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CURRENT APPROACHES IN THE TREATMENT OF LIVER HYDATID ECHINOCOCCOSIS

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Summary. This research aimed to enhance the efficacy of surgical treatment for liver echinococcosis by incorporating cutting-edge technologies. Over a decade, 213 patients underwent surgery at the "Astghik" Medical Center, with 43 individuals presenting complicated forms of the disease. The patients were divided into two groups: the first undergoing open echinococcectomy (159 patients), and the second undergoing closed echinococcectomy using advanced equipment (54 patients).

The study provided comprehensive insights into patient demographics, concomitant diseases, and diagnostic methods, emphasizing the importance of serological reactions for accurate diagnosis. Notably, the second group's closed echinococcectomy demonstrated superior outcomes, including shorter treatment durations, reduced postoperative bleeding, and fewer complications compared to the open surgery group. Furthermore, the recurrence rate in the closed echinococcectomy group was significantly lower, highlighting its efficacy in preventing disease relapse.

Postoperative care and outcomes were meticulously examined, showcasing that patient in the closed echinococcectomy group experienced quicker recovery and fewer complications, leading to a higher rate of complete recovery upon discharge. The study also addressed the financial aspect, emphasizing the cost-effectiveness of the closed echinococcectomy approach, reducing financial burdens associated with antiparasitic drug treatment.

In conclusion, the research underscores the benefits of closed echinococcectomy, recommending its preference whenever possible due to its effectiveness in preventing complications, reducing recurrence rates, and optimizing postoperative recovery, all contributing to improved patient outcomes.

Key words: liver echinococcus, ideal echinococcectomy, Surgical Treatment, Closed Echinococcectomy, Postoperative Complications, Concomitant Diseases.

СОВРЕМЕННЫЕ ПОДХОДЫ К ЛЕЧЕНИЮ ЭХИНОКОККОЗА ПЕЧЕНИ

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Резюме. Цель данного исследования заключается в повышении эффективности хирургического лечения эхинококкоза печени с использованием передовых технологий. За десятилетие 213 пациентов прошли операции в медицинском центре "Астгик", причем 43 человека имели осложненные формы заболевания. Пациенты были разделены на две группы: первая прошла открытую эхинококкэктомию (159 пациентов), а вторая – закрытую эхинококкэктомию с использованием современного оборудования (54 пациента). Исследование предоставило всесторонний обзор демографии пациентов, сопутствующих

заболеваний и методов диагностики, подчеркивая важность серологических реакций для точного диагноза. Отмечено, что закрытая эхинококкэктомия второй группы продемонстрировала превосходные результаты, включая более короткие сроки лечения, уменьшение послеоперационного кровотечения и меньше осложнений по сравнению с группой открытой хирургии. Кроме того, уровень рецидивов в группе с закрытой эхинококкэктомией был значительно ниже, что подчеркивает ее эффективность в предотвращении повторного заболевания. Тщательно рассмотрены послеоперационный уход и результаты, показав, что пациенты в группе с закрытой эхинококкэктомией переживают более быстрое восстановление и меньше осложнений, что приводит к более высокой степени полного выздоровления при выписке. Исследование также затрагивает финансовый аспект, подчеркивая экономичность подхода с закрытой эхинококкэктомией, снижая финансовые бремена, связанные с антипаразитарным лечением. В заключение исследование подчеркивает преимущества закрытой эхинококкэктомии, рекомендуя отдавать предпочтение этому методу при возможности из-за его эффективности в предотвращении осложнений, снижении уровня рецидивов и оптимизации послеоперационного восстановления, что способствует улучшению результатов лечения пациентов.

Ключевые слова: эхинококк печени, идеальная эхинококкэктомия, хирургическое лечение, закрытая эхинококкэктомия, послеоперационные осложнения, сопутствующие заболевания.

Introduction. Armenia, as well as the whole Caucasus, is considered to be the endemic focus for echinococcus. The occurrence of the disease is quite high and continues to grow [1,2,3].

According to the international literature, the probability of recurrence of the disease after echinococectomy ranges from 3-54% [4,5,6], while some of the described cases of relapse had a fatal outcome.

