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CHARACTERISTICS OF CHILDREN'S INFECTIOUS MONONUCLEOSIS OF HERPES VIRUS ETIOLOGY

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ХАРАКТЕРИСТИКА ИНФЕКЦИОННОГО МОНОНУКЛЕОЗА У ДЕТЕЙ ГЕРПЕСВИРУСНОЙ ЭТИОЛОГИИ

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В статье приведены результаты изучения эпидемиологии и клинико-лабораторных показателей инфекционного мононуклеоза (ИМ) герпесвирусной этиологии у детей. Установлено, что уровень заболеваемости колеблется в течение года от 3,47 до 16,43 %, с наибольшей частотой в осенне-зимний период (11,5–16,43 %). Болеют преимущественно дети первых 6 лет жизни (83,14 %). Клиническая картина ИМ проявлялась лихорадкой (96,4 %), лакунарным тонзиллитом (79,5 %), лимфаденопатией (17,14 %), гепатолиенальным синдромом (96,4 %). В то же время атипичные мононуклеары встречались только у 48,2 % детей. В 55,42 % случаев ИМ был вызван сочетанием возбудителей (ВЭБ и ЦМВ). Изолированно вирус Эпштейна — Барр выявлялся только у 31,32 % детей, а цитомегаловирус — у 10,84 %.

Ключевые слова: инфекционный мононуклеоз, вирус Эпштейна — Барр, цитомегаловирус, герпесвирус человека 6-го типа, дети.

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CHARACTERISTICS OF CHILDREN'S INFECTIOUS MONONUCLEOSIS OF HERPES VIRUS ETIOLOGY

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The article gives the study results for epidemiology, clinical and laboratory data of infectious mononucleosis (IM) of herpes virus etiology in children. The level of disease occurrence ranges during a year from 3.47% to 16.43%, with the highest rate in autumn-winter period (11.5–16.43%). The children up to 6 year old 83.14% suffer from IM as a rule. Clinical manifestation of IM involve fever 96.4%, lacunar tonsillitis 79.5%, lymphadenopathy 17.14%, hepatolienal syndrome 96.4%. At the same time, atypical mononuclear cells were found only in 48.2% of children. 55.42% cases of infectious mononucleosis were caused by a combination of pathogens (VEB and CMV). In isolation, the Epstein–Barr virus was detected in 31.32% of children, and the cytomegalovirus in 10.84%.

Key words: infectious mononucleosis, Epstein–Barr virus, cytomegalovirus, herpesvirus 6 type, children.

In recent years, much attention has been paid to the etiology, symptoms, clinical options and therapeutic management of children's infectious mononucleosis in the scientific literature.

Infectious mononucleosis (IM) is an etiological infectious disease caused by various viruses from the Herpesviridae family.

Using highly sensitive modern diagnostic methods (ELISA, PCR), it is possible to identify the etiological agent of the disease in most cases. It has been established that myocardial infarction is mainly caused by the Epstein–Barr virus (VEB) and cytomegalovirus (CMV), both in the form of mono and mixed infections [1; 2; 9]. However, mononucleosis-like syndrome can also be caused by 6-th and 7-th types of human herpes viruses.

From 16 to 800 people per 100 thousand people get sick with infectious mononucleosis in various regions of the world annually [2; 3; 7; 10].

According to sero-epidemiological studies, almost 95% of the population over 40 years old have specific antibodies to EBV. About 50% of the population suffer from IM in childhood or adolescence in a manifested form, the other part in an atypical (obliterated or latent) form [3; 6; 7].

Detection of CMV, another frequent etiological agent of IM, according to various authors ranges from 25 to 95%. At the same time the frequency of detected positive serological markers of CMV among children of the first 5 years of life is 60% [3; 8].

The aim of the research was to study the epidemiology of IM, as well as its clinical and laboratory diagnostics.

Materials and Research Methods

The study was conducted on the basis of the Odessa Clinical HospitalHospital for Infectious Diseases. We examined 83 children aged 1 to 12 years who were in hospital with a diagnosis of infectious mononucleosis. Among them, there were 52 boys and 31 girls.

To verify the diagnosis, clinical, laboratory and instrumental, serological research methods were used.

The etiological agent was confirmed by PCR (determined by VEB DNA and CMV in the blood) and by ELISA. The antibody profile for Epstein–Barr virus was determined: IgM to capsid antigen (VCA), IgG to early antigen (EA), as well as IgG to nuclear antigen (NA) using a test system: Vitrotest VEB VCA-IgM, Vitrotest "EBNA-IgG", "VEB-EA-IgG-MBA" (manufactured by Ramintek, Ukraine). To detect IgM and IgG to cytomegalovirus the test systems used were: "DIA®-CMV-IgM", "DIA®-CMV-IgG", "DIA®-CMV-IgG-av" (manufactured by NVK DIAPROF-MED, Ukraine).

Statistical analysis was carried out using Microsoft Excel programs, using parametric and nonparametric methods with an indication of average values and standard error of the mean (M±m). Assessment of the significance of differences was carried out according to the t-criterion (Student's test).

