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COURSE AND OUTCOME OF CYTOMEGALOVIRUS INFECTION IN YOUNG CHILDREN: ANALYSIS OF CLINICAL OBSERVATIONS

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SUMMARY

Introduction. Cytomegalovirus (CMV) infection in young children poses a significant medical and social challenge due to its wide clinical spectrum. This disease often presents with mainly non-specific symptoms, which complicates its timely detection, especially in children with a complex premorbid background. In this regard, the problem of developing methods for objectifying and assessing the severity of clinical manifestations preceding an unfavorable outcome remains extremely urgent.

Objective. To study the clinical course and outcomes of cytomegalovirus infection in young children in Astana from 2021 to 2024.

Material and methods. The study consisted of observing young children (n=327) with a clinically and laboratory-confirmed diagnosis of CMV treated between 2021 and 2024.

Clinical monitoring of patients was carried out based on the following parameters: general condition of the patient, body temperature, symptoms of intoxication, condition of the skin (color, presence of rash), hemodynamic disorders, catarrhal-respiratory manifestations (dyspnea and its nature/respiratory rate, asthmatic breathing, presence and nature of cough, rhinorrhea, condition of the pharynx), auscultatory changes in the lungs and heart, pathological murmurs in the heart area; abdominal syndrome, flatulence, tenderness on palpation of the abdomen, localization, stool (frequency, consistency, impurities), diuresis; neurological symptoms, other clinical manifestations. All patients received therapy in accordance with the clinical treatment protocol based on their diagnosis.

Results. According to the results of our study, cytomegalovirus infection is characterized by polymorphism of clinical manifestations, with a predominance of intoxication syndrome (70%), respiratory syndrome (74%), and damage to the cardiovascular system (CVS) (46%). In the structure of CNS (central nervous system) damage, cystic formations in the brain of various localizations were predominant, accounting for 35.3%. The presence of hydrocephalus was recorded in 32.4% of patients, and CNS damage of hypoxic-ischemic genesis was observed in 29.4% of children. In the group of children with CNS damage, in the age aspect, patients from 1-3 months prevailed, which amounted to 48.6%, in the same group of children, cardiovascular damage was recorded in 52.2% in the form of minor anomalies of the heart development (MACD), patent foramen ovale (PFO), ventricular septal defect (VSD), atrial septal defect (DMPP).

Discussion. Analysis of clinical observations revealed that the clinical course of CMV is characterized by a wave-like progression, transitioning from asymptomatic carriage to a symptomatic form with long-term consequences. The obtained results corresponded to the literature data, confirming that the general intoxication syndrome manifests the severity upon admission to the hospital: in the form of increased body temperature, weakness, lethargy, decreased appetite (52.9%), then respiratory syndrome (42.5% of cases), anemic syndrome (38%), and neurological deficit (33%). In terms of age, children aged 1-3 months were the most prevalent (47.2%). In our study, the central nervous system was frequently involved in the pathological process, accounting for 70% of cases.

Conclusions. These indicators demonstrate the clinical polymorphism of CMV and emphasize the need for an interdisciplinary approach to the diagnosis and treatment of this disease, given the frequency of involvement of vital organs and systems in the pathological process. The results obtained may also be useful in developing clinical routes for early detection and risk stratification in patients with CMV.

Keywords: cytomegalovirus (CMV), young children, sensorineural hearing loss, central nervous system.

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Т Ұ Ж Ы Р Ы М

ЕРТЕЖАСТАҒЫ БАЛАЛАРДАҒЫ ЦИТОМЕГАЛОВИРУС ИНФЕКЦИЯСЫНЫҢ АҒЫМЫ ЖӘНЕ НӘТИЖЕСІ: КЛИНИКАЛЫҚ БАҚЫЛАУЛАРДЫ ТАЛДАУ

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Кіріспе. Ертежастағы балалардағы цитомегаловирусты инфекция (ЦМВ) кең клиникалық полиморфизмге байланысты күрделі медициналық-әлеуметтік проблема болып табылады; ауру көбінесе спецификалық емес белгілердің басым болуымен кездеседі, бұл оны әсіресе ауырған преморбидті фоны бар балаларда уақытылы анықтауды қиындатады. Осыған байланысты қолайсыз нәтиженің алдындағы клиникалық көріністердің ауырлығын объективті ету және бағалау әдістерін әзірлеу мәселесі өте өзекті болып қала береді.

