

Changes in Biochemical Indicators and Electrolytes in the Blood of Patients with Echinococcosis

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Annotation: Biochemical processes (peroxide, free radical oxidation; oxidative phosphorylation, tissue respiration and electrolyte metabolism) play a significant role in the pathogenesis of metabolic and structural disorders in various pathological conditions. The content of sodium and potassium in the blood plasma are rigid hemostatic constants, depending on the balance of the processes of entry and administration of ions, as well as their transformation between cells and the extracellular environment. Regulation of the homeostasis of these cations is carried out by changes in behavior (salt consumption) and with a decrease in humoral regulation, among which the aldosterone system and atrial natriuretic hormone are of primary importance. A study of the electrolyte composition of the blood plasma of patients with echinococcus found 1. a decrease in the level of calcium, zinc, and phosphates. There is an increase in magnesium levels. 2. A decrease in the content of calcium and zinc was detected in the serous fluid. 3. It is necessary to include calcium supplements in the complex therapy of echinococcosis.

Keywords: echinococcosis, microelements, polymerase chain reaction, biochemical features, serological studies.

Relevance. Echinococcosis remains a serious public health problem in the Republic of Uzbekistan (according to Nazirov F.G. et al., 2002), which causes significant damage to the health of the population and the economy of the republic. The Republic of Uzbekistan is one of the regions endemic for echinococcosis. Every year, up to 1,500 cases of echinococcosis are registered in the republic. In recent years, the incidence of echinococcosis has remained at the level of 4.5-5.0 per 100 thousand population. Echinococcosis is registered in all regions of the republic, as well as in Karakalpakstan. [1. 2].

The disease is characterized by a chronic course, damage to the liver, lungs, kidneys and other organs and structural and functional damage to the organs in which they live [3. 4].

Echinococcosis affects people of all ages, although up to 75% are people aged 20-60 years. In various forms of echinococcosis, the liver is affected in 75-85% of cases, which is associated with the predominantly fecal-oral route of transmission of the disease, i.e. invasion of the parasite from the gastrointestinal tract with blood flow through the portal veins. In 20-25% of cases, the lungs are affected, which is explained both by the possibility of overcoming the first barrier - the liver - by the lymphogenous route, and by the possibility of airborne infection. Other organs and tissues are affected separately in approximately 0.1-1.5% of cases (rare localized echinococcosis) [5. 6. 7].

In echinococcosis, the first place is taken by disorders associated with interstitial biochemical disorders [8, 9].

Biochemical processes (peroxide, free radical oxidation; oxidative phosphorylation, tissue respiration and electrolyte metabolism) play a significant role in the pathogenesis of metabolic and structural disorders in various pathological conditions. The content of sodium and potassium in the blood plasma are rigid hemostatic constants, depending on the balance of the processes of entry and administration

of ions, as well as their transformation between cells and the extracellular environment. Regulation of the homeostasis of these cations is carried out by changes in behavior (salt consumption) and with a decrease in humoral regulation, among which the aldosterone system and atrial natriuretic hormone are of primary importance [14.15.16].

The main homeostatic constant is the concentration of calcium in the blood plasma. Ca^{2+} is the most important regulator of metabolic processes and cell functions. It is also a source for transport into cells. Necessary to ensure the functional and chemical properties of plasma proteins, enzyme activity, and the implementation of blood clotting mechanisms [10.11].

Blood plasma contains a large number of various microelements. Such as copper, cobalt, manganese, zinc, chromium, strontium, etc. play an important role in the processes of cell metabolism, are part of enzymes, catalyze their action, participate in the formation of blood cells and hemostatics, etc. [12.13].

Potassium, sodium, magnesium and chlorine are the main electrolytes in the human body [17]. In the literature available to us, we did not find studies on determining the processes of electrolyte metabolism in tissues (liver, lungs) of intermediate hosts affected by echinococcus larvae.

The purpose of this work was to study electrolyte and biochemical indicators metabolism in the blood of patients with liver echinococcosis in order to develop effective treatment tactics.

Research method. Biochemical blood analysis: determination of bilirubin level, alkaline phosphatase, cholesterol, triglycerides, computed tomography, liver ultrasound, examination of serous fluid.

Results. The work was carried out at the Research Institute of Microbiology, Virology, Infectious and Parasitic Diseases named after L.M. Isayev at Samarkand State Medical University. There were 62 people under observation - a group of 32 patients with echinococcosis, where they had 20 patients diagnosed with liver echinococcosis and 12 patients with a diagnosis of pulmonary echinococcosis.

Group 1: patients with echinococcosis: 32 people aged 16-54 years.

2-group healthy individuals control group 30 people aged 16-54 years

Of these, 18 are men (%) and 14 women (%).

Group 3 – serous fluid isolated from hydatid cysts in operated patients. $n = 20$.

