

COAGULOGRAM INDICATORS IN HIV-INFECTED CHILDREN

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SUMMARY: HIV infection can significantly change the functioning of various organs and systems, including the hemostasis (blood clotting) system. HIV-infected children have various disorders, such as an increased tendency to thrombosis or, conversely, bleeding, which can lead to complications. Evaluation of the coagulogram helps in the diagnosis of these disorders.

The purpose of the work is to study the blood coagulation parameters in children with HIV infection at different clinical stages.

Materials and methods. In the course of the work, 89 children aged 4 to 18 years suffering from HIV infection were examined. The average age of the patients was 9.8 ± 0.49 years. The patients were divided into 4 main groups depending on the clinical stage of the disease.

Among these coagulation parameters, a reliable decrease in the platelet aggregation index was noted with normal platelet count, PTI, thrombin time and plasma fibrinogen.

Conclusions. Disturbances in the coagulogram in children at different clinical stages of HIV infection are represented by a decrease in the aggregation capacity of platelets, which is detected already at the initial stages of the disease.

Key words: HIV infection, coagulogram, platelets.

HIV infection can significantly alter the functioning of various organs and systems, including the hemostasis system (blood clotting.) [1;5;8;15]. HIV-infected children have various disorders, such as an increased tendency to clot or, conversely, bleeding, which can lead to complications. Assessment of the coagulogram helps in the diagnosis of these disorders [2; 3; 4].

HIV infection can lead to the development of concomitant diseases, such as thrombocytopenia, hemophilia or coagulopathy, which affects the overall clinical picture of the disease in children. Regular monitoring of coagulogram parameters can help identify abnormalities at an early stage, which, in turn, will allow for timely correction of the condition and prevent serious complications. [13;14].

Despite a significant number of studies on coagulopathies in adult patients with HIV, the study of this issue in children remains limited. Our study can fill this gap and offer new data, which will make the study particularly valuable for the scientific community and medical practitioners.

Objective: to study blood coagulogram parameters in children with HIV infection at different clinical stages.

Materials and methods.

In the course of the study, 89 children aged 4 to 18 years suffering from HIV infection were examined. The mean age of the patients was 9.8 ± 0.49 years. The children were under dispensary observation at the City's AIDS Control Center. The diagnosis was established on the basis of clinical and laboratory data in accordance with the order of the Ministry of Health of the Republic of Uzbekistan No. 206 dated 19.08.20215.

Patients were divided into 4 main groups depending on the clinical stage of the disease: HIV infection of the first clinical stage was detected in 1 patient (1 main group); HIV infection of the second clinical stage - in 16 people (2 main group); HIV infection of the third clinical stage - in 62 people (3 main group group); HIV infection of the IV clinical stage - in 10 people (4 main group).

The study of coagulogram parameters included the determination of the following parameters: platelet count, platelet aggregation (ADP 1 mmol), APTT, PTI, thrombin time, plasma fibrinogen, CN-a dependent fibrinolysis, orthophenanthroline test.

Statistical processing of the results of the study was carried out using the methods of parametric and nonparametric statistics using the computer program STATISTICA 5. Statistical processing of the material included calculation of absolute and relative indicators, average values (M). When describing quantitative indicators, we used: the minimum and maximum values, the average with the deviation error (m). For qualitative indicators, absolute and relative (in %) frequencies were calculated. The criterion of statistical reliability of the obtained conclusions was considered to be the generally accepted value of $P \leq 0.05$.

Research results and their discussion.

As a result of the analysis of the results, we obtained data characterizing the coagulogram parameters in patients suffering from HIV infection I-IV of clinical stages I-IV (Table 1).

Table 1

Comparative characteristics of coagulogram parameters in patients of 1-4 main groups

Indicator	Norm	1 main group	2 main group	3 main group	4 main group
Platelet count x10	140,0-320,0	341 ± 17,05	314,35 ± 15,72	275,6 ± 13,78	300,8 ± 15,04
Platelet aggregation: ADP: 1 mmol (%)	50-75	8 ± 0,4**	17 ± 0,85*	8,85 ± 0,44**	8,02 ± 0,41**
APTT (sec)	27-36	25 ± 1,25	28 ± 1,4	28,61 ± 1,43	29,1 ± 1,46
PTI (%)	70-120	77 ± 3,85	87,88 ± 4,39	86,55 ± 4,33	87,9 ± 4,4
Thrombin time (sec)	8-14	13 ± 0,65	12,63 ± 0,63	12,95 ± 0,65	13,4 ± 0,67
Plasma fibrinogen (g/kgl)	2-4	4 ± 0,2	2,95 ± 0,15	3,05 ± 0,15	2,86 ± 0,14

