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DIAGNOSIS AND SURGICAL TREATMENT OF LIVER ECHINOCOCCOSIS

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Ключевые слова: *эхинококкоз, печень, эхинококкэктомия, перицистэктомия*

Abstract. Diagnosis and surgical treatment of liver echinococcosis. Shaprinskyi V.O., Vorovskyi O.O., Kaminskyi O.A., Pashynskyi Ya.M. *The results of treatment of 72 patients with echinococcosis of the liver were analyzed, women – 62 (86.2%), men – 10 (13.8%). Primary echinococcosis was detected in 69 (95.8%) patients, secondary – in 3 (4.2%). Among instrumental research methods, ultrasound and computed tomography examination were of diagnostic value. Single liver cysts were found in 63 (87.5%) patients, multiple – in 9 (12.5%). Among patients with solitary cysts, the right lobe was more often affected than the left – 48 (66.7%) vs 24 (33.3%) cases. Echinococcosis of central localization was less common and was noted in 8 (11.1%) cases. Echinococcosis complications were observed in 16 (22.2%) patients. Among them, most often there were suppurations of the cyst – in 13 (18.1%); bursts of the cyst into the free abdominal cavity – in 1 (1.4%), in the pleural cavity – 1 (1.4%), in the biliary tract – in 1 (1.4%). Partial or complete calcification of the hand was observed in 12 (16.7%) patients. In 20 (27.8%) cases, the operation was performed from the upper median access, in 42 (58.3%) – from oblique hypochondria, accesses by Kocher or by Fedorov. Pericystectomy was performed in 48 (66.7%) patients, in 8 (11.1%) patients underwent resections of liver segments with an echinococcal cyst, in 4 (5.6%) – cyst opening with removal of contents and treatment of its cavity. Laparoscopic echinococectomy was used in 12 (16.7%) patients. In the postoperative period complications were observed in 16 (22.2%) patients. The use of the welding electrocoagulator EC-300M "Swarmed" in the thermal rehabilitation of the walls of the residual cavity after echinococectomy allowed to reduce blood loss from 2200±210 ml to 250±50 ml. With the use of laparoscopic echinococectomy, intraoperative blood loss was reduced by 9 times ($p=0.0001$); duration of operation – 2 times ($p<0.05$), stay in hospital – 3.3 times ($p=0.002$). There were no fatal outcomes. Before and after operation antirelapse antiparasitic therapy with albendazole (Vormil) was performed in two cycles 28 days each, separated by a 14-day break. The dose at body weight over 60 kg was 400 mg 2 times a day, and for less than 60 kg the drug was calculated at a rate of 15 mg/kg/day. There were 2 (2.8%) cases of relapse, there was no mortality.*

Реферат. Диагностика и хирургическое лечение эхинококкоза печени. Шапринский В.А., Воровский О.О., Каминский А.А., Пашинский Я.Н. *Проанализированы результаты лечения 72 больных с эхинококкозом печени: женщин – 62 (86,2%), мужчин – 10 (13,8%). Первичный эхинококкоз был обнаружен у 69 (95,8%) больных, вторичный – у 3 (4,2%). Среди инструментальных методов исследования диагностическое значение имело ультразвуковое и компьютерно-томографическое обследование. Одиночные кисты печени обнаружены у 63 (87,5%) больных, множественные – у 9 (12,5%). Среди больных с солитарными кистами правая доля поражалась чаще – у 48 (66,7%) больных, нежели левая – 24 (33,3%) случая. Эхинококкоз центральной локализации встречался реже и был отмечен в 8 (11,1%) случаях. Осложнения эхинококкоза отмечено у 16 (22,2%) пациентов. Среди них чаще всего были нагноения кисты – у 13 (18,1%); прорывы кисты в свободную брюшную полость – у 1 (1,4%), в плевральную полость – у 1 (1,4%), в билиарный тракт – у 1 (1,4%). Частичное или полное известкование кисты отмечено у 12 (16,7%) пациентов. В 20 (27,8%) случаях операцию выполняли с верхнего срединного доступа, в 42 (58,3%) – с косых подреберных доступов по Кохеру или по Федорову. Перицистэктомия была выполнена у 48 (66,7%) больных, у 8 (11,1%) пациентов были выполнены резекции сегментов печени с эхинококковой кистой, у 4 (5,6%) – раскрытие кисты с удалением содержимого и обработкой ее полости. Лапароскопическую эхинококкэктомию применили у 12 (16,7%) больных. В послеоперационном периоде у 16 (22,2%) больных наблюдались осложнения. Использование сварочного электрокоагулятора ЭК-300М "Свармед" при термической санации стенок остаточной полости после эхинококкэктомии позволило уменьшить кровопотерю с 2200±210 мл до 250±50 мл. При применении*

