

IMPROVEMENT OF THE METHOD FOR ANTIPARASITIC AND ANTI-INFLAMMATORY TREATMENT OF THE RESIDUAL CAVITY OF AN ECHINOCOCCA CYST

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Abstract. *The article presents the results of experimental and morphological studies aimed at solving the issue of treating the cavity of an echinococcal cyst with various antiseptics and assessing the effectiveness of laser radiation. Experiments performed in the laboratory of Republican specialized scientific and practical medical center for surgery named after V.Vakhidov. The main objective of the experimental study was to evaluate the effect of laser exposure in combination with treatment with various antiseptics on the germinal elements of echinococcal fluid and the fibrous layer of the capsule of parasitic cysts. For this purpose, the study is divided into 2 large series. Each series was carried out sequentially. In the first series, the authors gave a macroscopic (visual) and microscopic assessment of each sample.*

Keywords: *echinococcus, laser, residual cavity, treatment, laser irradiation, cyst.*

Relevance: Echinococcal disease is endemic in the Mediterranean, South America, the Far East, Central Asia and Eastern Europe. However, it is also commonly observed in non-endemic countries due to increased travel worldwide [1,3,7,9]. About 4000 diagnoses of echinococcosis are registered annually in Turkey [8].

F.A.Ikhamov analyzed the results of treatment of 34 patients with purulent residual cavities in the liver (RCL) after echinococectomy. In 31 patients, a new method of elimination was used RCL, which consisted of percutaneous puncture and drainage of the infected cavity, followed by transdrainage laser irradiation of its walls with nitrogen UV laser and a helium-neon laser in the visible spectrum. Transdrainage irradiation was carried out against the background of daily procedures of percutaneous laser irradiation of the liver (gallium arsenide infrared laser). The minimal trauma of percutaneous interventions and the pronounced antibacterial, anti-inflammatory and stimulating effects of low-energy lasers have significantly improved the results of treatment of patients RCL [1,2,4,5,6].

Target. Improve the results of surgical treatment by combining an antiseptic drug and laser radiation.

Materials and methods. The objective of the new method is to improve the results of surgical treatment of liver echinococcosis, complicated by suppuration, through combined intraoperative antiparasitic and anti-inflammatory treatment of the residual cavity.

In this context, the closest is the method of treating the cyst cavity with a defocused beam of a carbon dioxide CO₂ laser; a method of antiparasitic treatment with a solution is also known FarGALS. The disadvantage of treating a cyst cavity with a CO₂ laser is that radiation in this spectrum does not penetrate wet tissue, and when treated with a solution FarGALS, as well as other chemicals, it is possible to preserve the viability of scolex in daughter cysts, as well as in the fibrous capsule.

Taking into account the fact that morphological studies showed the presence of living germinal elements of the parasite not only in the echinococcal fluid, on the surface of the fibrous capsule, but also in its thickness, we decided to enhance the germicidal effect not only through photoactivation of the solution FarGALS, but also by manipulating another variant of physical impact on the entire surface of the fibrous capsule. Surgical laser LAKHTA-MILON, which was used in our study provides the possibility of using waves of different lengths, and therefore we recommend using this technology twice during treatment of the residual cavity. In this case, additional radiation delays the operation time by only 2-3 minutes.

The proposed method of eliminating an hydatid cyst complicated by suppuration is carried out by removing the remnants of the maternal membrane, as well as daughter and grandchild bladders, suturing biliary fistulas (if any) and treating the residual cavity of the cyst (fibrous capsule) with infrared laser radiation (surgical laser LAKHTA-MILON, Russia) with a wavelength of 910 nm, a power of 20 W in a pulse-periodic mode with a spot area of 1 to 2 cm² for 2-3 seconds per field, then the cyst cavity is treated with a solution FarGALS in a dilution of 1:3 for 3 minutes, after which the residual cavity is irradiated with the same laser in the green spectrum with a wavelength of 520 nm, a power of 0.5-1.0 mW in continuous mode with a spot area of 1 cm² for 3 seconds for each field (for each 1 cm² of fibrous capsule for 3 seconds), then the residual cavity is drained with a tube brought out through the skin.

Advantages of the method:

- laser radiation in the 910 nm spectrum penetrates deeply (up to 7 mm) into the fibrous capsule of the residual cyst cavity, especially in a humid environment;
- radiation with a power of 20 W and a duration of 2-3 seconds completely destroys the cellular structure of the parasite, even when located inside the daughter bladder or in the thickness of the fibrous capsule;
- FarGALS, has a powerful antiparasitic property and its effect is enhanced after laser treatment of tissues, which provides an additional antiparasitic effect;
- laser irradiation of the fibrous capsule of the residual cavity in the 520 nm spectrum after its treatment with a solution FarGALS provides increased local anti-inflammatory effect and microcirculation, as well as acceleration of reparative processes.

The method is carried out as follows. A patient with liver echinococcosis undergoes an upper-median laparotomy; after revision, the area of cavity formation is covered with gauze swabs, after which the hydatid cyst is punctured; if there is thick content and it is impossible to remove it through a puncture needle, the fibrous capsule is opened and the chitinous membrane is removed, and if all daughter parts are present and grandchild cysts in compliance with the recommended principles of aparasiticity. After removing all the contents, the residual cavity is treated with a 3% solution of H₂O₂ (hydrogen peroxide), after which bile fistulas are inspected and, if identified, sutured. Next, the entire internal surface of the residual cavity (fibrous capsule) is irradiated infrared spectrum of a surgical laser «LAKHTA-MILON» (Russia) with a wavelength of 910 nm, a power of 20 W in a pulse-periodic mode, while the laser spot area is from 1 to 2 cm², respectively, the entire surface of the capsule is irradiated for 2-3 seconds per field (laser spot area), then the residual cavity of the cyst is treated with a solution FarGALS in a dilution of 1:3 for 3 minutes (with a wide dissection of the fibrous capsule, it is possible to use a solution soaked FarGALS gauze swab), after which the remaining solution is removed by suction and the residual cavity is irradiated with a laser «LAKHTA-MILON» but already in the green spectrum with a

wavelength of 520 nm, a power of 0.5-1.0 mW in continuous mode with a spot area of 1 cm² for 3 seconds per field (for each 1 cm² of fibrous capsule for 3 seconds), then residual the cavity is drained with a tube brought out through the skin. The surgical wound is sutured in layers.

To perform the method, it is necessary:

- antiseptic drug FarGALS in its pure form, antiseptic drug FarGALS, diluted with water for injection in a ratio of 1:3.

- Surgical laser «LAKHTA-MILON» - laser device for resection and coagulation.

Conclusion. In case of liver echinococcosis complicated by suppuration, after the traditional stage of removing the parasite and treating the residual cavity using the proposed method, maximum excision of the fibrous capsule is recommended within acceptable limits in relation to the liver parenchyma, while if wide abdominal dissection is performed, then drainage of the residual cavity and adjacent space is possible with a single drainage.

The timing of drainage of the residual and abdominal cavity after operations for complicated echinococcosis of the liver should be limited and the indication for drainage removal is the absence of bile or purulent discharge, as well as a tendency, according to ultrasound data, to collapse or decrease in the residual cavity without the presence of hyperechoic liquid contents in it.

Thus, the proposed method of treating the residual cavity after surgery for liver echinococcosis with a combination of laser irradiation, complicated by suppuration, will reduce the duration of the postoperative hospital stage, the duration of drainage, and the overall incidence of complications.

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