Мақсаты. 2021-2024 жж. Астана қаласындағы жас балалардағы цитомегаловирусты инфекцияның клиникалық ағымының ерекшеліктері мен нәтижелерін зерттеу.

Материал және әдістері. Зерттеу клиникалық және зертханалық расталған ЦМВ диагнозымен 2021-2024 жылдар аралығында емделген жас балаларды (n=327) бақылаудан тұрды. Пациенттердің клиникалық мониторингі келесі көрсеткіштер бойынша жүргізілді: науқастың жалпы жағдайы, дене температурасы, интоксикация белгілері, терінің жағдайы (түсі, бөртпелердің болуы), гемодинамикалық бұзылулар, катаральді-тыныс алу белгілері (ентігу және оның сипаты/тыныс алу жиілігі, астматикалық тыныс алу, жөтелдің болуы және сипаты, риноратлы ауру, ішек ауруы), өкпе мен жүрек, жүрек аймағындағы патологиялық шу; абдоминальды синдром, метеоризм, іштің пальпациясында ауырсыну, локализация, нәжіс (жиілігі, консистенциясы, қоспалар), диурез; неврологиялық симптомдар, басқа клиникалық көріністер. Барлық науқастар диагнозға сәйкес клиникалық емдеу хаттамасына сәйкес терапия алды.

Нәтижелері. Біздің зерттеу нәтижелері бойынша цитомегаловирусты инфекция клиникалық көріністердің полиморфизмімен сипатталады: интоксикация синдромы – 70%, тыныс алу синдромы – 74% және жүрек-тамыр жүйесінің (ЖЖЖ) зақымдалуы – 46%. ОЖЖ құрылымында (орталық жүйке жүйесі) зақымдануы, әртүрлі локализациядағы мидың кистозды түзілістері басым болды, ол 35,3% құрады, гидроцефалияның болуы пациенттердің 32,4%-ында, гипоксиялық-ишемиялық генездің ОЖЖ зақымдануы балалардың 29,4%-ында байқалды. ОЖЖ зақымданған балалар тобында жас ерекшелігі бойынша 1-3 айлық пациенттер басым болды, 48,6% құрайды, сол топтағы балаларда 52,2% жүрек-қантамыр жүйесінің кішігірім аномалиялары түрінде жүрек-қан тамырлары зақымдануы (ЖҚА), ашық тесік овале (ПФО), қарыншалық перде ақауы (ҚҚА), атеросклероздық ақаулар.

Нәтижелерді талқылауы. Клиникалық бақылауларды талдау ЦМВ клиникалық ағымының асимптоматикалық тасымалдаудан ұзақ мерзімді салдары бар манифестті формаға дейін толқынды екенін көрсетті. Алынған нәтижелер ауруханаға түскен кездегі ауырлық дәрежесі жалпы интоксикация синдромымен көрінетінін растайтын әдебиет деректеріне сәйкес болды: дене температурасының жоғарылауы, әлсіздік, летаргия, тәбеттің төмендеуі (52,9%), содан кейін респираторлық синдром (42,5% жағдайлар), анемия синдромы (38%) және неврологиялық дефицит (33%). Жас ерекшелігі бойынша 1-3 айлық балалар басым болды (47,2%). Біздің зерттеуімізде орталық жүйке жүйесі патологиялық процеске жиі қатысты, ол 70% құрады.

Қорытындылар. Бұл көрсеткіштер ЦМИ клиникалық полиморфизмін және патологиялық процеске өмірлік маңызды ағзалар мен жүйелерді зақымдалу жиілігін ескере отырып, осы ауруды диагностикалау мен емдеуге пәнаралық тәсіл қажет екенін көрсетеді. Алынған нәтижелер ЦМВИ бар балаларда ерте анықтау және тәуекелді стратификациялау үшін клиникалық бағыттарды әзірлеуде де пайдалы болуы мүмкін.

Негізгі сөздер: ЦМВ, ерте жастағы балалар, сенсорлық есту қабілетінің жоғалуы, орталық жүйке жүйесі.

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Р Е З Ю М Е

ТЕЧЕНИЕ И ИСХОД ЦИТОМЕГАЛОВИРУСНОЙ ИНФЕКЦИИ У ДЕТЕЙ РАННЕГО ВОЗРАСТА: АНАЛИЗ КЛИНИЧЕСКИХ НАБЛЮДЕНИЙ

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Введение. Цитомегаловирусная инфекция (ЦМВИ) у детей раннего возраста представляет собой серьезную медико-социальную проблему ввиду её широкого клинического полиморфизма. Данное заболевание нередко протекает с преобладанием неспецифических симптомов, что затрудняет его своевременное выявление, особенно у детей с отягощенным преморбидным фоном. В связи с этим крайне актуальной остается проблема разработки методов объективизации и оценки степени выраженности клинических проявлений, предшествующих неблагоприятному исходу.