Echinococcosis is often associated with numerous complications that can result in patient disability, prolonged disability, and even death [7-12]. Additionally, according to the World Health Organization (WHO), the cost of treating a single patient with echinococcosis is approximately 10,000 US dollars due to the extended duration of treatment (10-15 years) [13].

A number of studies indicate that echinococcal lesions are most commonly found in about 50-70% of cases. Complicated forms of liver echinococcosis occur in 15-35% of patients, and the mortality rate of the disease ranges from 12% to 25%. Relapses of the disease are observed in 6.2%-16.0% of patients [7-9,14-16]. The implementation of comprehensive measures to prevent the spread of parasites in the body during echinococectomy, along with postoperative administration of antiparasitic drugs, has contributed to a certain degree of treatment effectiveness [13,17]. However, early diagnosis, effective treatment and prevention of complications, associated with liver echinococcosis, remain urgent priorities in the field of medicine.

The aim of the study is to enhance the effectiveness of surgical treatment for patients with liver echinococcosis by using the latest technologies.

Materials and Methods. The study enrolled 213 patients who underwent surgery for liver echinococcosis at “Astghik” Medical Center (formerly “Natalie-Pharm” or “Malatia” Medical Center) over a 10-year period from 2006 to 2016. Among these patients, 43 individuals (20.2%) had complicated forms of the disease. 55.9% (n=119) were women, and 44.1% (n=94) were men out of the total patient population (Fig. 1).

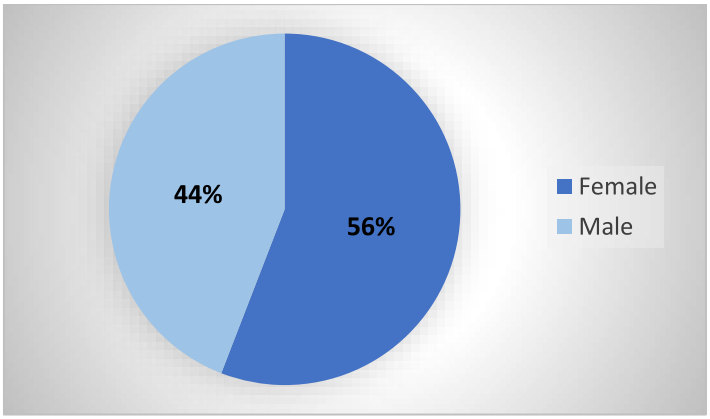

Fig. 1. Gender distribution of studied patients.

The average age of the patients was 42.1, with a range of 19.3 to 79. 16.9% of patients (n=36) among the study participants had concomitant diseases. Among them 55.6% (n=20) had cardiovascular diseases, 5.6% (n=2) had respiratory system diseases, 8.3% (n=3) had thyroid diseases, 36.1% (n=13) had obesity of III-IV degree and 41.7% (n=15) had diabetes mellitus. Among the patients, 52.8% (n=19) had disorders in two organ systems and 25% (n=9) had disorders in three organ systems (Fig. 2).

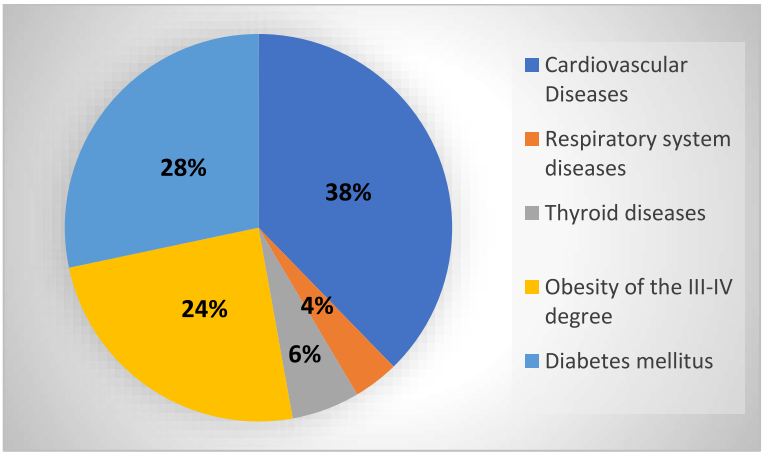

Fig. 2. Concomitant Diseases of studied patients.

