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Evaluating the effectiveness of antiplatelet therapy of the patients with kidney disease

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ABSTRACT

The study has evaluated the effectiveness of antiplatelet therapy of patients with chronic kidney disease. The patients were divided into two groups when treating the disease, the first group was given allthrombosepin as antiplatelet therapy, and the second group was given dipyridamole. The research work was monitored for ten days, during which the amount of urea in the blood was 9.6% compared to healthy people and a decrease in the amount of creatinine to 7.52%. Aggregation of thrombocytes was observed in the first group by 10.23%, and 9.6% was in the second group. As can be seen from the results obtained, it has been proved that dipyridamole did not lag in effectiveness, which was taken from the factory as an antiplatelet therapy and was used with the locally developed allthrombosepin, as traditional treatment, while treating chronic kidney disease (CKD).

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INTRODUCTION

The experts of the Kidney Disease Outcomes Quality Initiative (K/DOQI) of the National Kidney Foundation of the United States define chronic kidney disease (CKD) as kidney damage or decreased level of kidney function for at least three months regardless of aetiology, and it is the most acute medical and social problem related to the priorities of national health systems of all industrialized countries in the world where there has been a steady increase in the prevalence of chronic kidney failure (CKF) in recent decades associated with reduced quality of life of patients and high fatality rate (Garcia *et al.*, 2012; Jha and Garcia-Garcia, 2015; Aloudat and Singh, 2008).

The prevalence of CKD in the world is also difficult to assess since different criteria and assessment methods have been used (Palaniappan, 2003; Jha, 2013). The prevalence of CKD in Romania (60,969 people aged 18 years and older were surveyed) is 7%, in the United States among the population aged 20 years and older — 12% (Vatazin *et al.*, 2016; Mauriziosoresi and Davidenoto, 2015; Nugmanova *et al.*, 2014). Higher figures are also given, in particular for the United States, which largely depends on the assessment methodology (Ivanov, 2016; Shahinian

et al., 2013; Popov *et al.*, 2020).

Overall, probably about 10% of the world's adult population has CKD (Pugsley *et al.*, 2009). In patients with arterial hypertension, the prevalence of CKD is significantly higher and is 27.5% (Daminov *et al.*, 2013; Shutov, 2014; Crews *et al.*, 2010b).

At least 10% of all European residents currently suffer from CKD to some extent, which is estimated by experts to be about 50 million people living in the EU. This figure increases every year. If the current trend does not change, the number of people with CKD may double over the next decade (Barskova and Giniatullina, 2012; Khudyakova *et al.*, 2017; Rebollo-Rubio, 2015).

The costs associated with kidney failure are four times higher than the costs that patients can recover. Treatment of CKD is a serious financial burden on patients, the health care system, and society (Vatazin *et al.*, 2016; Schoolwerth, 2006; Shishkin and Lyndina, 2009). At present, there is no doubt that specific mechanisms due to the non-mediated nature of the disease completely determine the course of CKD only in the initial stage (Crews *et al.*, 2010a). At the same time, the reduction of the number of intact nephrons initiates a cascade of pathologic processes universal for nephropathies (such as hyperfiltration, hypercoagulation, violation of renal protein transport, elimination of expression mediators of cell damage), culminating in the formation of nephrofibrosis, often even if the cause that caused the initial damage to the nephrons is eliminated (Volkov *et al.*, 2009; Agarwal and Light, 2010; Kalyuzhin *et al.*, 2015).

Purpose of research

The purpose of the research is to evaluate the effect of allthrombosepin on the functional state of the kidneys while treating patients with chronic kidney disease with antiplatelet agents.

MATERIALS AND METHODS

The study has been conducted at the Department of Nephrology of the multidisciplinary hospital of the Tashkent Medical Academy during 2018 -2019, where the patients with chronic kidney disease of II-III degree of diabetic aetiology were treated. The total number of patients was 105. The controlled patients were divided into two groups with different conditions. The leading (first) group (group A) included 55 patients, and these patients were recommended allthrombosepine at a dose of 200 mg/day as antiplatelet therapy in combination with conventional therapy. The average age of patients in the main group is 43.0±1.65 years. Control group 2 (group B) included 50 patients who were prescribed dipyridamole at a dose of 225mg/day as an antiplatelet treatment regimen in combination with traditional therapy. The average age of patients in this group is 44.3±2.4 years. The study patient by age and gender are presented in Table 1.