Цель. Изучить особенности клинического течения и исходы цитомегаловирусной инфекции у детей раннего возраста в г. Астана за 2021-2024 гг.

Материал и методы. Исследование заключалось в наблюдении за детьми (n=327) раннего возраста с клинико-лабораторно подтвержденным диагнозом «ЦМВИ», пролеченными за период 2021-2024 гг.

Клинический мониторинг больных осуществлялся по следующим показателям: общее состояние больного, температура тела, симптомы интоксикации, состояние кожных покровов (цвет, наличие сыпи), гемодинамические нарушения, катарально-респираторные проявления (одышка и ее характер/ЧДД, астмоидное дыхание, наличие и характер кашля, ринорея, состояние зева), аускультативные изменения в легких и сердце, патологические шумы в области сердца; абдоминальный синдром, явления метеоризма, болезненность при пальпации живота, локализация, стул (кратность, консистенция, примеси), диурез; неврологическая симптоматика, другие клинические проявления. Все пациенты получали терапию по клиническому протоколу лечения в соответствии с выставленным диагнозом.

Результаты исследования. По результатам нашего исследования ЦМВИ характеризуется полиморфизмом клинических проявлений с преобладанием синдрома интоксикации – 70%, респираторного синдрома – 74% и поражение сердечно-сосудистой системы (ССС) – 46%. В структуре поражения центральной нервной системы (ЦНС) доминировали кистозные образования головного мозга различной локализации, что составило 35,3%, наличие гидроцефалии было зарегистрировано у 32,4% пациентов, поражение ЦНС гипоксически-ишемического генеза наблюдалось у 29,4% детей. В группе детей с поражением ЦНС в возрастном аспекте преобладали пациенты от 1-3 месяцев, которые составили 48,6%, в этой же группе детей у 52,2% было зарегистрировано поражение ССС в виде малых аномалий развития сердца (МАРС), открытого овального окна (ООО), дефекта межжелудочковой перегородки (ДМЖП), дефекта межпредсердной перегородки (ДМПП).

Обсуждение результатов. Анализ клинических наблюдений выявил, что клиническое течение ЦМВИ волнообразное, от бессимптомного носительства до манифестной формы с долгосрочными последствиями. Полученные результаты соответствовали литературным данным, подтверждая, что тяжесть при поступлении в стационар проявляется за счет общеинтоксикационного синдрома в виде повышения температуры тела, слабости, вялости, снижения аппетита (52,9%), далее респираторного синдрома (42,5% случаев), анемического синдрома (38%) и неврологического дефицита (33%). В возрастном аспекте, преобладали дети от 1-3 месяцев (47,2%). В нашем исследовании довольно часто в патологический процесс была вовлечена ЦНС, что составило 70%.

Выводы. Данные показатели демонстрируют клинический полиморфизм ЦМВИ и подчёркивают необходимость междисциплинарного подхода в диагностике и лечении данного заболевания, учитывая частоту вовлечения жизненно важных органов и систем в патологический процесс. Полученные результаты также могут быть полезны при разработке клинических маршрутов для раннего выявления и стратификации риска у пациентов с ЦМВИ.

Ключевые слова: ЦМВИ, дети раннего возраста, нейросенсорная тугоухость, ЦНС.

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Relevance. Cytomegalovirus infection is currently a serious medical and social problem in pediatrics. According to the World Health Organization (WHO), it is one of the infections that shape the future of infectious pathology [1, 2]. It is the most common congenital infection and represents a significant public health problem with a prevalence of 0.2% to 2.0% of live-born pregnancies [1, 3].

Among the leading causes caused by CMV are such problems as stillbirths, spontaneous abortions, premature births, morbidity among newborns, and infant mortality, as a result of which the reproductive potential is reduced and the depopulation of the population continues [2-3]. CMV I is characterized by the ubiquitous dissemination of the virus, infecting humans and being limited to a host, with a global seroprevalence of 45-100% in the adult population [3].