XN-a dependent fibrinogen (min)	5-12	$3 \pm 0,15$	$4,94 \pm 0,25$	$4,08 \pm 0,2$	$3,9 \pm 0,2$
Orthophenanthroline test (mg / l)	3,3 8/100	$9 \pm 0,45$	$7,25 \pm 0,36$	$6,89 \pm 0,34$	$6,89 \pm 0,34$

Note:

* $p \leq 0.05$ – Significance of the difference between the indicator group and the norm

* * $p \leq 0.01$ – Significance of the difference between the indicator group and the norm

Among these coagulogram parameters, there was a significant decrease in platelet aggregation under normal parameters of platelet count, PTI, thrombin time, and plasma fibrinogen.

In patients of the 1st main group, the platelet aggregation index is lower than in patients of the other groups ($8 \pm 0.4\%$), which may be related to the number of patients of the 1st main group (1 person).

Patients of the main groups 2,3 and 4 showed a gradual decrease in this indicator depending on the clinical stage of the disease, with the lowest result in patients of the main group 4 (Fig.1).

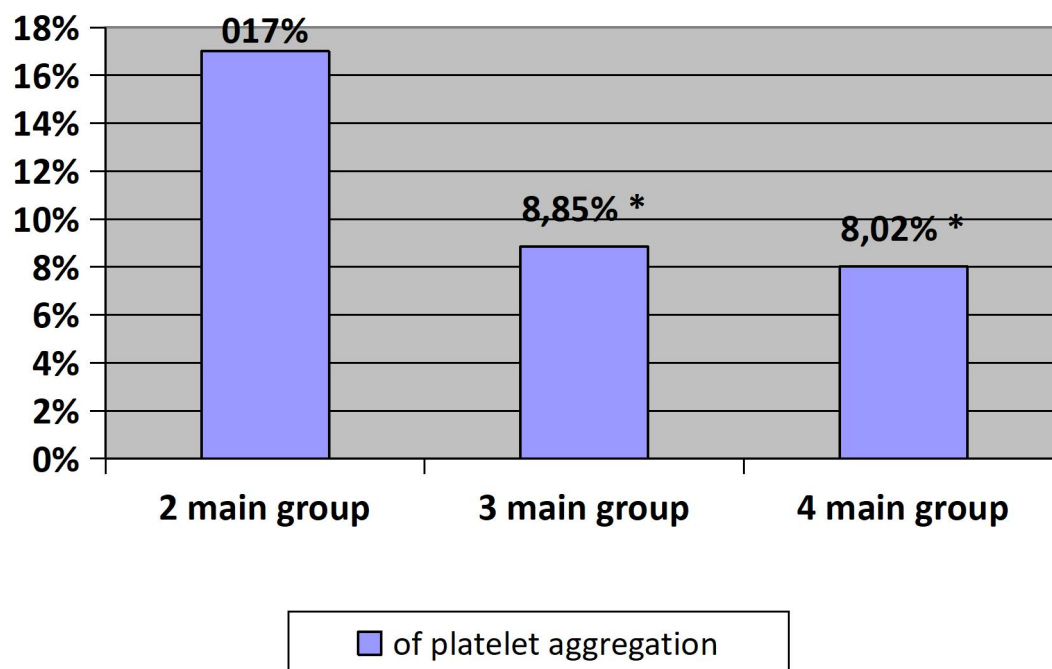


Figure 1. Comparative characteristics of platelet aggregation index in patients of 2, 3 and 4 main groups.

Note:

* $p \leq 0.05$ – Significance of the difference in the indicator between groups

Platelet link dysfunction, according to the results of the study, consisted in a decrease in platelet aggregation ability, detected from the first clinical stages of HIV infection [6;8;9].

This may be due to the weakening of the adhesive-aggregation and retrac-tive properties of platelets due to viral replication in the cells of the bone-marrow environment or their presence in platelets [6].

It is assumed that viruses can affect the antigenic structure of platelets, changing it, not only due to interaction with membrane proteins, but also as a result of non-specific fixation on the platelet surface.

In turn, this leads, firstly, to the production of antibodies against altered platelet antigens, and secondly, to the interaction of antiviral antibodies with viral proteins that are fixed on the platelet surface [7; 14].

Conclusions. Violations in the coagulogram in children of different clinical stages of HIV infection are represented by a decrease in the aggregation ability of platelets, which is detected already at the initial stages of the disease.

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