

## ASSESSMENT OF THE INFLUENCE OF ENTEROSORBENTS ON DIARRHEA SYNDROME IN HIV-INFECTED CHILDREN

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**Summary:** Purpose of the study: To conduct a comparative assessment of the effect of various enterosorbents on diarrhea syndrome in HIV-infected children.

**Materials and methods of research:** 96 HIV-infected children with diarrhea aged 7-18 years were examined. The diagnosis was established on the basis of clinical, virological, immunological, bacteriological, serological and statistical methods.

**Results of the study:** In HIV-infected children with acute diarrhea, after using enterosorbents, moderate and severe degrees of dehydration significantly decreased, especially when using the drug Enterogel. When treating acute diarrhea in HIV-infected children with Enterogel, a significant decrease in the daily number and duration of diarrhea episodes is observed, which leads to the disappearance of signs of dehydration. The watery, liquid and mushy consistency of the stool after using Enterogel acquired a formalized appearance.

**Key words:** HIV infection, children, diarrhea, dehydration, duration, consistency.

**Relevance.** In HIV-infected children, diarrhea is often one of the clinical manifestations, and dehydration against its background is a dangerous complication for the patient's life [2]. Given that the severity of the disease varies widely depending on fluid loss, the degree of dehydration in children with acute diarrhea syndrome should be carefully assessed and treated. Gastrointestinal dysfunction and its impact on nutrition, immune status and growth play a significant role in the outcome of HIV infection [6]. This is especially true for children due to the importance of nutrition for physical development and growth. Increased permeability of the intestinal wall leads to the penetration of antigens through it and increased release of various inflammatory mediators. In children, as HIV infection progresses without antiretroviral therapy, the likelihood of gastrointestinal damage increases [3,7]. In the early stages of the process, before the addition of opportunistic infections, digestive dysfunction is detected in every tenth case. In HIV-infected patients, the mucous membrane of the gastrointestinal tract, from the oral cavity to the rectum, is both the portal of entry and the site of clinical manifestations of many opportunistic and non-opportunistic infections and tumors [5]. According to WHO and UNICEF, there are approximately two billion cases of diarrhea and 1.9 million deaths from diarrhea among children under 5 years of age worldwide each year. The frequency of acute infectious diarrhea in

children under the age of 3 in European countries is 0.5-1.9 episodes per year [1]. The use of enterosorption in complex treatment is a simple, cheap and convenient method of detoxification [4].

**Purpose of the study.** To conduct a comparative assessment of the effect of various enterosorbents on diarrhea syndrome in HIV-infected children.

**Materials and methods of research.** In 96 HIV-infected children aged 7 to 18 years, the daily number of episodes of diarrhea was assessed during the use of enterosorbents for 10 days.

The diagnosis of HIV infection in children was made on the basis of the “National Clinical Report on the organization and implementation of medical care for persons with confirmed HIV status” No. 206 dated 08/19/2021 of the Ministry of Health of the Republic of Uzbekistan and No. 122 dated 03/25/2015 “ On improving measures to combat typhoid fever, paratyphoid fever, salmonellosis and acute intestinal diseases .

When assessing the severity of acute infectious diarrhea in HIV-infected children, an assessment is made of the degree of dehydration (dehydration according to WHO) that developed as a result of diarrhea in sick children, the daily amount and duration of diarrhea, as well as the shape, consistency, smell, color, amount of stool, existing pathological impurities. The diagnosis was established based on the patient's complaints, clinical, anthropometric, serological, bacteriological, immunological, virological and instrumental studies.

For the study to compare the effectiveness in age-specific dosages, the following were used: Activated carbon 0.05 g/kg body weight 3 times a day - in 18 children, Smecta 1 sachet 2 times a day - in 20 children, Lactofiltrum 2 tablets - in 18 children 3 times a day, Enterogel 1 tablespoon 2 times a day - in 40 children.

**Results.** When assessing the severity of acute infectious diarrhea in HIV-infected children, the degree of dehydration (WHO dehydration) that developed as a result of diarrhea in sick children was assessed. After using the drugs for 10 days, the degree of dehydration in each group of children was assessed.