WHO statistics show that the generalized form of CMV is the cause of the largest number of deaths in children worldwide after influenza and acute respiratory viral infection (ARVI). It should be taken into account that even in asymptomatic forms, 5-15% of children in the next 1-2 years and at a later date experience disorders of the central nervous system, hearing, vision, cerebral palsy, and mental retardation. It can have long-term consequences for approximately one in four children, including sensorineural hearing loss and neurodisability [4].

The negative impact of CMV on development, neurological, and audiological functions has been demonstrated in symptomatic infants showing high levels of intellectual disability. It is worth noting that both symptomatic and asymptomatic forms of infection contribute to the burden of NSHL, making it one of the leading non-genetic causes of childhood sensorineural hearing loss (SNHL) in developed countries. It has been shown that infants with asymptomatic CMV may develop SNHL during early childhood in almost 10% of cases with varying onset, course, and severity [5-7]. The major issue with CMV is that, as a nosological unit, this infection lacks clear, specific diagnostic criteria. Due to the pronounced clinical polymorphism, the infection most often manifests itself as a predominance of non-specific symptoms of infection over specific ones, which significantly complicates the timely and accurate recognition of the disease.

In our country, the level of awareness of doctors and other medical workers about this infection is insufficient. Low awareness among medical personnel regarding cytomegalovirus infection can result in incomplete or incorrect diagnoses. As a result: 1) the incidence among young children is underestimated; 2) specific treatment is postponed or not prescribed, the risk of severe complications with disabling consequences increases; 3) the number of prescriptions of unnecessary drugs and expensive diagnostic tests increases.

Objective of the study – to study the clinical course and outcomes of cytomegalovirus infection in young children in Astana from 2021 to 2024.

MATERIAL AND METHODS

The studies were conducted at the State Public Institution on the Right of Economic Management "Multidisciplinary City Children's Hospital No. 3" of the Akimat of Astana. This prospective observational study involved young children diagnosed with CMV and treated from 2021 to 2024 (n = 327). The disease/infection in children meeting the inclusion criteria was studied in detail. The severity analysis showed that 61.8% of children were admitted to the hospital in a severe condition. Regarding the length of hospital stay for patients with CMV, 40% stayed in a hospital for 8-15 days, 24% for 16 days, and 32% were treated for up to 60 days. Considering the polymorphism of CMV clinical manifestations, we conducted a detailed analysis of clinical data in patients.

The research methods included the collection of complaints and anamnesis (life history, disease history, and obstetric and gynecological history of the mother); an objective examination (physical, neurological, and anthropometric examination, palpation, percussion, auscultation, general thermometry, pulse and respiratory rate assessment, and evaluation of urinary function). Laboratory and instrumental: general clinical research methods; polymerase chain reaction (PCR) with determination of viral load; enzyme-linked immunosorbent assay (ELISA) detection of IgM and IgG with determination of avidity; ultrasound examination of internal organs, X-ray, neurosonography, echocardiography.

Inclusion criteria: age from 1 month to 3 years; presence of serological markers of CMV (IgM and IgG to CMV in ELISA and PCR). Exclusion criteria: negative results of examination for CMV, age over 3 years.

Clinical monitoring of patients was carried out according to the following parameters: general condition of the patient, body temperature, symptoms of intoxication, condition of the skin (color, presence of rash), hemodynamic disorders, catarrhal-respiratory manifestations (shortness of breath and its nature/respiratory rate, asthmatic breathing, presence and nature of cough, rhinorrhea, condition of the pharynx), auscultatory changes in the lungs and heart, pathological murmurs in the heart area; abdominal syndrome, flatulence, pain on palpation of the abdomen, localization, stool (frequency, consistency, impurities), diuresis; neurological symptoms.

RESEARCH RESULTS

As shown in Table 1, the severity of the condition is most often due to general intoxication syndrome (in the form of increased body temperature, weakness, lethargy, decreased appetite), which occurred in 52.9% (n=171; $p<0.05$), and the following respiratory syndrome determined the severity of the condition in 42.5% (n=139; $p<0.05$) of cases, in third place is anemic/sideropenic syndrome 38% (n=127), neurological symptoms 33% (n=108; $p<0.05$), pathological manifestations of the cardiovascular system occurred in every 4th patient and amounted to 25.9% (n=85; $p<0.05$). Neurological symptoms were clinically prominent in 33% (n=108; $p<0.05$) of children.

