

**MINISTRY OF HEALTH OF THE REPUBLIC OF UZBEKISTAN
BUKHARA STATE MEDICAL INSTITUTE NAMED AFTER ABU ALI
IBN SINO**

**CLINICAL AND EPIDEMIOLOGICAL CHARACTERISTICS OF
GIMENOLEPIDOSIS AND TENIARINHOISIS IN CHILDREN**
**Methodical manual for 5th year students of medical and medico-pedagogical
faculties of medical universities**

Bukhara-2021

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“CONFIRM”

**Rector of Bukhara state medical
institute, professor Sh.J.Teshaev**



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HYMENOLEPIDOSIS

Hymenolepidosis is a human contact biohelminthiasis caused by a dwarf tapeworm (*Hymenolepis nana*), in which sexually mature and larval forms of helminths parasitize in the intestines of one host, which is accompanied by damage to the gastrointestinal tract.

Etiology

The causative agent of hymenolepiasis is the dwarf tapeworm *Hymenolepis nana* belongs to the Plathelminthes type, the Cestoidea class, the Cyclophyllidea order, the Hymenolepididae family. *Hymenolepis nana* is a small cestode 15-45 mm long, 0.5-0.7 mm wide with a small head, four suction cups and a short proboscis, on which there is a corolla of 20-24 small chitinous hooks. The body of the tapeworm consists of a thin neck and a large number of segments (about 200-300). The middle segments contain the hermaphroditic reproductive system. In the mature posterior segments, the uterus is located, filled with eggs at different stages of development. The segments, separating from the tapeworm, are destroyed in the intestinal lumen. The released eggs have a spherical or elliptical shape with a size of 40×53 microns; their shells are colorless, double-contour. The eggs contain a larva (oncosphere) with 6 hooks. Eggs are released cyclically, according to the change of generations of helminths.

Invasive eggs of *Hymenolepis nana* are swallowed by humans, enter the proximal small intestine, oncospheres are released from the eggs and penetrate into the intestinal villi, where they are converted into larvocysts-cysticercoids (this process of helminth development lasts about 5-7 days). Cysticercoids enter the intestinal lumen, enter the distal parts of the small intestine, where they develop into sexually mature individuals within 2-2.5 months. The full development cycle of *Hymenolepis nana* lasts about 1 month.

For *Hymenolepis nana*, a person is both an intermediate and a main host (degraded biohelminthiasis), since in the human body, the helminth goes through both the larval and adult stages of development. The life span of a dwarf tapeworm is no more than 2 months.

The oncospheres contained in helminth eggs are able to penetrate into the mucous membrane of the small intestine, as a result of which intrainestinal autosuperinvasion develops. As a result of this phenomenon in the body of an invaded person, the dwarf tapeworm can go through an unlimited number of cycles, while the number of parasites, especially with immune suppression, is significantly multiplied. Autosuperinvasion processes are accompanied by bright allergic manifestations.

In addition to *Hymenolepis nana*, *Hymenolepis fraterna* (murina) and *Hymenolepis diminuta* (parasites of mice and rats) can parasitize in humans.

In rare cases, the development cycle of *Hymenolepis nana* occurs with a change of hosts, when the larvae or imago of insects (flour beetle, fleas) serve as an intermediate host. In the organism of the intermediate host, the larvae of *Hymenolepis nana* develop to the stage of cysticercoid, and a person becomes infected by accidental ingestion of invaded insects [Myandina G.I., Tarasenko E.V., 2015 6].

Pathogenesis. Human infection occurs when the invasive eggs of *Hymenolepis nana* are swallowed. In the proximal parts of the small intestine, oncospheres are released from the eggs and embedded in the intestinal villi, where they are converted into larvocysts-cysticercoids. The latter go out into the distal parts of the small intestine and turn into sexually mature individuals. The oncospheres contained in the eggs of *Hymenolepis nana* are able to invade the mucous membrane of the small intestine, the result of this process is intrainestinal autosuperinvasion. Due to autosuperinvasion in the body of an invasive person, *Hymenolepis nana* can perform an unlimited number of cycles, while the number of parasites are significantly multiplied.