**Table 1.**

**The effect of enterosorbents on dehydration in HIV-infected children with acute diarrhea**

Degree of dehydration	Before treatment		After treatment							
	n=96		Enteros - gel n=40		Smecta n=20		Lactofil - trum n=18		Activated carbon n=18	
	n	%	n	%	n	%	n	%	n	%
no dehydration	23	23.9	24	60.0 *	8	40.0 *	6	33.3 *	5	27.8
average dehydration	41	42.7	9	22.5 *	9	45.0	9	50.0	8	44.4

severe dehydration	32	33.4	7	17.5 *	3	15.0 *	3	16.7 *	5	27.8
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According to the data obtained, before using the drugs, signs of dehydration were absent in 23 HIV-infected children with acute diarrhea (23.9%), after using Enterosgel, the absence of signs of dehydration significantly decreased by 2.5 times, after using Smecta by 2.3 times, after using Lactofiltrum by 1.9 times (65%; 55% and 44.4% of cases, respectively,  $P < 0.05$ ), and after the use of Activated Carbon, no significant differences were observed in the absence of dehydration ( $P > 0.05$ ).

In the examined (96) children, the average degree of dehydration before treatment was determined in 41 (42.7%). After using Enterosgel, only in 9 HIV-infected children with acute diarrhea (22.5%), the average degree of dehydration significantly decreased by 1.9 times ( $P < 0.05$ ), as in children of the other groups (received Smecta, Laktofiltrum, Activated carbon) no significant differences were observed ( $P > 0.05$ ).

Before treatment, severe dehydration was observed in 32 HIV-infected children (33.4%). After using Enterosgel in the examined children, the severe degree of dehydration significantly decreased by 2.7 times, after using Smecta by 2.2 times, after using Lactofiltrum by 1.5 times (12.5%; 15.0% and 22.2% of cases respectively,  $P < 0.05$ ). After the use of activated carbon, no significant differences were found ( $P > 0.05$ ).

**Table 2.**  
**Influence enterosorbents on the number of episodes of diarrhea in HIV-infected children.**

Quantity	Before treatment		After treatment							
	n=96	%	Enteros -gel n=40		Smecta n=20		Lactofil-room n=18		Activated carbon n=18	
			n	%	n	%	n	%	n	%
more than 10 times	43	44.8	1	2.5	1	5.0	2	11.1	4	22.2
6-10 times	32	33.3	4	10.0	4	20.0	5	27.8	6	33.3
3-5 times	21	21.9	19	47.5	8	40.0	7	38.9	5	27.8
less than 3 times	0	0.0	16	40.0	7	35.0	4	22.2	3	16.7

Before treatment, a daily stool frequency of up to 10 times was observed in 43 HIV-infected children (44.8%). After treatment with Enterosgel (2.5%) and Smecta (5%), the stool frequency up to 10 times was maintained in only one child from each

group; after using Lactofiltrum , the stool frequency up to 10 times decreased by 4 times, and in children taking activated charcoal by 2 times ( 11.1% and 22.2% of cases, respectively,  $P < 0.05$ ). If 32 HIV-infected children before treatment had stool frequency from 6 to 10 times, then after treatment with Enterosgel it decreased by 3.3 times, and after using Smecta by 1.7 times (33.3%; 10% and 20% cases, respectively,  $P < 0.05$ ). After taking Lactofiltrum and Activated Charcoal, a decrease in the frequency of daily episodes of diarrhea from 6 to 10 times, no significant differences were noted (27.8% and 33.3% of cases, respectively,  $P > 0.05$ ). Before the start of treatment with enterosorbents, stool frequency from 3 to 5 times was observed in 21 HIV-infected children (21.9%), after the administration of Enterosgel (47.5%), the frequency decreased by 2.1 times, after the use of Smecta (40%) and Lactofiltrum (38.9%) decreased 1.8 times (  $P < 0.05$ ), and after Activated carbon (27.8%) there were no significant differences (  $P > 0.05$ ).

After using Enterosgel, in 40% of cases the stool frequency reached less than 3 times a day (16 HIV-infected children). When using Smecta, this figure reached 35% of cases (7 patients). The significant difference between Enterosgel and Lactofiltrum was 1.8 times, and after using Activated Carbon it was 2.4 times, the significant difference between Smecta and Laktofiltrum , as well as Activated Carbon was 1.5 and 2.1 times (40%; 35 %; 22.2% and 16.7% of cases, respectively,  $P < 0.05$ ).