In terms of age, as shown in diagram 1, patients aged 0-3 months predominate and account for 47.2% of the total number of patients with respiratory system damage, children aged 4-6 months – 25%, among patients aged 7-9 months – 22.2% and among children aged 13-48 months – 4.3%. At the same time, 18 children with congenital stridors were registered with a pulmonologist.

During the examination of patients in a hospital setting, additional studies were conducted, revealing additional clinical syndromes. As shown in Diagram 2, the syndrome-by-syndrome analysis of organ and system damage is characterized as follows: respiratory damage occupies a leading position and accounts for 74%. Moreover, one of the frequent manifestations was inflammation of the lung tissue - pneumonia, which occurred in 58.8% of children. In 50% of cases, pneumonia was accompanied by varying degrees of respiratory failure. It should also be noted that 20.5% had broncho-obstructive syndrome (BOS). Bronchopulmonary dysplasia (BPD) was registered much less frequently in children, which amounted to 3%, CNS damage accounts for 70%, the share of gastrointestinal tract (GIT) damage accounts for 66%, also the cardiovascular system occupies a large percentage and amounts to 46%, disorders in the genitourinary system in children were noted in 18%, intrauterine growth retardation

in the form of hypotrophy in 16%, it is noteworthy that in 17% of cases, hearing loss in the form of sensorineural hearing loss was registered in children, and skin damage (maculopapular in nature) was observed in 10% of cases.

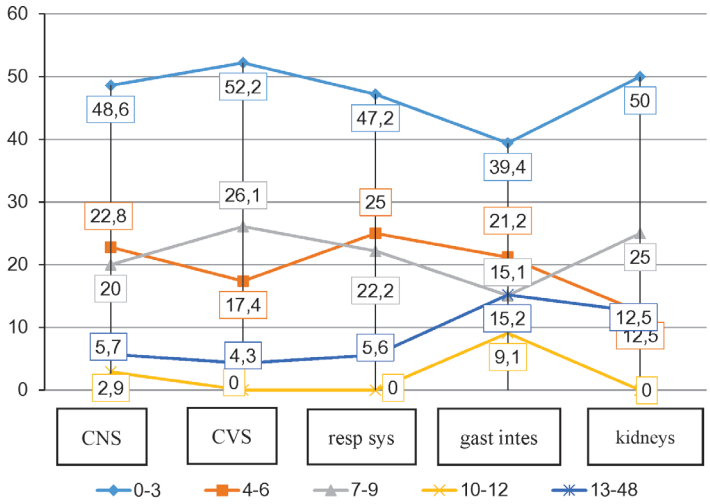

Diagram 1 – Age distribution of syndrome complexes in children with CMV

Table 1 **- Clinical syndromes of CMV in young children upon admission to the hospital**

Pathological conditions	(n=327)	
	abs	%
Intoxication syndrome	171	52.9*
Respiratory syndrome	139	42.5*
Anemic/sideropenic syndrome	127	38*
Neurologic symptomatology	108	33*
Diseases of the hepatobiliary system	93	28.4
Pathology of the cardiovascular system	85	25.9
Note (p<0.05)*		

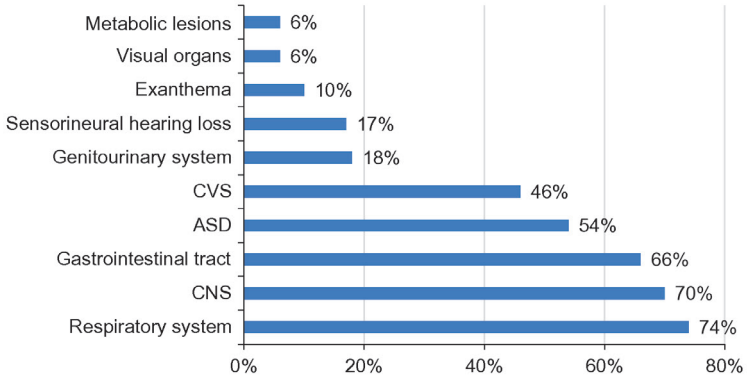

Diagram 2 – Clinical manifestations of CMV, additionally established in the hospital setting

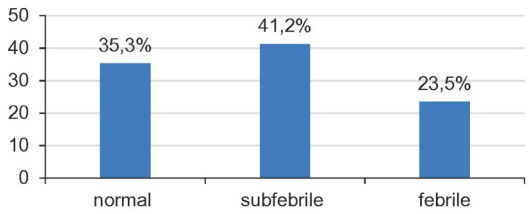

Diagram 3 – Body temperature indicators in children upon admission to the hospital

As shown in Diagram 3, CMV in young children is characterized by polymorphism of clinical manifestations. One of the leading syndromes is the syndrome of general intoxication. In the clinical picture of the syndrome of general intoxication, attention is drawn to the presence of a prolonged temperature reaction in patients of varying degrees of sever-

ity, from subfebrile to hectic. It was established that the normal body temperature upon admission, regardless of the severity, was within the normal range in 35.3% of the studied children. At the same time, a subfebrile temperature was most often noted in 41.2%, and a febrile body temperature was recorded in 23.5%.