The leading factor in the pathogenesis of hymenolepiasis is mechanical damage to the mucous membrane of the small intestine by larvae and sexually mature helminths. Macroscopic changes in the villi of the small intestine are characterized by their increase due to edema. Microscopic changes are characterized by deformation of the villi, flattening of the columnar epithelium,

edema and lymphohistiocytic infiltration of the stroma of the villi and submucosal layer, the presence of degenerative processes and necrosis. Larvocysts are able to penetrate beyond the intestinal wall, then they are found in hyperplastic intestinal lymphoid follicles. Adult tapeworms damage the intestinal mucosa with suckers and hooks, in the places of their attachment under the influence of proteolytic enzymes excreted by the helminth, deep ulcerative and necrotic changes develop. In the development of pathological changes in the mucous membrane of the small intestine with hymenolepiasis, the sensitization of the macroorganism with helminth antigens is important. As a result of an extensive and deep inflammatory process in the mucous membrane of the small intestine with hymenolepiasis, numerous interrelated pathological changes are observed: general inflammatory reaction; intoxication; disorders of digestion (maldigestion) and absorption (malabsorption) of nutrients, contributing to the occurrence of polydeficiency states, protein-caloric deficiency; dyspeptic disorders, abdominal pain syndrome, intestinal dysbiosis develop, which have an adverse effect on the growth and development of children. With manifest forms of hymenolepiasis, neurological disorders are often noted. In addition, *Hymenolepis nana* reduces the immune responses of the human body, the latter explains the possibility of long-term parasitization of the parasite.

The source of infection with hymenolepidosis is a person. The mechanism of helminthiasis transmission is fecal-oral, transmission routes are contact-household and food. Factors of transmission of dwarf tapeworm are hands contaminated with helminth eggs, pots, personal hygiene items, door handles, food products, as well as flies, cockroaches on which helminth eggs *Hymenolepis nana* retain their viability for 24 hours. *Hymenolepis nana* eggs are sensitive to drying and exposure to high temperature. They are able to persist on human hands for 2 hours; when dried on slides at room temperature, they die after 60-70 hours; in river water in the summer, they remain viable for about 1 month. Adult patients with hymenolepizosis have close contact with children (service personnel in children's institutions, mothers of sick children), therefore, family foci are characteristic of

the disease [Sarbasheva M.M., Kumysheva Yu.A., Dzuganova M.H., 2009]. The structure of morbidity. With the greatest frequency, hymenolepidosis is registered in children of primary and secondary school age. Foci of hymenolepidosis can occur in orphanages, boarding schools, and preschool institutions. The rise in morbidity is noted in the summer-autumn period of the year. Hymenolepidosis is found everywhere. Immunity after hymenolepidosis is unstable. Repeated cases of infection are frequent [Sarbasheva M.M., Bittirova A.A., Atabieva Zh.A., 2012; Sarbasheva M.M., Kumysheva Yu.A., Dzuganova M.H., 2009; Lobzin Yu.V., 2013].

TENIARINHOZ

Teniarinhoz (lat. Taeniarhynchosis) - helminthiasis from the group of cestodoses, caused by *Taeniarhynchus saginatus* (bovine chain) or *Taeniarhynchus confusum* and characterized by the development of dyspeptic manifestations. A person becomes infected by eating beef containing the larvae of the pathogen and not having undergone sufficient heat treatment.

Epidemiology

The source of the contamination of the environment with the oncospheres of the bovine tapeworm is man - the only definitive host. Persons caring for animals (shepherds, milkmaids, etc.) pose the greatest danger.

Infection of animals most often occurs on pastures. Helminth eggs with feed enter the intestine of the intermediate host. 16 weeks after the animal is infected, its meat becomes infectious for humans. Cysticerci in the muscles of animals remain viable for 1-3 years.

The mechanism of human infection is oral - when eating raw or insufficiently cooked finnozy meat of animals, intermediate owners of the helminth. The most affected meat is young animals. Helminthiasis is common in areas where pasture and distant cattle keeping is adopted.

