THE EXPERIENCE OF USING GLYCERINE DURING THE PROCESSING OF LARVAL CYST CAVITY

The paper intends to define influence of the hot glycerine to the structure of the germinal elements and chitin surface. It also observes the extent to which the hot glycerine affects the fibrous capsule and adjoining tissue. We carried out the study of morphology of excretory capsules and protoscolexes by the influence of glycerine as warmed up until temperature 60°C, and as in room temperature. During the processing of larval cyst cavity by hot glycerine the chitin membrane, germinal elements were exposed to full destruction. This indicates to the irreversibility of changes caused by this intervention; significant changes of fibrosis capsule testify about the deep penetrating and antiparasitic effects of glycerine. The structure of excretory capsules of protoscolex is significantly changed even in applying glycerine of room temperature. Morphological investigations showed that the influence of glycerine led to structure disorders of germinal elements of echinococcus.

Key words: Germinal elements of echinococcus, larval cyst, glycerine, antiparasitic effect, recurrence.

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Introduction

The research data concerning on properties of different antiparasitic drugs show that different chemical, physical methods and interventions are used to prevent recurrence and dissemination of echinococcosis during the surgical operation; they are used in processing both residual cavity and treatment of larval cyst cavity. These chemical preparations include such chemical substances as aqueous solutions of formalin, iodine, ethanol, mercuric chloride, hydrogen peroxide, ether and glycerine. The data about effectiveness of the pointed substances is more discrepant. In view of this, none of enumerated substances was not become dominated in the surgical treatment of echinococcosis and among them there was not the absolutely safe and significantly effective substances.

Besides of the absence of the absolute antiparasitic activity the most of the pointed substances differ from the high toxicity. Germinal elements of the larval cyst such as germinative membrane, excretory capsules, small daughter and grandnephew cysts and also protoscolexes can play the important role in the etiology of the recurrent and disseminated types of echinococcosis. Sowing of the bordering to the parasites patient’s internal organs and tissues can promote to the damage of the wall of the maternal larval cyst and especially incomplete decontamination of the residual cavity by the fibroses capsule of the parasite during the surgical operation. Scanning electronic microscopy (SEM) is one of the objective methods of evaluation three-dimensional structure of the biochemical objects. However to evaluate the viability of the excretory capsules and protoscolexes after interventions of the different chemical and physical factors, SEM was rarely used.

Glycerine in pure type and in complex with other drugs is widely used in medicine. However in the surgical treatment of echinococcosis, especially in children is rarely used. Glycerine as an antiparasitic drug, as a rule is used in a room temperature. In literature there are not data regarding of using of the noted aims of the warmed up glycerine. Accessibility of glycerine, its relative safety, lower price and high bactericidal and antiparasitic activity defined our interest for the possibility of using this drug as in surgical
Materials and methods

The basic objectives tend to answer the following questions:

1. What influence the hot glycerine can render to the structure of the germinal elements and chitin surface in general?
2. In what measure hot glycerine can render to the fibroses capsule and adjoining tissue?

We carried out the study of morphology of excretory capsules and protoscolexes by the influence of glycerine as warmed up until temperature 60°C, and as in room temperature. For the light microscopy material was fixated in 10% of the formalin fluid, paraffin cuts were dyed by hematoxylin and eosin. For the SEM the specimens were fixated in 2.5% of solution of glutar aldeid on the phosphate buffer (pH 7.2) and it was additional fixated in 1% solution of four oxidated fluid of osmium in the same buffer and after dehydratation it was dried by using the method of critical point in the equipment of “НСРA2” (Hitachi, Japan) and it was raised the dust by using gold-ion method in the special equipment “IBA 3” (Eiko, Japan). The preparations were investigated by using electronic microscope “SA 405” (Hitachi, Japan).

Results and discussion

Light-optic investigation of the changes of larval cyst and adjoining of the to the fibrosis capsule tissues after interventions by glycerine showed that after intervention of cold glycerine into the cavity of larval cyst of the liver it was determined destruction of chitin surface with the lysis of germinant layer. During the processing with the cold glycerine of the cavity of larval cyst in echinococcosis of the lungs it was also determined stratification of chitin surface and partial stratification of the fibrosis surface and the germinant layer of chitin surface was destroyed and in a few cases, these features were not determined which was pointed to its lytic process.

After the intervention of the hot glycerine it was determined the same significant changes of chitin surface and fibrosis capsule as in echinococcosis of the liver and as echinococcosis of the lung. It was determined the full stratification of the chitin surface and fibrosis capsule. The processing of the cavity of larval cyst in the echinococcosis of the liver by using hot glycerine, in comparison with cold glycerine it was caused the most significant injures of the chitin surface with its stratification and full destruction of the germinant layer. In the fibrosis surface it was also determined stratification (Figure 1).

The processing of the chitin surface by the hot glycerine in the echinococcosis of the lung could cause the same changes, either in chitin surface or in fibrosis capsule, as in echinococcosis of the liver during the same processing. During the use of hot and cold glycerine in the processing of the larval cyst cavity we were not determined the significant destructive changes in the adjoining to the fibrosis capsule tissues neither in liver nor in lung (Figure 2). However in the cavity of some alveolar it was determined free erythrocytes. The cavities of the most alveolar had their own air-space.