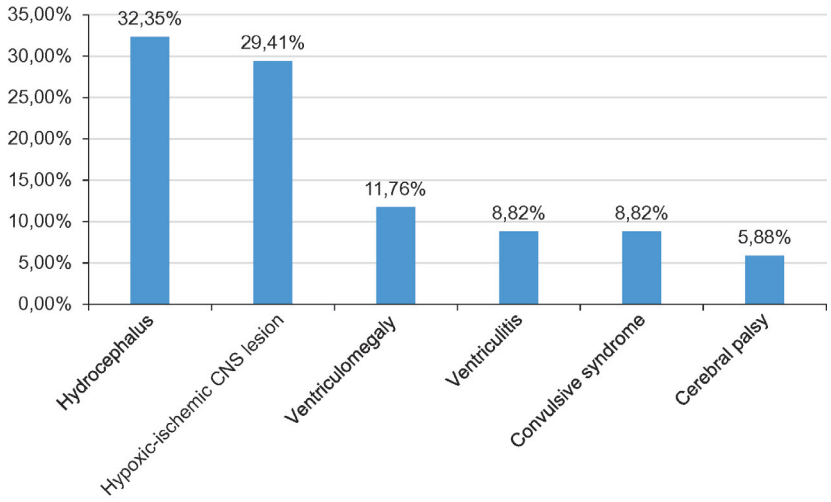

Diagram 4 – CNS damage in CMV infection in young children

Involvement of the central nervous system in the pathological process was observed frequently in all examined children, accounting for 70% (Diagram 4). At the same time, 40% of patients were already registered with a neurologist prior to admission to the hospital. In terms of age, patients aged 1-3 months prevail and make up 48.6% of the total number of patients with central nervous system damage, children aged 4-6 months – 22.8%, among patients aged 7-9 months – 20%, in the group of children aged 10 to 12 months, central nervous system damage takes up 2.9% and in children aged 13-48 months - 5.7%. Among all lesions, cystic formations of the brain, regardless of localization, account for 35.3%. The presence of hydrocephalus was noted in 32.4% of cases. CNS damage of hypoxic-ischemic genesis was observed in 29.4% of children discharged from the hospital in an improved condition; 25% of cases were fatal. Manifestations of convulsive syndrome are 8.8%, and ventriculomegaly is noted in 11.7%.

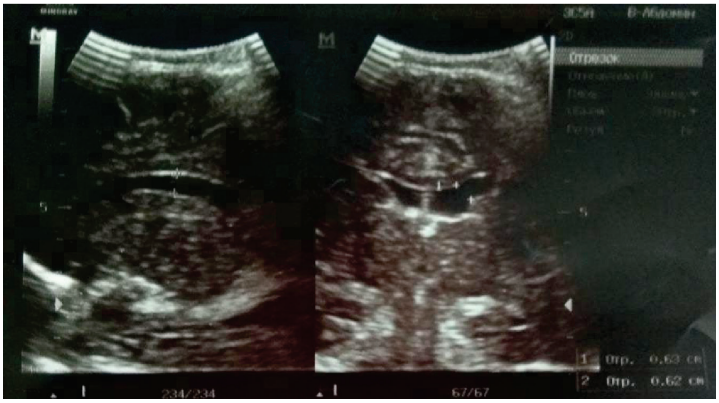

Diagram 5 – Ventriculomegaly on the left (own observations)

The extent of fetal and neonatal damage, in particular severe impairment of brain function, appears to correlate mainly with the gestational age at which vertical transmission occurs: a more severe risk of fetal-neonatal prognosis is mainly associated with primary maternal infection occurring in the first trimester of pregnancy [8].