Causes of the teniarinhoza

Teniarinhoz is caused by *Taeniarhynchus saginatus* (unguided, bullish), which belongs to the type Plathelminthes, class Cestoda, family Taeniidae. Its

body is flat, ribbon-like and consists of a head with four powerful suckers and many (1000 or more) segments (proglottids). Length of mature segment 20 mm, width 5 mm. The uterus has a median trunk and 18-30 lateral branches. Helminth reaches a length of 4-12 m. Mature hermaphroditic proglottids contain more than 140,000 eggs.

Eggs are almost spherical in shape, the germ (oncosphere) is inside. The bovine tapeworm belongs to biohelminths, with the development replaces two masters. The man - the final owner, intermediate - cattle, buffalo, yak, zebu.

In humans, adult worms parasitize in the small intestine for a long time (up to 20 years). Mature segments, detaching from strobila. Enter the environment with faeces, passively or actively crawl out of the anus. In the intermediate host organism, the larvae develop in muscular and connective tissue, where they turn into oval-shaped larvostist - cysticercus (Finns). The larvae trapped in the intestines of a person reach the stage of adult helminth after 2.5-3 months. The bovine tapeworm in the human intestine, as a rule, is parasitic in the singular (the old name of the helminth is the tapeworm). The parasite, reaching a size of several meters, attaching suction cups to the mucous membrane of the small intestine, causes damage and irritates the intestinal receptors. Affecting the motor and secretory functions of the intestines. Separated proglottids that provoke pain syndrome, especially when passing through the ileocecal valve, can have an additional mechanical effect. Cases of parasite penetration into the appendix, common bile duct and pancreatic duct have been described, leading to obstruction and inflammatory changes. Perhaps the development of teniarinhoznaya intestinal obstruction. Intensive parasite consumption of nutrients in the process of growth and development (young individual per day lengthens by 7-10 cm) creates a shortage of the most biologically valuable components in the patient's diet. The blocking effect of substances secreted by the helminth on the human intestinal enzyme system, as well as sensitization by products of bovine tapeworm metabolism, have a certain value in the pathogenesis of teniarinhosis.

Pathogenesis

The bovine tapeworm in the human intestine, as a rule, is parasitic in the singular (the old name of the helminth is the tapeworm). The parasite, reaching a size of several meters, attaching suction cups to the mucous membrane of the small intestine, causes damage and irritates the intestinal receptors. Affecting the motor and secretory functions of the intestines. Separated proglottids that provoke pain syndrome, especially when passing through the ileocecal valve, can have an additional mechanical effect.

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Relevance

According to the World Health Organization, about 5 billion people in the world are affected by protozoal diseases and helminthiases, i.e. the overwhelming majority of the inhabitants of our planet [Abdiev F.T., 2015]. According to the World Health Organization (WHO), of the 50 million people who die in the world every year, more than 16 million people die from infectious and parasitic diseases (WHO, 2005). In the structure of infectious diseases, the fourth place is occupied by parasitic diseases [Oblokulov A.R., Niyazov G.E., Oblokulov A.A., 1999; Konstantinova T.N., 2005; Ibrakhimova H.R., Oblokulov A.R., 2020; Gaybullayev Fazliddin Khayriddinogli, 2021].

Recently, in many countries, including in the countries of the Central Asian region, due to the deterioration of the epidemiological situation under the influence of anthropogenic factors (hypermigration of the population, hyper-urbanization, deterioration of the socio-ecological situation, etc.), the risk of infection of children

increases [Tazhiev B.M., Daminova M.N., 2019; Ibrahimova H.R., Oblokulov A.R., 2019].

Helminthiasis are one of the most common diseases in Uzbekistan, accounting for more than 90% of the total number of parasitic diseases. The level of long-term incidence of the population remains stably high. Annually, in the country, more than 200 thousand infested are registered. Today the number of infested people is about 200 thousand people, 70% are children under 14 years old. The prevalence of certain types of helminths varies by region. Enterobiasis and hymenolepiasis are ubiquitous, both in urban and rural areas. The incidence rate of tapeworm infection among children is low, but the Khorezm region is an intense focus of tapeworm infection [Zhuraeva, F.R., 2017; Masharipova R.T., Alieva P.R., 2020]. Parasitic diseases are characterized by a relatively slow development, chronic course, and often long-term compensation. It is these features that are mainly the reason for the underestimation of the medico-social significance of these diseases [Oblokulov A.R., Elmuradova A.A., 2020; Daminova M.N., Rasulova Z.D., 2020]. Parasitic diseases cause mental and physical retardation in children [Abdulloev F.F., Mirzoeva M.R., 2020], reduce resistance to infectious and somatic diseases [Mirzoeva M.R., Khamidova N.K., 2020; Khamidova N.K., 2021], cause allergization of the body, inducing secondary immunodeficiencies [Mirzoeva M.R., Khamidova N.K., 2020]. Under the influence of helminths, homeostasis is disturbed in the body, pathological and immunopathological processes develop, which are of an adaptive nature.