лапароскопической эхинококкэктомии удалось уменьшить интраоперационную кровопотерю в 9 раз (p=0,0001); продолжительность операции – в 2 раза (p<0,05), пребывание в стационаре – в 3,3 раза (p=0,002). Летальных исходов не было. До и после операции проводили противорецидивную антипаразитарную терапию альбендазолом (Вормил) в два цикла по 28 дней, разделенных 14-дневным перерывом. Доза при массе тела более 60 кг составляла 400 мг 2 раза в сутки, а при менее 60 кг препарат назначали из расчета 15 мг/кг/сут. Имело место 2 (2,8%) случая рецидива, летальность отсутствовала.

Echinococcosis is a dangerous helminthiasis, belongs to the severe parasitic diseases, in its development it always undergoes the stage of formation of cysts that affect the internal organs [12]. The causative agent is the larval stage of the tapeworm Echinococcus granulosus sensu lato (a strain of sheep dogs) [9], which parasitizes in carnivores (final host) [8]. The intermediate host of the parasite is humans and farm animals. Endemic regions of echinococcosis are Turkey, Moldova, some regions of Russia, Turkmenistan, Kyrgyzstan, Australia, some regions of America, North and East Africa [7]. The territory of Ukraine is a center of tension of echinococcosis, the incidence of which has a steady tendency to increase. The number of patients with this pathology is constantly growing and ranges from 0.4% to 7.3%. The frequency of recurrence of the disease is from 2% to 23.2% and often fatal [1].

The clinical course of echinococcosis has been asymptomatic for a long time [8]. The main complications of hydatid disease are rupture of the echinococcal cyst (EC), with the subsequent development of secondary infection and anaphylaxis, disseminated formation of daughter cysts in the abdominal cavity. Direct spread to the pleura, pericardium, colon and bones is less common [7].

Most surgeons adhere to the FA Ilhamov's classification.: I) morphology of larvocysts: echinococcus veterinorum, echinococcus hominis, echinococcus acephalocystis; II) by origin: primary, recurrent, implantation; III) by the number of cysts: solitary, multiple with lesions of one or more anatomical areas, polysegmental; IV) by organ involvement: isolated, combined; V) by diameter of the cyst: 1) small (up to 5 cm), 2) medium (6-10 cm), 3) large (11-20 cm), 4) giant (21 cm and more); VII) type of complication: suppuration of the cyst, compression and burst into the bile ducts and portal vein, rupture in the abdominal and pleural cavities, calcification, combined [5].

Kazoni's diagnostic method is almost never used against the background of low informativeness and high allergy. Preference is given to more sensitive methods of immunological diagnosis of echinococcosis: latex agglutination reaction, indirect hemagglutination, enzyme-linked immunosorbent assay. These reactions have virtually no contraindications, their diagnostic sensitivity is in the range of 56-100% [2].

Among the instrumental methods of diagnosis ultrasound (US) ranks first [1].

Comparative analysis of ultrasound and computed tomography (CT) provides the advantages of ultrasound in the detection of cysts less than 1 cm in diameter, but inferior in terms of topical diagnosis [11].

Currently, there are three ways to treat echinococcosis: chemotherapy, surgery (through traditional or laparoscopic access) and percutaneous interventions [10]. It is believed that drug therapy is not effective due to the presence of a dense fibrous capsule around the parasite. There are publications on the clinical efficacy of percutaneous interventions using 1.0% aqueous sodium hypochlorite solution as a scolecidal drug [4]. However, most authors consider surgery to be the only effective method of EC treatment. Among the surgical methods the following are used: extirpation of the EC (pericystectomy), semi-closed and closed echinococcectomy [6]. In recent years, there has been a tendency to expand the indications for minimally invasive technologies (laparoscopic echinococcectomy, PAIR technology, removal of EC from mini-access) both in "complex" localization and in complicated EC. The main danger of laparoscopic echinococcectomy is the rupture of EC with the possible development of anaphylactic shock, dissemination of the parasite, bleeding. The frequency of postoperative complications is 6-22% of cases, mortality is close to zero, recurrence is almost not noted [3]. It is considered necessary to include chemotherapy with albendazole or praziquantel in the treatment.