The processing of the larval cyst cavity could cause the disorders of the integrated up to full destruction of the germinant layer. After processing of cold glycerine on the saved fragments of the germinant layer of the chitin surface it was determined the germinal elements and erythrocytes, moreover, many of them were presented by the pathological forms on the surface of germinant layer of the chitin surface, sometimes we determined a few changes in the germinal elements. During the processing by the hot glycerine it was determined the most significant destructive changes of the chitin surface especially in its germinant layer. Most often germinant layer was not determined and on the chitin surface there were many erythrocytes, most of them presented as pathological forms (Figure 3).
FIGURE 1. DESTRUCTION OF THE CHITIN SURFACE WITH FULL LYSIS OF THE GERMINANT LAYER AND STRATIFICATION OF THE FIBROSIS CAPSULE. LIVER LARVAL CYST. PROCESSING BY THE HOT GLYCERINE. G-E. 10x10


FIGURE 3. LYSIS OF THE CHITIN SURFACE OF THE GERMINAL CAPSULE AND PATHOLOGICAL FORMS OF ERYTHROCYTES DURING THE PROCESSING OF THE LIVER LARVAL CYST BY THE HOT GLYCERINE. SEM x 1000
**Figure 4.** The remains of the chitin surface of the liver larval cyst during the processing its cavity by the hot glycerine. SEM x 1000

**Figure 5.** Stratification of fibrosis capsule of the liver during the processing it by hot glycerine. SEM x 1000

**Figure 6.** Destruction of the germinal elements (excretory capsules) of the liver larval cysts during the processing its cavity by hot glycerine. SEM x 2000
The chitin surface itself was stratified and, as a rule, on its surface it was determined just a few elements of the germinant layer. On the inside surface of the larval cyst cavity it was determined the left elements of the chitin surface and destroyed fragments of the germinal elements. These changes were the same either in echinococcosis of the liver (Figure 4), or in the echinococcosis of the lung. The changes of the forms of the erythrocytes on the surface of the fibrosis capsule was the singular indicator of the destructive interventions of the different factors, such as chemical, physical and so on (Figure 4).

The increase of the amount of the pathological forms of erythrocytes in that aspect also confirmed the destructive action of the glycerine, especially hot one on the plasmatic membrane of the cells. Fibrosis capsule during the processing by the cold glycerine was also intervened by the significant stratification, but in this case it was not determined destructive injures. Fibrosis capsule both in echinococcosis of the liver and in echinococcosis of the lungs after processing of the larval cyst cavity by using hot glycerine was intervened by stratification, but with changes of the destructive character. Between stratified structures it was located erythrocytes and cells of the connective tissue (Figure 5).

In spite of the significant structural changes of the fibrosis capsule as its stratification and the presence it among the filament components of erythrocytes; in general, the capsule had its own architectonic. The presence on its internal surface of the pathological and irreversible forms of erythrocytes was pointed to the destructive influence of the hot glycerine. These influences could cause decreasing of the fertility of germinal elements. Morpho-functional formations of larval cyst and fibrosis capsule were exposed to the most destructive changes after processing of hot glycerine. In this case, in the liver it was determined its stratification of forming of the big cavities. Among filament structures it was located the cells of the connected tissue and erythrocytes.

In the lungs in the border of the stratified fibrosis capsule it was located the extended alveolar with the significant amount of erythrocytes in its cavity. The influence of cold glycerine could cause the significant changes of the form of the most germinal elements, appearing on its surfaces hollows, erosions up to full fragment destruction of the brooded capsules. Processing by hot glycerine could cause the most structural changes of the germinal elements both in larval cyst of the liver and in larval cyst of the lungs. On the surface of brooded capsules sometimes appearing on the fragments of the chitin surface it was determined the big amount of hollows, erosions and other changes which could cause the disorders of its integrity and characteristic forms (Figure 6). It resulted about the loss of viability of the germinal elements. Especially these changes were more significant in the germinal capsules locating in the gitadid fluid.

So, we carried out the morphological investigation which showed that during the processing of the larval cyst cavity by glycerine could cause the significant changes either in germinal surfaces and in germinal elements or in the chitin surface and in the fibrosis capsule. During the processing of the larval cyst cavity by hot glycerine the chitin surface and germinal elements could be intervened by the full destruction which pointed to the irreversibility of changes caused by this intervention and the significant changes of the fibrosis capsule which was confirmed by the penetration of the glycerine in its deeper structures and the antiparasitic features of the glycerine.

Apart from this, all germinal elements and germinate surface itself were intervened by the destruction with not saving the integrity of the chitin surface. It was intervened by the fragmentation and by separating from the fibrosis capsule. By the influence of glycerine as our investigation showed the structure of the brooded capsules of protoscolexes was significantly changed even in using glycerine of the room temperature.

So, morphological investigation showed the intervention by using glycerine could cause structural disorders of the germinal elements of echinococcus and it also could cause the dead of them in the level of the human organism. The carried out ultrastructural investigations by using SEM showed that by the influence of hot glycerine it was followed
up the significant changes of the most protoscolexes both in germinal surfaces and in hydatid fluid. The character of these changes pointed to its irreversibility and it was resulted about the dead of the most germinal elements. It was also determined the same character of changes in the used methods of processing of the larval cyst cavity both in echinococcosis of the liver and in echinococcosis of the lungs.

References