Purpose. Study of the clinical and epidemiological features of hymenolepiasis and teniarhynchiasis in hospitalized children of different ages.

Materials and methods

To solve the set tasks, a clinical examination of 178 patients with intestinal parasitosis in children aged 4 to 18 years was carried out in the Bukhara, Khorezm regional infectious diseases hospital and the private clinic "Amal". The diagnosis of hymenolepidosis and teniarinchosis was confirmed by the detection of *Hymenolepis nana* eggs and *Taenia saginata* eggs during triple coproscopy; in

some cases, teniarinchiasis was diagnosed when a segment of *Taenia saginata* was detected, which was excreted (actively or passively) from the intestine. Parasitological examination of the stool was carried out 3 times with a break of 3-4 days. The diagnosis of hymenolepiasis was confirmed by the detection of helminth eggs in freshly excreted feces. The diagnosis of teniarhynchosis was confirmed by the detection of eggs during coproscopy and isolated segments.

Results and discussion. To solve the set tasks, clinical and epidemiological examinations of 178 patients with intestinal cestodosis (hymenolipidosis and teniarinhoses) in children aged 4 to 18 years were carried out. They were divided into 2 groups based on the etiological factor. In the hymenolepiasis group (group 1) of 120 patients by age, children were distributed as follows: from 4 years to 7 years - 52 (43.3%) children, from 8 years to 11 years - 33 (27.6%) and from 12 years to 15 years 19 (15.8%), 16 years to 18 years 16 (13.3%). 54 boys (45.0%) and 66 girls (55.0%). In the group of teniarinhoses (group 2), out of 58 children by age were distributed from 8 years to 11 years - 13 (22.4%) and from 12 years to 15 years 17 (29.5%), from 16 years to 18 years 28 (48.3%). They were distributed by sex as follows: 22 (37.9%) boys and 36 (62.1%) girls.

Of the total number of patients in group 1, 68 (56.7%) patients were urban and 52 (53.3%) - rural residents, and group 2, respectively, 19 (32.8%) and 39 (67.2%). All parasitic patients observed were hospitalized several months after the onset of the disease. In all cases, the diagnosis is confirmed parasitologically.

All children have studied in detail the medical history, epidemiological history, past and concomitant diseases of the child and parents, the somatic status of the child was determined. According to the indications, the children were examined by consultants of various specialties and underwent special studies depending on their pathology. Laboratory research methods included a general analysis of blood, urine, and feces. The analysis of the results of the epidemiological history in sick children of the 1st group showed that the main path of the spread of parasitosis is contact-household. Epidemiological history shows that 2 - groups of eating raw

meat, when cutting carcasses, when using not enough thermally processed meat and meat products.

In these patients, the parasites were found microscopically on routine examination, but detailed examination revealed mild parasite-like symptoms. The frequency of detection of clinical signs are shown in the table.

Table. The frequency of clinical signs in patients with hymenolepiasis and teniarinchiiasis.