Thus, today there is no single method of removing the parasite and processing the residual cavity, the exact indications for the use of various types of operations. The aim of the study was to improve the results of surgical treatment of echinococcosis of the liver by the optimal choice of liver surgery.

MATERIALS AND METHODS OF RESEARCH

In the clinic of surgery No. 1 of National Pirogov Memorial Medical University, Vinnytsya, which is located on the basis of the surgical department of Vinnytsya Regional Clinical Hospital named after MI Pirogov, from 2011 to 2019, 72 patients with echinococcosis of the liver were operated on. There were 62 women (86.2%) and 10 men (13.8%). The mean age was 47.5±2.7 years. Primary echinococcosis was detected in 69 (95.8%) patients,

secondary – in 3 (4.2%). Solitary liver cysts were found in 63 (87.5%) patients, multiple – in 9 (12.5%). The size of the cysts averaged 4-5 cm, the maximum reached 18 cm in diameter. By localization, the right lobe was affected more often – in 54 (75.0%) patients than the left – 18 (25.5%) cases. In 16 (22.2%) of cases, patients were admitted with complicated forms of echinococcosis: suppuration of the cyst – 13 (18.1%), burst into the free abdominal cavity – 1 (1.4%), burst into the pleural cavity – 1 (1.4%), burst into the biliary tract – 1 (1.4%). Physical examination and history taking revealed moderate pain in the right hypochondrium, moderate weakness, periodic fever, skin rash, itching, jaundice. Among the instrumental methods of research, lung radiography, ultrasound diagnostics, and computed tomography were mandatory. Examination radiography of the lungs was used to exclude the combined lesion of echinococcus of the lung, which was observed in 2 (2.8%) cases.

The presence of EC was an indication for surgical treatment. In 20 (27.8%) cases, when the EC was located in the left lobe of the liver, the operation was performed through the upper-middle access. In 42 (58.3%) – oblique subcostal accesses according to Kocher or Fedorov. Pericystectomy was performed in 48 (66.7%) patients, in 8 (11.1%) patients – resections of liver segments with EC, in 4 (5.6%) – cyst opening with removal of contents and treatment of its cavity. Laparoscopic echinococcectomy was performed in 12 (16.7%) of patients. In 16 (22.2%) of patients the high-frequency welding electrocoagulator EC-300M “Svarmed” was used, where in 4 (5.6%) cases of parenchymal bleeding the “coagulation” mode was used, and in 1 (1, 4%) of a patient with vascular bleeding – mode of "evaporation", in other cases when removing the EC with the liver parenchyma – modes of "coagulation" and "cutting" alternately.

All patients, according to the EC treatment protocol, received antirelapse antiparasitic therapy with albendazole (Vormil). The dose for patients weighing more than 60 kg was 400 mg twice a day, and for those less than 60 kg – 15 mg/kg/day. Before and after surgery, two cycles 28 days, separated by a 14-day break each were performed.

All studies were conducted in accordance with the ethical principles of bioethics set out in the Helsinki Declaration on Ethical Principles for Human-Based Medical Research, developed by the World Medical Association.

Statistical processing of the survey results was performed using standard methods using the application package StatSoft "Statistica 5.5" (licensed No. AXXR910A374605FA) with the calculation of the arithmetic mean of the investigated indicator (M), standard error of the average (m), relative values frequency,%). The average statistics are given in the form of M±σ.

RESULTS AND DISCUSSION

The operative method and access were determined individually depending on the location, depth and size of the EC. For the convenience of surgery and manipulation in the localization of cysts in the right lobe of the liver, we always crossed the coronal and round ligaments and, taking the latter in the clamp, we could pull the liver into the wound. In order to prevent intraoperative insemination with scolices of the parasite, the operating field was covered with three or four tampons soaked in betadine.

