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SURGICAL TREATMENT OF LUNG AND LIVER ECHINOCOCCOSIS

ABSTRACT

The article reports the analysis of the results of examination and treatment of patients with lung and liver echinococcosis. According to the analysis, in most cases we observed lung damage with a significant lack of hydatid cysts in the liver, which is not complying with the all-Russian statistics as a whole. Patients were forwarded to our department from different out- and in-patient facilities. Based on the data of instrumental and laboratory studies, all patients underwent echinococectomy combined with antiparasitic therapy.

Keywords: echinococcosis, surgery, diagnosis of echinococcosis, echinococectomy.

The causative agent of hydatidosis is the tapeworm *Echinococcus granulosus*, which parasitizes in carnivores. According to modern classification, echinococcus refers to the Scolecida lower worms supertype, the Plathelminthes flatworms type, the Cestoda tapeworms class, the Cyclophyllidea order, the Taeniata suborder, the Taeniidae family, the *Echinococcus* species and the *Echinococcus granulosus* genus.

The ultimate owners of *E. granulosus* are representatives of the canines: dogs, jackals, wolves, dingoes, foxes, coyotes, hyenas, etc., in intestine of which the mature tapeworms parasite by length of 3.4-6.2mm, by width of 0.47-0.98 mm, consisting of a head (scolex) with four bothriums and a double crown of hooklets (38-40 ones), a neck and 3-4 segments. The last one, a mature segment, has a queen containing 400-800 eggs round or oval in shape by diameter of 0.030-0.036 mm. Inside the egg there is a thick-covered hexacanth and an embryo with six hooklets. Mature segments depart with excrement, some creep out actively. The segments departed with excrement are mobile and are able to spread out in a radius of 20-30 cm, disseminating the environment with hexacanth [4]. The intermediate hosts of the parasite are men and livestock. At that, a man can be regarded as a peculiar biological deadlock in the development of the parasite [1].

In humans, the typically affected organs are liver - in 60% of cases, lungs - in 30% of cases and other ones - in 10% of cases [1, 4]. The main source of human invasion is the dog. Human infection occurs through the alimentary way, contaminated water and poor personal hygiene. *Echinococcus* embryo develops to a parent cyst (larvotsista), whose wall consists of an outer and an inner germinal cuticular

membranes. The bubble filled with liquid in which evaded scolexes and brood capsules freely fluidize - the so-called hydatid sand. The outside cyst is surrounded by a dense connective fibrous capsule, carrying a protective function, preventing the parasite from mechanical damage and impact factors of the host immune defense. According to recent reports, there is indirect evidence that increase in the number of stray dogs in settlements, their high prevalence with echinococcosis, the intensity and extent of eggs excretion at sexually mature worms, hexacanth stability in the external environment are major factors in the spread of vermination and morbidity. This causes the issue of the echinococcosis urgency for practical public health.

MATERIAL AND METHODS

We analyzed 107 patients with echinococcosis from 2003 to the present day, being treated in the Republic's Hospital № 1 - NCM, Department of Surgery № 1 and № 2. Of them, there were 60 women and 47 men. Patients were from 16 to 82 years of age. 104 patients were in the working age. It is believed that the incidence of echinococcosis occurs in people from rural areas, with a particular occupation (hunting, fell dressing). In this regard, the analysis was carried out depending on the place of residence and occupation (Diagram 1).

From the given diagram it is seen that urban residents are dominating in the group studied including 36 cases from Yakutsk and 16 patients from Olekminsk.

According to ethnic composition, the distribution is as follows: Yakuts - 55, Russians-32, Evenkis - 11, Yukagirs, Chukchi, Germans, Chinese - by 1 case, Tajiks - 2, Uzbeks - 3.

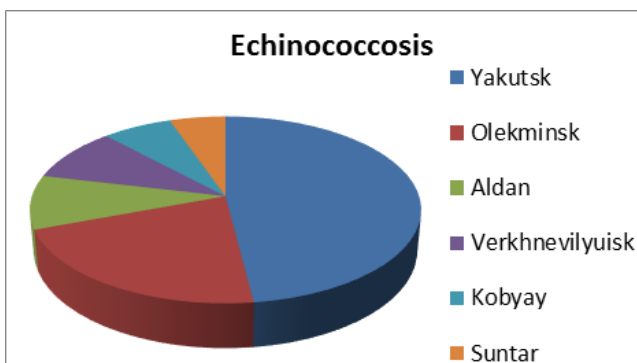
By occupation office employees prevail - 59 cases, while there were only 13 hunters or persons associated with fell dressing activities, working men make up 17, unemployed - 18 ones. Thus, the majority of vermination reported in patients is not connected with the profession related to processing of furs and hunting.

