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Clinical and laboratory characteristics of rotavirus gastroenteritis in children in Tashkent-city

Abstract: The article presents the clinical and laboratory findings of children with rotavirus gastroenteritis. It was found in the majority of cases, children with gastroenteritis received in the hospital for 2–3 days of the disease, and they have mostly recorded a severe form of the disease. RVGE in children starts with vomiting from the first day of the disease. Vomiting accompanied by diarrhea, diarrhea was mainly the secretory nature rarely observed invasive diarrhea. Changes in koprogramms of children with RVGE was characterized with moderate and excessive presence of mucus in the feces, moderate and excessive presence of neutral fats. Routine blood test indicators in children with RVI prevailed decrease white blood cell count, and in some cases — reducing the level of hemoglobin. Also, we examined children leukopenia, which, in our opinion, is due to a viral etiology of the disease. Moreover, these values were recorded in children with severe forms of the disease and, accordingly, a high level of virus replication. In most cases, leukocytes values were within normal limits.

Keywords: rotavirus, gastroenteritis, children.

In recent years, domination of virus agents in acute intestinal infection (AII) morbidity has been observed worldwide; about 70 % of acute diarrhea cases are caused by them [1].

The major etiologic agent of acute gastroenteritis in infants both in developing [5; 6] and developed countries [4] is rotaviruses.

According to the WHO data, almost every child within the first five years of his life suffers from rotavirus gastroenteritis irrespectively of the race and social or economic status. Nearly 125 million cases of rotavirus infections are registered globally every year, of which 600–900 thousand come to the end lethally, that makes almost one quarter of all fatal cases among patients with diarrhea [2; 3; 4]. Thereupon, studying early and pathognomonic symptoms as well as the characteristic changes in laboratory indicators in rotavirus infections in children is of highly practical importance for timely diagnosis of the disease and, accordingly, carrying out corresponding medical interventions.

Research objective: study clinical and laboratory features of rotavirus gastroenteritis in children.

Material and research methods

We have examined 671 children with acute diarrhea and analyzed the information from the medical histories. All the patients were admitted to city clinical infectious hospital No 4 in Tashkent (Uzbekistan), they have been treated during the period from 2011 (November–December) till 2012 (January–February).

The diagnosis of "rotavirus gastroenteritis " (RVGE) was made on the basis of epidemiological anamnesis coupled with the clinical semiology that is characteristic for RVGE under the condition of obligatory detection of the rotavirus antigen in the feces by the enzyme multiplied immunoassay (ELISA) made in the virological laboratory of the Center for Sanitary-and-Epidemiologic Surveillance in Tashkent.

Results and discussion

Among 671 children hospitalized in the fall-winter period, the "rotavirus gastroenteritis" diagnosis was made to 209 children that made 31.1 % from all children examined to reveal the viruses.

The sex distribution of the RVGE patients was as follows: boys — 58.8 % (123 children), girls — 41.2 % (86 children). The age structure of the children was analyzed: the babies at the age from 0 till 6 months made 8.7 % (18 babies), from 6 months till 1 year — 16.5 % (35 infants), from 1 till 2 years — 42.5 % (89 infants), from 2 till 3 years — 18.7 % (39 infants), elder than 3 years — 13.4 % (28 children). Among the patients, the organized (visiting day-nurseries) children made 46.8 % (98 children), unorganized gave 53.1 % — (111 children).

In the epidemiologic past history of the hospitalized patients, such factors as contacts with AII patients (33 patients — 15.8 %), contacts with patients with some respiratory infection (20 patient — 9.5 %), no known cause (31 patients — 14.8 %) and wrong nutrition (125 children — 59.8 %) prevailed. The patients have been admitted to the hospital: at day 1of the illness — 19 children (9 %), day 2, 3 — 156 children (74.6 %), day 4 and later — 34 children (16.4 %). The average duration of children treatment in the hospital made 3.8 ± 0.7 days.

The RVGE patients had the following forms of the disease: severe form — 146 children (69.9 %), moderate — 63 children (30.1 %). Mild forms were not registered.

The observed children had some accompanying diseases: acute respiratory virus infection — 19 children (9 %), rickets — 34 children (16 %), anemia — 66 children (31.1 %).

We have analyzed the clinical symptoms of rotavirus gastroenteritis in children in the dynamics of the disease development. The obtained findings are presented in Table 1.

As the table shows, in the RVGE children, the characteristic manifestations were intoxication symptoms, dyspepsia events. The fact that from the beginning of the disease 33 % of children showed catarrhal events in the form of cold, pains in the throat, cough comes under notice. It can be used as a diagnostic criterion to differentiate RVGE from gastroenteritis of other etiology. Vomiting and diarrhea were observed in less than half of the children (40.5 % and 44.5 %, accordingly). One third of patients had tympanism which is one of characteristic signs of viral diarrhea. Approximately by day 4–5 of the disease the clinical semiology abated.