In 18 (25.0%) cases, the cyst was fused with neighboring organs: stomach, gallbladder, diaphragm, omentum. At their separation there was a threat of disturbance of integrity of a capsule of a cyst and inoculation with scolices of abdominal organs. In such cases, puncture of the cyst, evacuation of its contents, cystotomy and removal of the chitinous membrane with daughter and grandchildren's bubbles were performed. In 8 (11.1%) patients with multichambered EC, the contents could not be removed by puncture due to obturation of the lumen of the needle with fragments of the chitinous membrane. In these cases it was necessary to perform a cystotomy and treat the inner surface with a high-frequency welding electrocoagulator EC-300M "Svarmed". In 16 (22.2%) patients after evacuation of the contents of the cyst perforating bile ducts were found, which opened into its lumen. In the presence of a bile duct a yellow spot usually appeared on the extended napkin. The same method can be used to determine the effectiveness of the elimination of perforation of the bile duct. The further course of surgery depended on the individual characteristics of the cyst. It was possible to complete the operation without forming a residual cavity in the liver by performing subtotal pericystectomy. Large venous branches approaching the cyst were sutured or ligated or clipped. In 4 (5.6%) cases with deep EC, where there was a risk of profuse bleeding, damage to large bile ducts, complete removal of the fibrous capsule was not performed. In these cases, the capsule was excised as much as possible and for the purpose of hemostasis the defect was treated with welding electrocoagulator EC-300M "Svarmed". In such cases, a follow-up examination with CT was performed.

When removing solitary EC, blood loss did not exceed 200-300 ml. With the removal of numerous ECs, including from hard-to-reach places (VII and VIII segments of the liver), blood loss sometimes reached 2.5 liters. Laparoscopic echinococcectomy was performed with localization of EC in II, III, IV, V, VI segments, the former was not used in disseminated echinococcosis of the liver and in the localization of EC in segments I, VII and VIII. The use of laparoscopic surgery for echinococcosis of the liver allowed to reduce intraoperative blood loss by 9 times ($p=0.0001$); duration of operation – from 3.5 to 1.5 hours (2 times) ($p>0.05$), hospital stay – from 10 to 3 days (3.5 times) ($p=0.002$); recurrences occurred in 2 (2.8%) cases with laparotomy access.

In the postoperative period, bleeding was observed in 1 (1.4%) patient, which was stopped by welding electrocoagulator EC-300M "Svarmed". The use of this method allowed to reduce blood loss from 2200±210 ml to 250±50 ml, slight bile leakage was observed in only 7 (9.7%) patients, no recurrence was observed with this method. Right-sided exudative pleurisy was noted in 3 (4.2%) patients. Recurrences occurred in 2 (2.8%) cases, where in one patient the course of the disease was complicated by a burst of EC into the pleural cavity, in another – in the biliary tract. We had no fatalities after these interventions.

Thus, for a long time the clinical course of echinococcosis was asymptomatic, resulting in 16 (22.2%) patients with complicated forms of echinococcosis (suppuration of the cyst, burst into the free abdominal cavity, burst into the pleural cavity, burst into the biliary tract); 18 (25.0%) – had fusion of the cyst with neighboring organs (stomach, gallbladder, diaphragm, omentum); in 16 (22.2%) – bile fistulas were opened in the EC lumen, which in total amounted to 50 (69.4%) cases of the total number of patients with EC [8]. It is in them on admission there were complaints of pain in the right hypochondrium, periodic fever, skin rash, itching, jaundice. In the diagnosis of EC ultrasound was the main, CT was performed to identify daughter and grandchildren's cysts and determine the scope of the operation, MRI – in patients with complicated EC. In these 48 (66.7%) patients we managed to perform pericystectomy, where due to the use of welding electrocoagulator EC-300M "Svarmed" it was possible to radically remove the EC capsule, achieve stable hemostasis and prevent bile leakage. Laparoscopic echinococcectomy without capsule damage was performed in 12 (16.7%) patients with uncomplicated forms of EC.

CONCLUSIONS

1. Echinococcectomy with complete excision of the fibrous capsule of the liver – pericystectomy, is a radical and effective operation as for complete recovery and recurrence of the disease.
2. The use of welding electrocoagulator EC-300M "Svarmed" in the thermal rehabilitation of the walls of the residual cavity after echinococcectomy allowed to reduce blood loss from 2200±210 ml to 250±50 ml ($p=0.0001$), recurrence – from 2.8% to 0%, virtually avoid bile leakage.
3. Laparoscopic echinococcectomy managed to reduce intraoperative blood loss by 9 times ($p=0.0001$); duration of operation – by 2 times ($p<0.05$), hospital stay – by 3.3 times ($p=0.002$). It is possible to apply this method at localization of echinococcal cyst in II-VI segments of a liver.

Conflict of interest. The authors declare no conflict of interest.

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