The patients had been directed to the NCM from the different hospitals and primary hospital care units. Diagnosis was mainly conducted at the community-based clinics, during medical examinations, examinations for other reasons (76.7% of cases). At the same time 81.3% of the cases revealed the cyst localizing in the lungs without liver disease.

In 23.3% echinococcosis went with various symptoms such as jaundice (20.6%) and abscess formation (2.7%)

By hydatid cyst localization the patients distribution was as follows (Table 1):

As can be seen from Table 1, in 69.1% of cases the cyst localized in the lungs, in 26.1% of cases in the liver. According to



Distribution of patients with echinococcosis residence

the literature, based on the pathogenesis of echinococcus growth in the intermediate host, the cyst develops when the hexacanth gets to the liver from the gastrointestinal tract through the portal system. Therefore, the most of hydatid lesions localize specifically in the liver. Given the massive invasion and weakening of the liver, many hexacanth get through a small circle of blood circulation into the lungs, through a large circle - into the brain, bones, etc. According to our data, on the other hand, 69.1% have a primary asymptomatic lesion of the lungs with a sound lack of hydatid cysts in the liver, which is generally contrary to the pathogenesis of the disease commonly known. At the same time, it should be emphasized that the hydatid disease refers to understudied ones, and, in our opinion, not all of the pathogenic mechanisms of the disease are explored.

Methods of testing at the hospital link is quite standard and included laboratory tests, ultrasound, X-ray examination in different projections, CT, MRT, linked immunosorbent assay for echinococcus.

The blood eosinophilia was observed in only 23% of cases, which corresponds to other authors' data. In our opinion, this may be due to the fact that the initial localization in the lungs is caused by the airborne penetration of the parasite, and thus there is no sensitization. Under biochemical studies, abnormalities in the form of increased transaminases and bilirubinemia were recorded in 23.3% of cases. Specific reaction (linked immunosorbent assay) were informative in more than 74% of cases.

In 4.2% of hydatid infestations more careful differential diagnosis was required with liver tumors. The examination included MRT, selective angiography. Thus, in most cases adequate diagnostic approach presents no particular difficulties.

RESULTS AND DISCUSSION

The study found out that of 107 patients were treated, 104 ones were of working age (97.2%). At the same time most of the studied lived in the city, which changes the postulate that the hydatid disease is of rural residents. It should be noted that the ethnic composition data, the occupation (prevalence of office employees) show that at the present time, the spread of echinococcus lesions are more extensive and the invasion occurs in the absence of direct contact with wild animals when hunting or fur processing.

Classical picture of echinococcus infection occurs through the alimentary way, with the release of hexacanth under activity of digestive juices. Therefore, it was thought that the lung damage, and a rare invasion occurs only after passing the liver barrier and respectively heavy defeats arise combined with dissemination to all organs. According to our data, the lung lesions are by an order of magnitude (69.1%) greater and at that in most cases are asymptomatic, and the focal area is detected during medical examinations or examinations for other reasons. Therefore, apparently, there is an aerogenous way of infestation. Eggs from the parasite are inhaled with dust and under the influence of airway mucus secretion they begin to lose their coat and start developing [2, 3, 5]. It can be assumed that invasion through the respiratory tract is influenced by many factors such as weakening of the protective properties of the bronchial mucosa when smoking and under various embodiments of inflammatory diseases. According to our data, 94% of invasions into lung tissue are connected with smoking. But at the same time, there are no reliable statistics on the issue in connection with which a detailed study is necessary of the pathogenesis of echinococcus aerogenous invasion.

Table 1

Surgical treatment methods applied for the treatment of patients about echinococcosis of lungs

Localization	Пациенты (107)
Lungs	74 (69,1%)
Liver	28 (26,1%)
Associated lesions (lung, liver, spleen)	5 (4,7 %)

All patients were surgically treated in various intervals in combination with antiparasitic therapy. The data on the held surgical procedures in the thorax is shown in Table № 2.

As seen from the table, most of the surgery was performed with removal of hydatid liquid. Even with a single cyst in 56 observations, an open echinococectomy was provided. Cyst cavity treatment was carried out by the usual method. The closed echinococectomy was performed only in one case. 12 patients underwent hardware resection of 1 or more segments.