The electrolyte composition of the blood was examined in all observed patients: the content of sodium, potassium, calcium, and magnesium was determined. Electrolyte metabolism was studied on a BS – 200 apparatus (HUMAN – Mindray, Germany) with special kits for determining the composition of calcium, potassium, sodium, iron, zinc, chlorides and phosphates. In addition, biochemical studies were carried out in parallel for the content of alkaline phosphatase, triglycerides, cholesterol, total protein, protein, CVP and CNP, bilirubin, aminotransferases, RID, etc.

It was found that in group 1, patients with echinococcosis had a sharply reduced calcium content - $1.936 \pm 0.09 \mu\text{mol/l}$ compared to healthy individuals - $2.71 \pm 0.04 \mu\text{mol/l}$, zinc - $6.9 \pm 0.42 \mu\text{mol/l}$ - in patients with echinococcosis, $15.4 \pm 0.98 \mu\text{mol/l}$ in healthy people. The sodium content was moderately increased: $139.4 \pm 3.9 \mu\text{mol/l}$ versus $145 \pm 4.56 \mu\text{mol/l}$ in healthy people, potassium $3.87-0.53 \mu\text{mol/l}$ in healthy people $4.45 \pm 0.25 \mu\text{mol/l}$. Increased magnesium content $1.54-0.087$ in patients, $0.99 \pm 0.07 \mu\text{mol/l}$ in healthy exit The content of chlorides and phosphates is also reduced (**Table 1**).

It was revealed that in relation to healthy individuals, the calcium content of patients sharply decreases, the level of sodium, chlorides, cholesterol and triglycerides decreases moderately. In addition, operated patients have less calcium than those in the first group. Based on the data received, a table was compiled

Thus, it was established that in the blood of patients, except for sodium, almost all electrolytes differ from those of healthy individuals. The amount of calcium, magnesium, iron, zinc and phosphates is especially changed. If magnesium levels are elevated, calcium, iron, zinc and chlorides are reduced. In the serous fluid, the levels of sodium, calcium, magnesium and phosphate are close to those in the

peripheral blood. There is much less iron and zinc in the serous fluid than in the blood. Chloride levels are reduced, but not as much.

There is a decrease in calcium in the blood of patients with echinococcus. This may explain the fact that in many patients the cysts calcify very slowly. In addition, many surgeons note that during surgery, frequent cyst ruptures occur when the cyst shell is thin. [18]. According to the literature, calcium and zinc affect the thickening of cyst membranes. Therefore, it can be assumed that the inclusion of calcium-containing drugs in the course of treatment can increase the therapeutic effect of conservative treatment.

Discussion: The study of the electrolyte composition of the blood plasma of patients with echinococcus revealed 1. a decrease in the level of calcium, zinc, and phosphates. There is an increase in magnesium levels. 2. A decrease in the content of calcium and zinc was detected in the serous fluid. 3. It is necessary to include calcium supplements in the complex therapy of echinococcosis.

Table 1. Biochemical composition of serous fluid, as well as the blood of healthy and echinococcus-infested individuals

Index	Echinococcosis patient group	Control group	Composition of serous fluid
Sodium, ml.mol/l	139,4±3,9	145±4,56	147,0±2,33
Potassium, mmol/l	3,87±0,53**	4,45±0,25	4,0±0,16
Calcium, mmol/l	1,936±0,09*	2,71±0,04	2,5±0,03
Magnesium, mmol/l	1,54±0,087*	0,99±0,07	2,0±0,09
Iron, µmol/l	13,48±0,57*	18,1±0,76	3,5±0,067
Zinc, µmol/l	6,9±0,42*	15,4±0,98	2,5±0,09
Chlorides, µmol/l	84,6±3,58**	102,5±4,67	60,0±5,33
Phosphates, µmol/l	1,98±0,11*	2,6±0,067	1,53±0,12

References

- Сергиев, В. П., Легоньков, Ю. А., Полетаева, О. Г., & Черникова, Е. А. (2008). Эхинококкоз цистный (однокамерный). Клиника, диагностика, лечение, профилактика.
- Назиров, Ф. Г., Ильхамов, Ф. А., & Атабеков, Н. С. (2002). Эхинококкоз в Узбекистане: состоянии проблемы и пути улучшения результатов лечения. *Медицинский журнал Узбекистана*, (2-3), 2-5.
- Вахобов, Т. А., Саидахмедова, Д. Б., Качугина, Л. В., & Абдуллаев, О. У. (1999). ТЕРАПИЯ ГИДАТИДОЗНОГО ЭХИНОКОККОЗА ЧЕЛОВЕКА С УЧЁТОМ БИОХИМИЧЕСКИХ ОСОБЕННОСТЕЙ ВОЗДЕЙСТВИЯ ПАРАЗИТА. *Инфекция, иммунитет и фармакология*.
- А.В.Зангинян, Г.С.Казарян, Л.М. Овсепян. Исследование перекисного окисления липидов и содержания оксида азота в крови больных эхинококкозом// Институт молекулярной биологии НАН РА 0014, Ереван, ул. Асратяна, 7. АВ Зангинян, ГС Казарян, ЛМ Овсепян - Медицинская наука Армении, 2012 - medlib.am.
- Абдуллаев, А. М. (2015). *Выбор метода лечения эхинококкоза печени при малых размерах кист* (Doctoral dissertation, Дагестан. гос. мед. акад.).
- Иманкулов, С. Б., Байгенжин, А. К., Туганбеков, Т. У., & Жампеисов, Н. К. (2015). Гидатидозный эхинококкоз—современный взгляд. *Клиническая медицина Казахстана*, (2 (36)), 11-14.
- Williams, D. S. (2015). Hydatid Cysts of the Lung and Liver. *Journal of Insurance Medicine*, 45(1), 58-60.