The patients were divided into two groups for the study. The first group comprised 159 patients who underwent open echinococcectomy for the surgical treatment of liver echinococcosis, while the second group consisted of 54 patients who underwent closed echinococcectomy (Fig. 3). In case of closed echinococcectomies, atypical liver resections were performed using advanced equipment, including ligature and Argon-plasma coagulation modules as well as the Harmonic scalpel. These technological advancements allowed for an optimal echinococcectomy by minimizing postoperative bleeding of the liver and biliary tract

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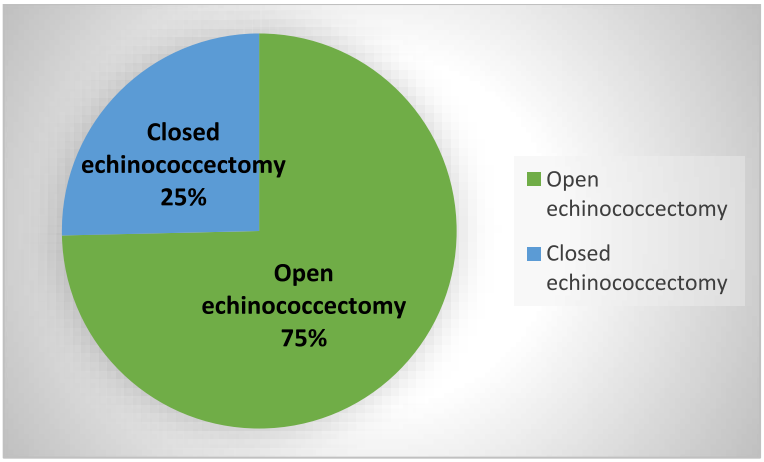

Fig. 3. The surgical treatment of the echinococcosis among studied patients.

Prior to the operation, all these patients underwent necessary clinical and laboratory tests. The diagnosis of liver echinococcosis relied significantly on ultrasound and computer stratigraphy, providing precise information regarding the number, size and location of echinococcal cysts as well as the presence of daughter cysts and complications associated with residual cavities. In recent years, serological reactions (RPLA, RNGA, IFA) have played a crucial role in the differential diagnosis of echinococcosis. Positive results in these serological tests indicate the presence of echinococcal cysts. Unfortunately, few surgeons pay sufficient attention to this diagnostic method, resulting in occasional errors (such as misdiagnosing liver hemangioma, solitary cyst, amoebic abscess, tumor, etc.) that can affect surgical tactics and pose challenges for the operating team.

Results. In the study, echinococcal cysts were detected in the right lobe of the liver in approximately 86.4% (n=184) of the included patients, while around 13.6% (n=29) had cysts in the left lobe. Among the patients, the size of the echinococcal cysts was less than 5 cm in about 14.5% (n=31), between 5 and 10 cm in approximately 55.9% (n=119), and larger than 10 cm in around 29.6% (n=63). Echinococcal hydatid cysts with a unilocular appearance were observed in

about 80.3% (n=171) of the patients, while approximately 19.7% (n=42) had multilocular cysts.

The average duration of treatment for patients in the first group (n=159) undergoing investigation was 13.8±6.6 (8-47) days(b/d), while for patients in the second group (n=54), it was 8.2±2.4 (6-12) days(b/d). After the surgery in the first group of patients, the duration of drains placed in the abdominal cavity ranged from 7 to 23 days(b/d), while in the second group, it ranged from 2 to 6 days(b/d). Additionally, in the first group, 11.9% of patients (n=19) experienced biliary bleeding in the postoperative period after drainage of the echinococcal cavity. This resulted in longer hospitalization and delayed recovery of working capacity. In the second group, only 1 patient had bile outflow from the abdominal drainage, which ceased by the third postoperative day. Regarding patient outcomes, in the first group, 59.7% (n=95) were discharged from the hospital with complete recovery, while 40.3% (n=64) showed improvement in their health but still experienced a temporary decrease in working capacity. In the second group, 83.3% (n=45) of patients were discharged with complete recovery, and 16.7% (n=9) showed improvement in health but had a temporary decrease in working capacity.