**Table 3.**

**Influence enterosorbents on the duration of diarrhea in HIV-infected children.**

Duration	Before treatment		After treatment							
	n=96	%	Enteros -gel n=40		Smecta n=20		Lactofil-room n=18		Activated carbon n=18	
			n	%	n	%	n	%	n	%
up to 5 days	27	28.1	31	77.5	14	70.0	10	55.6	8	44.4
5-9 days	40	41.7	7	17.5	4	20.0	5	27.8	6	33.3
10-14 days	29	30.2	2	5.0	2	10.0	3	16.7	4	22.2

Before treatment, diarrhea lasted 10-14 days in 29 HIV- infected children (30.2%). After treatment with Enterosgel and Smecta , in 2 children from each group, the duration of stool for up to 14 days was maintained; after using Lactofiltrum , the duration of stool for up to 14 days decreased by 1.8 times (5%; 10% and 16.7% of cases, respectively,  $P < 0.05$ ), and in children taking Activated carbon (22.2%) no significant differences were observed in these values (  $P > 0.05$ ). If in 40 HIV-infected children (41.7%) episodes of diarrhea lasted from 5 to 9 days, then after treatment with

Enterogel they decreased by 2.4 times, after using Smecta by 2.1 times, after taking Lactofiltrum their number decreased by 1.5 times, and in children (17.5%; 20.0% and 27.8% of cases, respectively,  $P < 0.05$ ) taking Activated carbon (33.3%), no significant differences were detected ( $P > 0.05$ ). Before treatment with enterosorbents, 27 HIV-infected children had diarrhea for up to 5 days. After using Enterogel this figure increased by 2.8 times, when using Smecta by 2.5 times, after Lactofiltrum by 2.0 times, and after using Activated Carbon it was 1.6 times. (28.1%; 77.5%; 70%; 55.6% and 44.4% of cases, respectively,  $P < 0.05$ ).

**Table 4.**

**Influence enterosorbents on stool consistency in diarrhea syndrome in HIV-infected children**

Consistency	Before treatment		After treatment							
	n=96	%	Enteros - gel n=40		smecta n=20		Lactofil-room n=18		Activated carbon n=18	
			n	%	n	%	n	%	n	%
<b>watery</b>	48	50.0	1	2.5	1	5.0	2	11.1	3	16.7
<b>liquid</b>	38	39.6	2	5.0	2	10.0	2	11.1	4	22.2
<b>mushy</b>	10	10.4	12	30.0	6	30.0	5	27.8	5	27.8
<b>formalized</b>	0	0.0	25	62.5	11	55.0	9	50.0	6	33.3

Before treatment, almost half of the sick children (50%) had watery stool consistency ; after treatment with Enterogel (2.5%) and Smecta (5%), one child from each group had watery consistency; with Lactofiltrum (11.1) in two children, after Activated carbon (16.7%), watery stools decreased by 3 times. In 38 HIV-infected children (39.6%), the consistency of the stool was liquid; after treatment with Enterogel (5%), Smecta (10%) and Laktofiltrum (11.1), 2 children retained liquid stool, and after Activated carbon (22. 2%) loose stools decreased by 1.8 times compared to before treatment. In 10 HIV-infected children (10.4%) before treatment with enterosorbents, the stool consistency was mushy; after treatment with Enterogel (30%) and Smecta (30%), this figure increased 3 times, after treatment with Lactofiltrum (27.8%) and Activated carbon increased by 2.7 times. Since 96 HIV-infected children did not have formed stools before treatment, after using Enterogel in 25 patients (62.5%) the stool acquired a formed consistency, after Smecta in 11 children (55%), after Activated Carbon in 6 sick children (33.3% ), after Lactofiltrum, in half of the patients (9 children), the consistency of the stool acquired a formed appearance.

### Conclusions

1. In HIV-infected children with acute diarrhea, after the use of enterosorbents, the moderate and severe degrees of dehydration significantly decreased, especially when using the drug Enterosgel.
2. When treating acute diarrhea in HIV-infected children with Enterosgel, a significant decrease in the daily number and duration of diarrhea episodes is observed, which leads to the disappearance of signs of dehydration.
3. The watery, liquid and mushy consistency of the stool after using Enterosgel acquired a formalized appearance.

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