Research Results

Among hospitalized, children under the age of 3 years old — 24 (28.92±9.80)%, from 3 to 6 years old — 45 (54.22±10.90)% and over 7 years — 14 (16.86±±8.20)%. At the same time, there were 1.5 times more boys than girls (62.65±10.60)% and (37.34±10.60)%, respectively, at $p<0.05$).

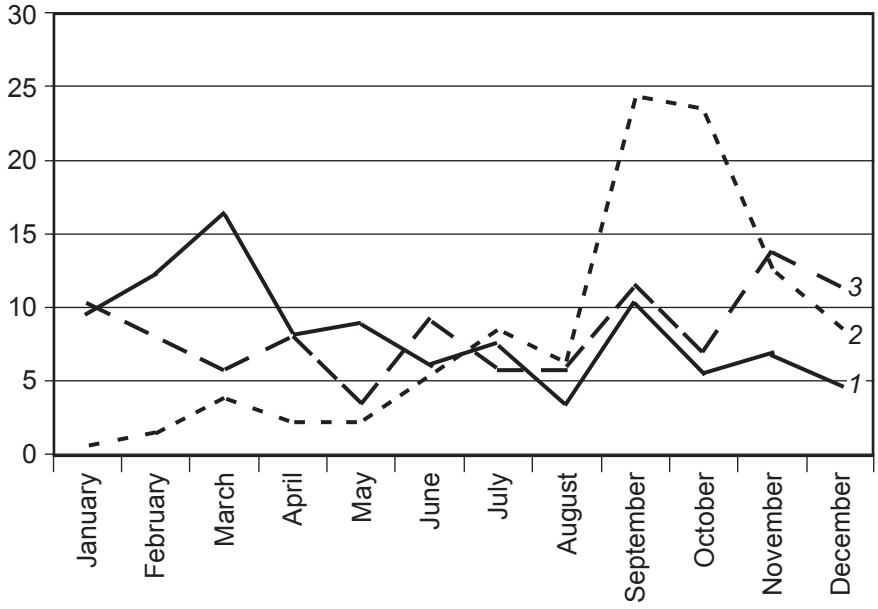

Fig. 1. The incidence rate of IM during the year for a 3-year observation period: *1* — 2016; *2* — 2017; *3* — 2018

The clinical picture of IM in hospitalized children in most cases retains its typical features, such as: fever, tonsillitis, lymphadenopathy, hepatolienal syndrome.

Acute onset of the disease was observed in 72.29% of patients. A gradual onset of the disease with prodromal symptoms such as languor, decreased appetite, low-grade fever, a slight increase in regional lymph nodes were noted in 27.71% of children.

Signs of intoxication in the form of languor, weakness, increased fatigue were observed in 100% of cases, and headache, nausea and vomiting — in 80% of cases.

Low-grade fever was observed in 42.16% of cases, febrile in 36.14% of children and high in 18.09%. The course of the disease without fever was observed in 3.62% of cases. It should be noted that in all girls the acute period was accompanied by hyperthermia. The duration of fever in all children ranged from 1 to 18 days (an average of (5.67±3.65) days). Most often, the duration ranged from 2 to 5 days (60.24%), and in a small part of the children (7.23%), the duration of the febrile period was more than 2 weeks.

An increase of lymph nodes was detected in all patients, of which: an increase of the lymph nodes of the submandibular group — in 78.2% of children, anteroposterior and/or posterior — in 70.9%, inguinal — in 42.3%. Lymphadenopathy was observed only in 17.14% of children. In rare cases, an increase in axillary, supraclavicular and subclavian lymph nodes was observed (5.6%).

Damage to the nasopharynx was observed in 100% of patients. Edema of the face and eyelids was observed in 30% of children, snoring in sleep — in 37.17%, discharge from the nose — in 50.6%, difficulty in nasal breathing — in 83.5%. Lack of nasal breathing occurred in 20.5% of cases. Exacerbation of chronic adenoiditis was noted in 7.5% of children.

Signs of acute lacunar tonsillitis were noted in most children (79.51%). In some children (10.84%), the damage to the oropharynx was marked only by edema, a tickle in a throat, pain

when swallowing, hyperemia of the mucous membrane of the oropharynx, granularity of the soft palate and arches, enlargement of the tonsils.

An increase in the liver and spleen was observed in 96.4% of patients with myocardial infarction. At the same time, hepatomegaly was observed in 73 patients (77.95%), and splenomegaly was detected in 62.65% of children.

Five children (6.02%) had core-like spotted-papular rashes on the skin and one child had scarlet-like rashes.

The incidence the main clinical symptoms of infectious mononucleosis depends on gender.