Symptoms	Hymenolipido sis (abc:%)	Тениаринхоз (abc:%)	Symptoms	Hymenolipido sis (abc:%)	Тениаринхоз (abc:%)
General weakness	110 (91,7%)	55 (95,0%)	Epileptiform seizures	14 (11,7%)	-
Malaise	78 (65,0%)	54 (93,1%)	Nausea	27 (22,5%)	9 (15,6%)
Fatigue	57 (47,5%)	56 (96,6%)	Vomiting	5 (4,2%)	12 (20,7%)
Bad dream	62 (51,7%)	31 (53,4%)	Heartburn	10 (8,4%)	16 (27,6%)
Bad memory	96 (80,0%)	23 (39,7%)	Weight loss	76 (63,3%)	56 (96,6%)
Dizziness	71 (59,2%)	30 (51,7%)	Hypersalivation	82 (68,3%)	52 (89,7%)
Headache	82 (68,3%)	32 (55,2%)	Stomach ache	62 (51,7%)	54 (93,1%)
Increased irritability	76 (63,3%)	23 (39,7%)	Stool instability	32 (26,7%)	18 (31,0%)
Depressed mood	69 (57,5%)	21 (36,2%)	Allergic dermatoses	64 (53,3%)	15 (25,9%)
Blinking eyes	18	2	Absent-mindedness	15	10

	(15,0%)	(3,4%)		(12,5%)	(17,2%)
Chills	17 (14,2%)	4 (6,9%)	Eosinophilia	100 (83,3%)	45 (77,6%)
Frowning eyebrows	21 (17,5%)	5 (8,6%)	Leukopenia	87 (72,5%)	52 (89,7%)
Fainting	6 (5,0%)	18 (31,0%)	Anemia	110 (91,7%)	57 (98,3%)
Convulsive muscle twitching	32 (26,7%)	6 (10,3%)	Brittle nails and hair	52 (43,3%)	31 (53,4%)
Bruxism	66 (55,0%)	14 (24,1%)	Onychophagia	32 (26,7%)	18 (31,0%)

These tables show that most children with hymenolipidosis had astheno-neurotic symptoms, which are distributed as follows: in 80.0% of patients, poor memory was found, in 68.3% of hypersalivation during sleep, in 63.3% of increased irritability, in 57.5% of patients had a depressed mood, 55.0% of patients had bruxism, and symptoms such as blinking of the eyes, seizures, frowning of eyebrows, epileptiform seizures were recorded in a median of 11.7% - 26.7%.

Dyspeptic symptoms such as nausea were recorded in 22.5%, vomiting in 4.2%, diarrhea in 8.4%, lower abdominal pain in 51.7%, and stool instability in 26.7% of patients in group 1.

Of the symptoms of intoxication, headaches were observed in 68.3% of children, general weakness in 91.7%, fatigue in 47.5%, dizziness in 59.2% of patients. Indicators of allergic manifestation, such as eosinophilia were in 83.3%, allergic dermatoses in 53.3% of patients with hymenolipidosis.

When analyzing the clinical manifestations in patients with teniarinchiasis, it was found that most children had astheno-neurotic symptoms, which are distributed as follows: 39.7% of patients had poor memory, 89.7% had hypersalivation during sleep, 39.7% had increased irritability, depressed mood in 36.2% of patients, bruxism in 24.1% of patients, and symptoms such as blinking of the eyes, seizures,

frowning of the eyebrows were recorded in a median of 3.4% - 24.1%. Epileptiform seizures were not recorded in any case.

Dyspeptic symptoms such as nausea were recorded in 15.6%, vomiting in 20.7%, unstable stool in 31.0%, lower abdominal pain in 93.1% of patients in group 2.

Of the symptoms of intoxication, headaches were observed in 55.2.3% of children, general weakness in 95.0%, fatigue in 96.6%, dizziness in 51.7% of patients.

Indicators of allergic manifestation such as eosinophilia were 77.6%, allergic dermatoses in 25.9% of patients with teniarinchiasis.

When studying the clinical manifestations in two observed groups of patients, astheno-neurotic symptoms - poor memory, increased irritability, depressed mood, blinking of eyes and seizures were significantly higher ($P < 0.001$) in patients of group 1 than in patients of group 2. Symptoms such as weight loss, malaise, faintness, abdominal pain, and vomiting were significantly higher ($P < 0.001$) in patients with teniarinchiasis than in patients of the first group.

Conclusions

Thus, the astheno-neurotic symptoms that were noted in helminthiasis were more pronounced in patients with hymenolipidosis than in teniarinchiasis. Symptoms such as abdominal pain, weight loss, malaise; and fatigue were common in patients with teniarhynchiasis.

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