8. Alghofaily, K. A., Saeedan, M. B., Aljohani, I. M., Alrasheed, M., McWilliams, S., Aldosary, A., & Neimatallah, M. (2017). Hepatic hydatid disease complications: review of imaging findings and clinical implications. *Abdominal Radiology*, 42(1), 199-210.
9. NEMATİ, H. B., Hayatollah, G., Nikshoar, M., Forootan, M., & Feizi, A. M. (2016). Liver hydatid cyst and acute cholangitis: A case report.
10. Roinioti, E., Papathanassopoulou, A., Theodoropoulou, I., Simsek, S., & Theodoropoulos, G. (2016). Molecular identification of *Echinococcus granulosus* isolates from ruminants in Greece. *Veterinary Parasitology*, 226, 138-144.
11. Sattarova Xulkar G'ayratovna, Khalikov Qahhor Mirzayevich, Suvonkulov Uktam Toirovich, Usarov Gafur Xusanovich. PRINCIPLES OF THE USE OF ANTIGENS IN THE IMMUNITY DIAGNOSIS OF ECHINOCOCCOSIS DISEASE. *Thematics Journal of Social Sciences*. 2022/4/8.
12. КМ Халиков, ХГ Саттарова, ГХ Усаров, ЗА Саидмуродова. СРАВНИТЕЛЬНЫЙ АНАЛИЗ ЭФФЕКТИВНОСТИ ДВУХ СЕРОЛОГИЧЕСКИХ МЕТОДОВ ДИАГНОСТИКИ ЭХИНОКОККОЗА. *Биотехнология и биомедицинская инженерия* 218-222 стр.
13. ХГ Саттарова, УТ Сувонкулов, КМ Халиков, АС Ахмедов, ДА Тошмуродов. ПРИМЕНЕНИЕ “МЕСТНЫХ АНТИГЕНОВ” В ИММУНОЛОГИЧЕСКОЙ ДИАГНОСТИКЕ ЭХИНОКОККОЗА. *VOLGAMEDSCIENCE*. 592-593 стр.
14. Sattarova, Xulkar Gayratovna, Halikov, Qaxxor Mirzaevich, Suvonkulov, O'ktam Toirovich. Echinokokkoz kasalligini serologik tashxislashni takomillashtirish. *Monografiya. -Ilmiy kengash 7 son*, 2023-yil.
15. Саттарова Х.Г., Халиков К.М., Сувонкулов У.Т., Усаров Г.Х. Применение местного антиген при ранней диагностике эхинококкоза. *Фармация, иммунитет ва вакцина. Халқаро илмий журнал*. № 22021. ISSN 2181-2470.
16. Саттарова Х.Г., Халиков К.М., Саидахмедова К.М., Усаров Г.Х., Кодиров Н.Д., Рахмонова Ф.Э. “Состояние электролитного обмена в крови больных эхинококкозом. *Биология ва тиббиёт муаммолари. Халқаро илмий журнал*. № 3(136) 2022. 63-66 бетлар.
17. Саттарова Х.Г., Халиков К.М., Сувонкулов У.Т., Усаров Г.Х. Применение местного антиген при ранней диагностике эхинококкоза. *Фармация, иммунитет ва вакцина. Халқаро илмий журнал*. № 22021. ISSN 2181-2470.
18. Сувонкулов У.Т., Шамсиев Ж.А., Саттарова Х.Г., Мамедов А.Н., Садиков З.Ю., Муратов Т.И., Эхинококкозни ташхислашда “маҳаллий антигенлар”ни самарадорлигини аниқлаш. *Биология ва тиббиёт муаммолари. Халқаро илмий журнал*. № 3.1(103) 2018.
19. Sadikov Z. Yu., Tai-Soon Yong, Huk Sun Yu, Suvonkulov U.T., Sattarova X.G', Factors underlying the spread of Echinococcosis in Central Asia. *New Horizons in Harmful Organism Science*. April 24 (Wed) 27(Sat), 2019 № 1 (98)-2021 ISSN 2181-466X. Busan Port International Exhibition, Conversion Center, Busan, Korea.
20. Саттарова Х.Г., Халиков Қ.М., Усаров Ф.Х., Фазлиддинов Ж.З. Эхинококкоз касаллигини иммуноташхислашда маҳаллий антигенлардан фойдаланиш. *Международная научно – практическая конференция «Актуальные проблемы инфектологии, эпидемиологии и паразитологии»*. 116 бет.