A total of 46% of children were diagnosed with heart damage (Diagram 6). Among all pathologies, microanomalies of heart development (MARS) are most prevalent, with FAO accounting for 43.75%. VSD occurred in 8.9%, and ASD was registered only in 14.7%. Other developmental defects were relatively rare. In terms of age, patients aged 1-3 months predominate, accounting for 52.2% of the total number of patients with cardiovascular damage. Children aged 4-6 months comprise 17.4%, while those aged 7-9 months make up 26.1%, and children aged 13-48 months account for 4.3%. It is worth noting that only 26% of patients were registered with a cardiologist.

As shown in Diagram 7, in our studies, involvement in the pathological process and functional changes in the liver most often manifested as hepatomegaly, which accounted for 23.5%, or in combination with splenomegaly, which was similarly recorded in 23.5% of children, according to the results of ultrasound examination (US). The prevalence of hepatitis was observed in Group I in 20.6%, and the cholestatic component was observed in 14.7% of cases. Various authors point to liver damage in CMV infection, noting that cholestatic hepatitis is characteristic of this infection [9].

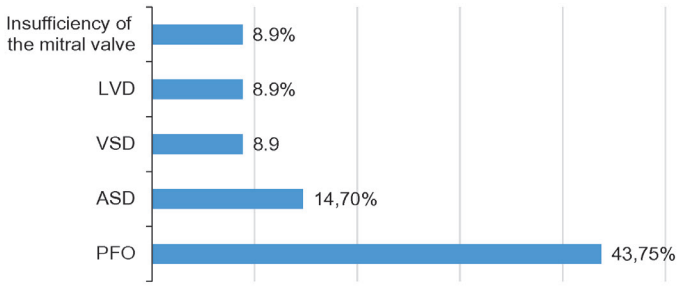

Diagram 6 – CVS damage in CMV infection in young children

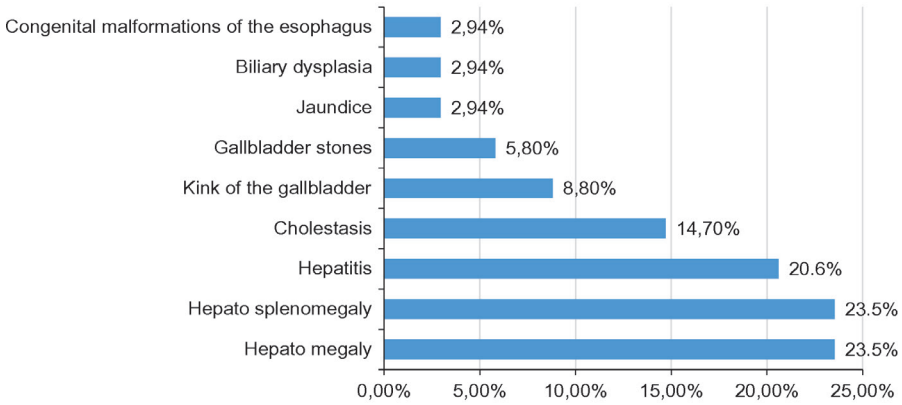

Diagram 7 – Gastrointestinal tract lesions in CMV infection in children

When studying the clinical manifestations of the endocrine system, we observed that involvement of the endocrine system in the pathological process was only present in Group II, in the form of thymomegaly, which occurred in 31.3% of cases. Additionally, a thyroid cyst was diagnosed in 6.3% of cases. Among the pathologies of the genitourinary system, renal pyelectasis was identified, with a prevalence of 14.7% in Group I and 6.3% in Group II, respectively.

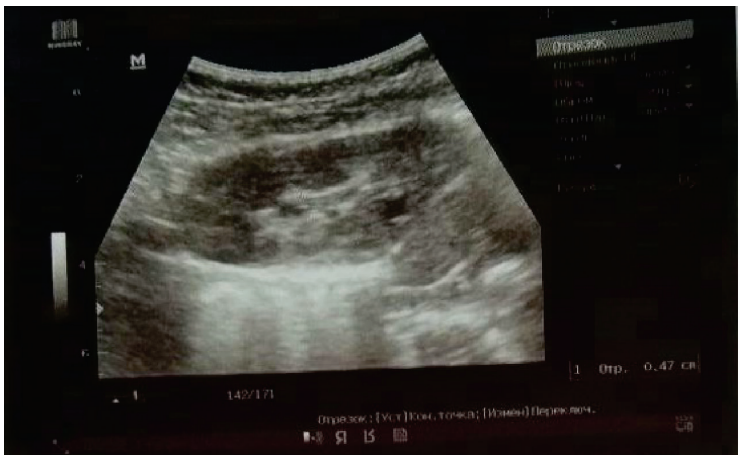

Diagram 8 – Pyeloectasia of the kidney on the left side
(own observations)

In total, 6% of patients had visual impairment: in Group I, they had partial atrophy of the optic nerve head, dacryocystitis, angiopathy of the retinal vessels, retinopathy, and edema of the optic nerve head. Congenital cataract was observed in 6.3% only in Group II. At the same time, three children were initially registered with an ophthalmologist.