Due to the recurrence of liver echinococcus, repeated treatment was carried out in 6 patients of the first group (3.8%), while 66.7% of patients were re-hospitalized 6-18 months after the first operation. Due to the recurrence of liver echinococcus, repeated treatment was performed in 6 patients of the first group, accounting for 3.8% of the total. Additionally, 66.7% of patients required re-hospitalization within 6-18 months following the initial operation due to the recurrence of the disease.

In the postoperative period, a residual echinococcal liver cavity was detected in only 7.5% (n=12) of patients in the first group while 6 individuals (50%) developed an abscess within the residual cavity, and 1 patient experienced a change in the volume of the residual cavity resulting in mechanical jaundice. Among cases with residual echinococcal cavities in the liver (n=11), surgical intervention was avoided in 91.7% of instances. These patients underwent percutaneous intervalvular drainage of the residual cavities under local anesthesia, with the procedure guided by CT or ultrasound. Adequate sanitation, appropriate antibacterial treatment and antiparasitic drug therapy were provided. In the second group, no recurrence of liver echinococcus or residual echinococcal cavity was observed during the postoperative period.

In the postoperative period, patients in the first group were prescribed antiparasitic medication as a necessary treatment measure. They received Albendazole 400 mg twice a day according to a specific 28-day regimen, repeated in a three-course regimen. The costs associated with antiparasitic drug treatment were also analyzed comparatively. On average, the cost of using Armenian Albendazole was approximately 35,000-40,000 AMD, while the cost of a foreign drug with the same name, following a three-course regimen, ranged from 230,000 to 380,000 AMD. Therefore, in the second group, where an ideal echinococectomy was performed, it becomes possible to avoid both excessive financial expenses and potential hepatotoxic and other side effects associated with antiparasitic drugs during the postoperative period.

Discussion. Thus, according to the results of our study, considering the benefits associated with closed echinococectomy (such as the absence of residual cavities, prevention of postoperative complications, no risk of dissemination and avoidance of multi-stage antiparasitic drug treatment in the postoperative period), we recommend, whenever possible, the use of closed echinococectomy.

A retrospective cohort study from Nyingchi, China, assessed short-term outcomes in patients with hepatic cystic echinococcosis who underwent either conservative or radical surgery [18]. This study, while not comparing open versus closed procedures directly, does provide insight into different surgical approaches. It found that radical surgery was associated with a lower risk of overall morbidity compared to conservative surgery, even after adjusting for various covariates. However, radical surgery was also associated with higher levels of blood loss during surgery, although it resulted in shorter surgery times.

Additionally, a comprehensive clinical trial was conducted in Turkey to evaluate the efficacy and safety of laparoscopic versus open surgery for the management of cystic echinococcosis of the liver [19]. The objective was to demonstrate that there is no difference in the rate of recurrence 2 years after laparoscopic compared to open management of the condition. This trial's design is significant because it is a randomized, controlled trial that assesses the long-term recurrence rates, which are crucial for determining the success of the surgical approach in echinococcosis treatment.

When comparing the methodology, our study enrolled patients who underwent surgery for liver echinococcosis at a single medical center over 10 years. The Chinese study is a retrospective cohort study analyzing short-term outcomes based on the type of surgery performed, either conservative or radical, and includes various covariates for analysis. [18] The Turkish clinical trial is a multicenter, randomized, double-blind, parallel-group study comparing laparoscopic versus open surgery for hepatic cystic echinococcosis with a follow-up period of 2 years to assess recurrence rates [19].

While our study and the Chinese study use retrospective data, the Turkish study uses a randomized controlled trial design, which is the gold standard for clinical trials due to its potential to minimize bias.

If we compare patient demographics, in our study, the patients' average age was 42.1, with a gender distribution of 55.9% female and 44.1% male. The Chinese study had a cohort with a mean age of 41.3 years, with a slight female preponderance of 53.1% [18]. The Turkish study does not specify the demographics in the provided information, but it was conducted across multiple sites and thus might have a diverse patient population [19].

The demographics in the Chinese study are quite comparable to those in our study, suggesting that the findings might be relevant to a similar patient population.