Surgical procedures performed in the abdominal cavity were as follows (Table № 3).

As can be seen from the table, attention is drawn to a high percentage (over 36%) of laparoscopic Echinococectomy in the amount of atypical liver resection. Hemihepatectomy was held in 3 cases under multiple lesions of the liver and spleen. Open echinococectomy was performed in 18 cases. At the same time it should be noted that 4 patients were diagnosed with multiple cysts, and in 4 cases with combined echinococcosis of lungs and liver surgery was performed in 2 steps after the removal of cysts from the chest.

In 5 cases of combined echinococcosis and at 9 patients with multiple lesions of the liver or lungs the complexed multi-stage treatment was conducted. The technique involves the removal of the largest and the most important hy-

Table 2

Surgical treatment methods applied for the treatment of patients about echinococcosis of lungs

Type of surgery	Unit cyst on one	Multiple hydatid cysts on one easy	Multiple hydatid cysts of both lungs	Multiple hydatid cysts of lung and liver
Resection of lung segment	7	-	-	-
Open echinococectomy	54	4	1	2
Closed echinococectomy	1	-	-	-
Resection of more than one segment of the lung	1	3	1	-

Table 3

Methods of operations carried out on the liver echinococcosis

Type of surgery	Unit cyst on one segment of the liver	Multiple hydatid liver cysts	Multiple hydatid cysts of the liver, spleen	Multiple hydatid cysts of lung and liver
Laparoscopic liver resection atypical	12	-	-	-
Hemihepatectomy	-	2	1	-
Closed echinococcectomy with laparotomy	2	-	-	-
Open echinococcectomy with laparotomy	10	3	1	4

datid cysts with further therapy by the "Albendazole" medicine using the usual scheme.

The postoperative course in 103 (96.2%) patients was uneventful, 1 case was complicated with abscess formation, in 3 cases in the early postoperative period bleeding developed, requiring the repeated surgical intervention. No fatal cases were observed.

Thus, the study revealed that well-known and generally accepted pathogenetic mechanisms of echinococcosis do not disclose all aspects of the problem and there are indirect signs of atypical ways of parasite infection, which in our opinion makes the problem very relevant to in-depth study. However, I would like to note the lack of consensus in the surgical treatment of this disease, which ultimately affects the outcome. Apparently, the reluctance of surgeons to make the closed echinococcectomy is associated with the danger of cyst discontinuity under isolation and outpouring of the hydatid fluid. According to the literature, the closed echinococcectomy is held 3-4 times less than the removal of the cyst with the evacuation of the liquid containing scolexes, which is quite understandable under the surgical intervention by a thoracotomy access. On the contrary, when removing the cysts by the thoraco-

scopic procedure, the majority of surgical procedures is carried out with atypical hardware resection by the closed method, with a more favorable outcome. Therefore, there is need for development and implementation of the thoracoscopic surgery in the surgical treatment of peripherally located hydatid cysts of the lungs.

REFERENCES

1. Vetshev P.S. Musayev G.K. Ekhinokokkoz: sovremennyy vzglyad na sostoyaniye problemy [Echinococcosis: modern view on the state of the problem] Annaly khirurgicheskoy gepatologii, 2006, V. 11, № 1, P. 111-117.
2. Geller I.Y. Ekhinokokkoz (Mediko-ekologicheskiye aspekty i puti likvidatsii invazii) [Echinococcosis (Medical and ecological aspects and ways to eliminate infestations)], M.: Meditsina, 1989, P. 259.
3. Ibadildin A.S. Kidirmagambetov I.L. Zhetpisbayeva N.K. i dr. Rezul'taty lecheniya ekhinokokkoza pecheni i legkikh [Results of treatment of echinococcosis of the liver and the lungs], Vestnik Kazhskhskogo Natsional'nogo meditsinskogo universiteta, 2016, № 1, P. 362-364.
4. Polyakov N.V. Romikh V.V. Safarov R.V. Polyakov V.Y. Odnokamernyy (gidatidnyy) ekhinokokkoz [Single chamber

(hydatid) echinococcosis], Issledovaniya i praktika v meditsine, 2015, V. 2, № 1, P. 27-35.

5. Cheremisinov O.V. Meditsinskaya vizualizatsiya [Medical imaging], 2004, N 4, P.90-96.

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