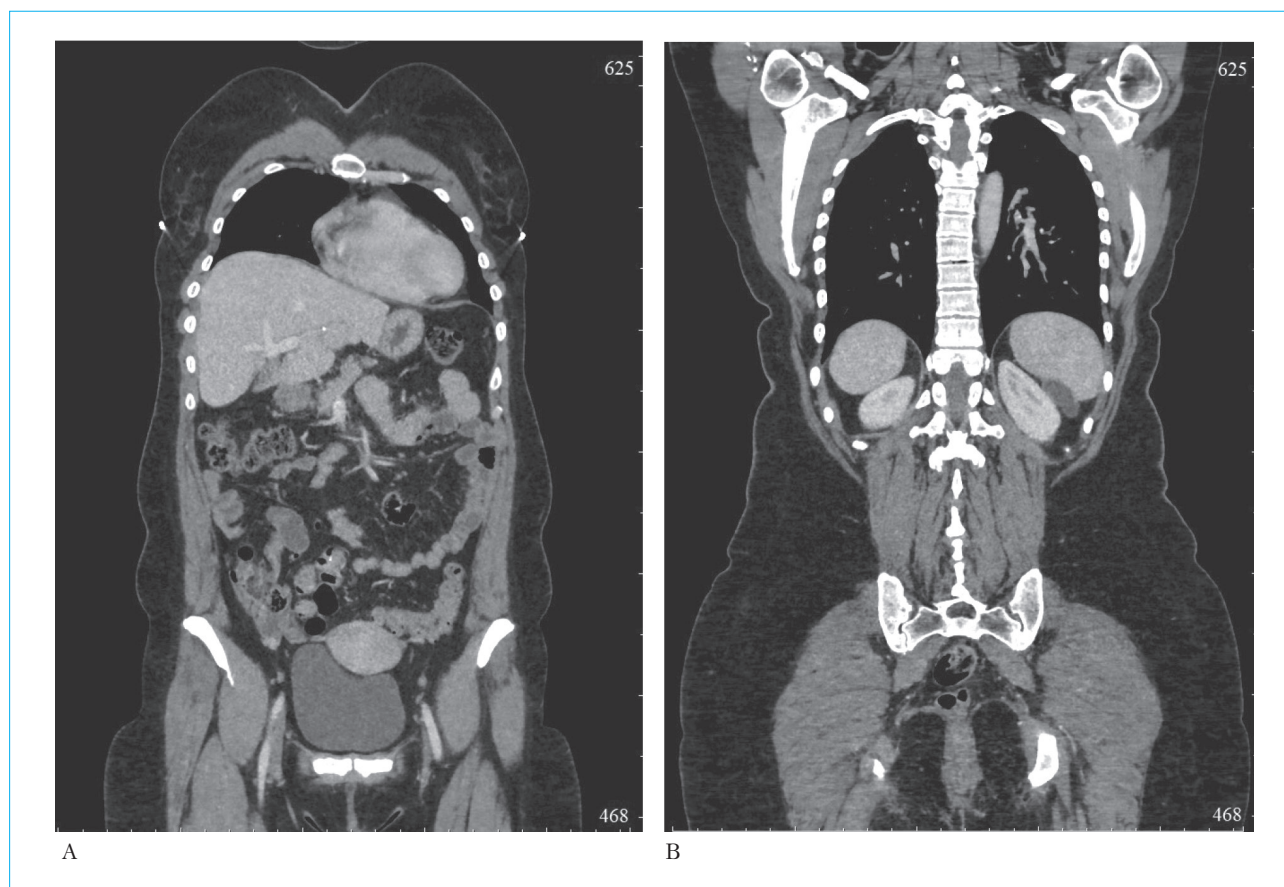
was homogeneous, without pathologic foci. A  $30 \times 25 \times 45$  mm ovoid cyst with a pronounced exorganous component was visualized along the lower contour of the spleen (Fig. 6B).

The stomach was not flattened. Duodenal walls — without visible focal / infiltrative changes, duodenal lumen was not significantly deformed. The walls of the small and large intestine at the level of the study were without visible focal, infiltrative changes.

Adrenal glands were unchanged.

The kidneys were typically located, the volume of parenchyma was preserved. X-ray contrast concrements were not detected. The pelvicalyceal system and ureters were not dilated. Small simple cysts were visualized in the renal parenchyma.

An encapsulated fluid accumulation of  $73 \times 40 \times 20$  mm in size was visible in the pelvis between the body of the uterus and the bottom of the bladder. In the upper third of the cervix there was a rounded cyst with a diameter of 10 mm.



**Figure 6.** MSCT (venous phase) after surgical treatment, different levels of scanning: A — there are postoperative changes along the edge of the liver resection, the portal vein is patent, there are no cysts between the loops of the small intestine and in the greater omentum; B — residual cavity at the lower pole of the spleen, there are no cysts between the loops of the small intestine and in the greater omentum

**Рисунок 6.** МСКТ (венозная фаза) после хирургического лечения, разные уровни сканирования: А — отмечаются послеоперационные изменения по краю резекции печени, воротная вена проходима, кисты между петель тонкой кишки и в большом сальнике отсутствуют; В — остаточная полость у нижнего полюса селезенки, кисты между петель тонкой кишки и в большом сальнике отсутствуют

Lymph nodes at the level of scanning were not enlarged.

**Conclusion.** Condition after atypical resection of liver segments V, VI and VII, subtotal pericystectomy, cholecystectomy, subtotal pericystectomy of cysts of liver segments II and IVb, subtotal pericystectomy of spleen cysts, resection of the greater omentum, echinococectomy from the lesser omentum, small intestine mesentery, hepatoduodenal ligament, gastroduodenal ligament. Cystic inclusions in the spleen and pelvis, probably a residual cavity in the spleen, a dead hydatid cyst in the pelvic cavity. Cystic formation of the cervix, most probably — a naboth cyst.

The patient was discharged in satisfactory condition on day 9 after surgery. No data for recurrence were obtained during follow-up (42 months).

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## Conclusion

Echinococcosis is a parasitic disease widespread in the central part of Russia. In recent years, significant migration of the population in our country has raised the number of patients with combined echinococcal lesions and multiple organ damage. Due to the peculiarities of the course of helminthiasis and the marked variability of the lesions, it is extremely difficult to develop universal and effective treatment algorithms, which determines the relevance of this problem. This clinical observation demonstrates an example of successful application of a special surgical tactic for the treatment of “complex” abdominal echinococcosis with a good long-term follow-up result in the National Medical Research Center of Surgery named after A. Vishnevsky.

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