While our study measures outcomes such as the presence of residual cavities, complications, length of hospital stay, and rates of recurrence and recovery, the Chinese study focuses on overall morbidity, bile leakage, pleural and lung complications, and hypoalbuminemia, along with factors associated with these complications [18]. The Turkish study primarily measures cyst recurrence over a 24-month period post-surgery, providing data on the long-term efficacy of the surgical approach [19].

The outcome measures across all studies are consistent with common clinical endpoints for surgical treatments of echinococcosis. The Chinese study provides insight into short-term complications, which could be useful for your study's focus on improving surgical outcomes. The long-term recurrence rates from the Turkish study could provide a benchmark for assessing the effectiveness of the procedures over time.

It's crucial to consider the methodology's impact on the findings when comparing these studies. The randomized controlled design of the Turkish study, for instance, is likely to provide strong evidence for the equivalence or non-inferiority of laparoscopic surgery compared to open surgery. The retrospective nature of your study and the Chinese study might make them more susceptible to selection bias, but they still provide valuable real-world data on the outcomes of surgical treatment for liver echinococcosis.

While our study focused on closed echinococectomy, the results from other forms of radical surgery also suggest benefits in terms of reducing postoperative complications and morbidity. The randomized controlled trial from Turkey may provide high-quality evidence due to its design, potentially supporting the use of minimally invasive techniques in the management of hepatic echinococcosis. This could reinforce the suggestion that less invasive procedures, such as closed echinococectomy, may be preferred when feasible.

The implications of our study's findings in the context of the broader research on surgical treatments for liver echinococcosis are multi-faceted. Our study suggests that closed echinococectomy is preferable, highlighting its benefits such as reduced postoperative complications and absence of residual cavities. When compared to the Chinese retrospective cohort study, which indicated a lower risk of overall morbidity with radical surgery [18], our study could suggest that closed echinococectomy, as a less invasive radical option, may offer similar or even superior short-term outcomes. The findings advocate for a shift in surgical practice toward minimally invasive techniques where feasible.

Our study touches upon the economic aspect, with closed echinococectomy being more cost-effective due to the shorter duration of treatment and potentially less postoperative medication needed. This is particularly significant in the face of the WHO's report on the high costs associated with echinococcosis treatment. In healthcare systems, especially where resources are limited, your study's findings could influence policy decisions regarding the allocation of funding and resources for the management of echinococcosis.

Given the Turkish randomized controlled trial aiming to compare recurrence rates after two years [19], your study's implications could extend to the importance of long-term follow-up. Your findings might prompt further investigation into whether the advantages of closed echinococectomy observed in the short term translate into sustained benefits, such as lower recurrence rates, in the long term.

Our study could contribute to the refinement of clinical practice guidelines. If closed echinococectomy demonstrates a clear advantage in various metrics, there may be a push to standardize this approach as the first-line treatment, potentially updating surgical protocols and training to reflect this preference.

Given the endemic nature of echinococcosis in certain regions, the implications of finding a more effective and less costly surgical intervention are significant. It could lead to more accessible treatment for populations in endemic areas, ultimately reducing the disease burden.

Improvements in surgical techniques that lead to fewer complications and shorter recovery times can significantly impact the quality of life for patients. Our study could help healthcare providers make more informed decisions that prioritize not only the clinical outcomes but also the well-being and comfort of patients post-surgery.

Future Research Directions. The study opens avenues for future research, particularly in

comparing the different types of echinococectomy techniques. Understanding why closed echinococectomy results in better outcomes could lead to improvements in surgical methods and postoperative care protocols.

Conclusion. Based on the study results, the recommendation was made to prefer closed echinococcectomy whenever possible. This conclusion was drawn considering the benefits associated with closed procedures, including the absence of residual cavities, prevention of postoperative complications, and avoidance of multi-stage antiparasitic drug treatment in the postoperative period. Closed echinococcectomy, as highlighted in the study, offers a more favorable outcome for patients undergoing surgical treatment for liver echinococcosis.

Our study contributes valuable data to the ongoing discussion about the best surgical practices for treating liver echinococcosis. By highlighting the benefits of closed echinococectomy, it supports the trend toward less invasive surgical techniques, which could have a profound impact on patient care and healthcare resource utilization.

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