DISCUSSION OF THE RESULTS

The study revealed that the clinical course of CMVI varies, necessitating timely diagnosis and rational management strategies for the patient. It is known that CMV can have lifelong consequences for every fourth child, including sensorineural hearing loss and neurodisability [10]. However, in our study, we did not set the goal of long-term observation after discharge from the hospital.

It should be noted that, in terms of age characteristics, children aged 0-3 months (47.2%) predominated among all patients with respiratory system damage (n=36), followed by children aged 4 to 6 months (25%).

Acquired CMV infection in children is usually asymptomatic or mild, often as a flu-like infection with prolonged fever. However, in some children, especially new-

borns and immunocompromised children, CMV can cause serious complications, including pneumonia, hepatitis, developmental delay, and neurological problems [7, 9, 10]. In the children studied, the severity of the condition upon hospital admission was most often due to general intoxication syndrome, which occurred in 52.9%. In second place was respiratory syndrome in 42.5% of cases, neurological deficits in 38%, and nemic syndrome in 33% of children.

According to the literature, only about 10% of infants with CMV I have symptoms such as growth retardation, microcephaly, petechial rash, hepatosplenomegaly, retinitis, thrombocytopenia, or hepatitis at birth [8-10]. In 90% of infants infected with CMV in utero, the infection is asymptomatic at birth. About half of children with symptoms have long-term consequences due to the congenital genesis of CMV [2]. In our study, the central nervous system was involved in the pathological process in approximately 70% of cases. At that, 40% of patients were supervised by a neurologist before admission to the hospital. Firstly, cystic formations of the brain in various localizations were recorded at 35.3%, convulsive syndrome at 8.8%, and ventriculomegaly at 11.7%. The presence of hydrocephalus was 32.4%, and damage to the central nervous system of hypoxic-ischemic genesis was observed in 29.4% of children.

The largest available dataset of viral load in blood at birth was collected by Marsico in 2018; their study aimed to examine the impact of antiviral therapy on viremia. Among symptomatic newborns, higher viral loads appeared to correlate with some markers of active disease, such as thrombocytopenia and elevated transaminases [11], which are prerequisites for subsequent observations. Timely diagnosis of CMV infection is crucial for selecting rational treatment strategies for patient management. Recognition of CMV signs is crucial for physicians of all specialties. Early diagnosis enables the initiation of valganciclovir treatment, when necessary, to improve outcomes in infants with CMV.

CONCLUSIONS

According to the results of our study, cytomegalovirus infection is characterized by polymorphism of clinical manifestations with a predominance of intoxication syndrome (52.9%), respiratory syndrome (42.5%), anemic syndrome (38%), and neurological symptoms (33%).

The structure of CNS damage was characterized by cystic formations in various areas of the brain, accounting for 35.3%. The presence of hydrocephalus was recorded in 32.4% of patients, and CNS damage of hypoxic-ischemic genesis was observed in 29.4% of children.

In the group of children with CNS damage, in terms of age, patients aged 0-3 months predominated, accounting for 48.6%; in the same group of children, 52.2% had cardiovascular damage in the form of ARS, PFO, VSD, and ASD.

Thus, the clinical course of CMV in young children in Astana in 2021–2024 is characterized by polymorphism of symptoms, where signs of damage to the central nervous system, liver, and respiratory organs predominate. To date, CMV is one of the most prevalent infections. In this regard, numerous unresolved issues exist regarding the diagnosis, treatment, and prevention of this infection, which necessitate further comprehensive and multidisciplinary study.

Transparency of research

The study was not sponsored.

Declaration of financial and other relations

The authors received no fees for the research.

Authors' contributions

All authors took equal part in the conception and writing of the scientific article, scientific design of the study, final approval of the article for publication, and agreed to be accountable for all aspects of the work, including ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of interest

The authors declare no obvious or potential conflicts of interest related to the content of this article.

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