The children were brought to the hospital with clinical symptoms in different combinations (fever-diarrhea, diarrhea-vomiting, etc.) or with one of them.

The next stage of the research was studying the changes in general clinical laboratory indicators to reveal typical RVGE manifestations. The changes in the findings of feces analysis are shown in Table 2.

Table 1. – RVGE clinical manifestations in the disease dynamics

Major symptoms	Days of the disease (number of patients – 209)						No symptoms
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	
	Abs (%)	Abs (%)	Abs (%)	Abs (%)	Abs (%)	Abs (%)	Abs (%)
Fever	79 (37.8)	67 (32.0)	28 (13.4)	5 (2.4)	3 (1.4)	2 (0.95)	25 (11.9)
Lack of appetite	97 (46.4)	70 (33.5)	32 (15.3)	5 (2.4)	3 (1.4)	2 (0.95)	0
Nausea	71 (34.0)	65 (31.1)	39 (18.6)	18 (8.6)	4 (1.9)	0	12 (5.7)
Vomiting	84 (40.5)	70 (33.5)	35 (16.7)	18 (8.6)	0	0	2 (0.95)
Diarrhea	93 (44.5)	49 (23.4)	43 (20.5)	22 (10.5)	0	0	2 (0.95)
Tympanism	65 (31.1)	43 (20.5)	38 (18.1)	28 (13.4)	23 (11.0)	12 (5.7)	0
Catarrhal events	69 (33.0)	47 (22.5)	28 (13.4)	15 (7/2)	2 (0.95)	0	48 (22.9)

Table 2. – Feces analysis indicators in RVGE children

Indicators	RVGE children (n = 209)	
	abs.	%
Presence of mucus in feces:		
Not present	24	11.5
Slightly	60	28.7
Moderately	89	42.6
Excessively	36	17.2
Presence of neutral fats in feces:		
Not present	13	6.2
Slightly	71	33.9
Moderately	107	51.2
Excessively	18	8.6
Feces color:		
physiological	12	5.7
Green	125	59.8
Yellow	72	34.4

Table 3. – Hemogram indicators in RVGE children

Parameters	Patients' group	
	abs.	%
Erythrocytes: (normal 3.6–4.7 × 10^{12}/l)		
Up to 3.6 × 10^{12}/l	47	22.5
From 3.6 to 4.7 × 10^{12}/l	145	69.4
Over 4.7 × 10^{12}/l	17	8.1
Hemoglobin (normal 109–139 g/l)		
Up to 109 g/l	66	31.5
From 109 to 139 g/l	128	61.4
Over 139 g/l	15	7.1
ESR: (normal 2–8 mm/h)		
Up to 2 mm/h	19	9.0
From 2 to 8 mm/h	155	74.2
Over 8 mm/h	35	16.8
White blood cells: (normal 5.0–12.0 × 10^{9}/l)		
Up to 5.0 × 10^{9}/l	42	20.2
From 5.0 to 12 × 10^{9}/l	159	76.0
Over 12 × 10^{9}/l	8	3.8

In RVGE children, the following changes in the findings of general analysis of feces were revealed. As the table shows, moderate (42.8 %) and excessive (17.2 %) presence of mucus in the feces was characteristic for RVGE children, as well as moderate (51.4 %) and excessive (8.7 %) presence of neutral fats. In 60 % of children, the feces got pathological coloring (greenish color). It, in turn, indicates the presence of local inflammatory process and disorder in the processes of digestion and absorption in the intestines that once again confirms the presence of infectious diarrhea of virus character.

We have analyzed the indicators of the complete blood analysis of children with ARI. The obtained findings are shown in Table 3.

In the complete analysis of blood of the majority of children, the erythrocytes indicators were within the age norm (69.4 %). Leukopenia was observed in 42 (20 %) of cases, while in the leukocyte count demonstrated minor alterations of all indicators. Also, one third of patients (31.5 %) showed a decrease in the level of hemoglobin.

Moreover, these values were registered in children with severe forms of the disease and, accordingly, a high level of the virus replication. In most cases (76 %), leukocytes count were within the normal values.

Conclusion

Thus, in the general structure of AII, RVGE is considerably (31.1 %) distributed among the population of Tashkent during the fall-winter seasons. The highest values of the disease indicators (67.7 %) were registered among the children under 2 years, mainly unorganized ones.

RVGE children admitted to the hospital in Tashkent currently have been presenting typical clinical symptoms and signs: fever, vomiting and tympanism as well as catarrhal events since day 1of the illness.

The changes in general clinic and laboratory indicators are insignificant. It predetermines expediency of introduction of highly sensitive methods of early verification of gastroenteritis of rotavirus origins for timely revealing and treatment of the patients.

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