Table 1

The Frequency of Occurrence the Main Clinical Symptoms of Infectious Mononucleosis Depending on Gender

Clinical symptom	Total, n=83		Of which			
			Girls, n=31		Boys, n=52	
	abs.	%	abs.	%	abs.	%
Hyperthermia	80	96.4±4.2	31	100	49	94.2±5.3*
Tonsillitis (as lacunar tonsillitis)	66	79.5±8.9	23	74.2±9.1*	43	82.7±8.2*
Lymphadenopathy	83	100	31	100	52	100
Hepatomegaly	72	86.7±7.5	27	87.1±7.3	45	86.5±7.5
Splenomegaly	60	72.3±9.8	22	70.1±10.0	38	73.1±9.7
Rash	6	7.2±5.7	2	6.45±5.4	4	7.69±5.8
Leukocytosis	43	51.8±10.9	13	41.9±10.8*	30	57.6±10.8*
Lymphocytosis	48	57.8±10.8	16	51.6±11.0*	32	61.5±10.6*

Note. * — the revealed differences between these groups are statistically significant ($p<0.05$).

When evaluating the results of general clinical laboratory studies, it was found that leukocytosis occurs in more than half of children with infectious mononucleosis (51.8%), while leucopenia was observed in 3.6% of children ($p<0.05$). The number of leukocytes ranged from $2\cdot10^9$ g/l to $38.7\cdot10^9$ g/l, and averaged $(12.9\pm6.7)\cdot10^9$ g/l.

Among boys, leukocytosis was observed in (57.6±10.8)% of cases, and among girls — in (41.9±10.8)%. Neutrophilia was detected in 45.7% of children, and neutropenia — in 43.37%. The stab shift was observed in 39.75% of cases.

Lymphocytosis was accompanied by MI in 57.8% of children (the number of lymphocytes ranged from 14% to 79%, and averaged ((65.2±7.5)%), and lymphopenia in 10.97% of cases. Lymphocytosis was more common among boys than among girls ((61.5±10.6)% and (51.6±±11.0)%, respectively). Monocytosis was observed much less frequently, only in 16.86% of children.

Atypical mononuclear cells are one of the pathognomonic signs of infectious mononucleosis, the frequency of their detection in children under our supervision was 48.19%. Their number varied widely: from 3 to 49% (average (18.2±11.5)%). In more than half of children (55.0%), the number of atypical mononuclear cells exceeded 10%, and only in 10.0% of cases their number did not exceed 5% in peripheral blood.

Accelerated ESR was observed in 43.37% of patients, its value ranged from 1 to 44 mm/h (on average, its value was (13.72±±9.7) mm/h).

Assessing the biochemical parameters of blood, it was found that the frequency of increase in ALT and AST was observed in 32.81 and 37.5% of children, respectively. The thymol test was increased in 82.81% of children, and an increase in amylase was observed in 15.6% of children.

Conclusions

1. The morbidity level for IM in children varies throughout the year (from 3.47 to 16.43%), with the highest frequency in the autumn-winter period (11.5–16.43%).

2. Among hospitalized children, children of the first 6 years of life (83.14%) are mostly affected.

3. In the clinical picture of myocardial infarction, fever (96.4%), lacunar tonsillitis (79.5%), lymphadenopathy (17.14%), hepatolienal syndrome (96.4%) and exanthema (6.02%) were observed. Moreover, atypical mononuclear cells were found only in 48.2% of children.

4. More than half of cases ((55.42±10.9)%) infectious mononucleosis was caused by a combination of pathogens (VEB and CMV). In isolation, the Epstein–Barr virus was detected in 31.32% of children, and the cytomegalovirus in 10.84%.

Ключові слова: інфекційний мононуклеоз, вірус Епштейна — Барр, цитомегаловірус, герпесвірус людини 6-го типу, діти.

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СТРУКТУРНО-ФУНКЦІОНАЛЬНІ ЗМІНИ КІСТКОВО-М'ЯЗОВОЇ СИСТЕМИ ПРИ ОСТЕОМАЛЯЦІЇ ТА ОСТЕОПОРОЗІ В ПОСТМЕНОПАУЗІ

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СТРУКТУРНО-ФУНКЦИОНАЛЬНЫЕ ИЗМЕНЕНИЯ КОСТНО-МЫШЕЧНОЙ СИСТЕМЫ ПРИ ОСТЕОМАЛЯЦИИ И ОСТЕОПОРОЗЕ В ПОСТМЕНОПАУЗЕ

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Обследовано 157 постменопаузальных женщин в возрасте (57,5±1,2) года, из них у 103 женщин был остеопороз (ОП) (группа I) и у 24 морфологически был установлен диагноз остеомаляция (ОМ) (группа II), в контрольную группу (III) вошли 30 практически здоровых женщин.

Определяли витамин D (25(OH)D), паратгормон (ПТГ) в сыворотке крови. При рентгеновской денситометрии исследовали минеральную плотность костной ткани в области шейки бедра. Оценку состояния скелетной мышечной ткани проводили с помощью ультразвукового исследования основных УЗ-параметров *m. quadriceps femoris*. Функциональную оценку состояния костно-мышечной системы проводили с помощью аппарата "Insight TM".