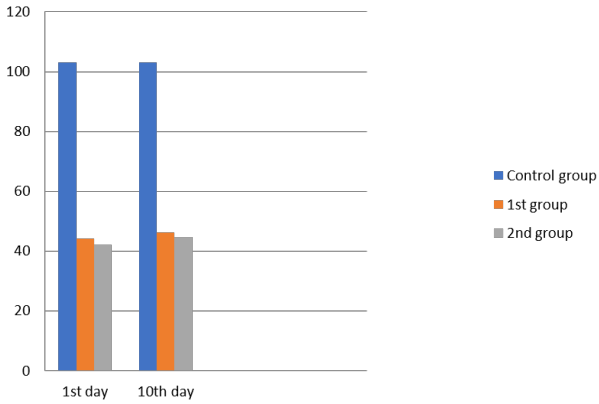

Figure 1: Dynamics of GFR changes of the patients of the control group

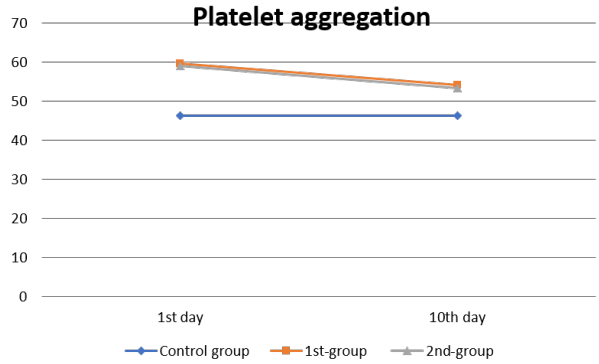

Figure 2: Results of platelet aggregation in the examined patients

As can be seen from the Table 1, 24 (43.6%) patients in the leading group were women, 41 (56.4%) were men, 22 (44%) of women in the control group, and 28 (56%) of men. Chronic kidney disease of the patients of two groups was caused by some diseases with diabetic aetiology as a complication. The Table 2 shows the proportion of significant diseases in both groups caused by CKD.

In all patients, laboratory and instrumental studies were performed on the first day of treatment procedure during which the treatment was performed, i.e. on the 10th day. To determine the effectiveness of the treatment regimen in all patients, the amount of urea, creatinine, cholesterol, and total protein in the blood was evaluated in comparison with the standard levels.

At a later stage of the study, laboratory tests were

Table 1: Division of the patients by age group and gender

No	Gender	First group (A group)	Second group (B group)	P
1.	Women	24 (43,6%)	22 (44%)	>0,05
2.	Men	41(56,4%)	28 (56%)	>0,05

Table 2: Interconnection of the main diseases caused by CKD in control groups

No	Disease	First group (A group)	Second group (B group)	P
1.	Chronic glomerulonephritis	39 (50%)	27(49,1%)	>0,05
2.	Chronic pyelonephritis	5 (24%)	14(25,4%)	>0,05
3.	Systemic lupus erythematosus	2 (12%)	5(9,1%)	>0,005
4.	Chronic tubulointerstitial nephritis	3 (8%)	5 (9,1%)	>0,05
5.	Renal amyloidosis	1 (6%)	4 (7,3%)	>0,05

Table 3: Results of a comparative study of improvement of clinical signs in patients of the control group

No	Complain	Control group n=20		1st-group (Alltrombosepin) (n=55)				1st-group (Curantyl) (n=50)			
				1st day		10th day		1st day		10th day	
		abc.	%	abc.	%	abc.	%	abc.	%	abc.	%
1.	Asthenia	2	10,0	49	89,1	42	76,4	48	96,0	41	82,0
2.	Loss of appetite	0	0	48	87,3	40	72,7	44	88,0	37	74,0
3.	Costiveness	1	5,0	28	50,9	19	34,5	23	46,0	15	30,0
4.	Nausea	0	0	24	43,6	16	29,1	22	44,0	14	28,0
5.	Body weight loss	0	0	26	47,3	24	43,6	25	50,0	23	46,0
6.	Dry skin	0	0	37	67,3	30	54,5	35	70,0	29	58,0
7.	Joint pain	0	0	22	40,0	18	32,7	23	46,0	17	34,0
8.	Oedemata	0	0	29	52,7	17	30,9	26	52,0	15	30,0
9.	Nycturia	0	0	33	60,0	25	45,5	31	62,0	22	44,0
10.	Polyuria	0	0	17	30,9	10	18,2	15	30,0	10	20,0
11.	Headache	2	10,0	36	65,5	27	49,1	35	70,0	25	50,0

Table 4: Dynamics of blood biochemical indicators in all patients in the group (Observations)

No	Indicators	Control group (n=20)	1^{st} group (Alltrombosepin)(n=55)		2^{nd} group (Dipyridamole)(n=50)	
1.	Urea, mmol/l	6,8±0,13	10,5±0,47***	9,5±0,34***	10,1±0,29***	9,34±1,67***
2.	Creatinine mmol/l	71,6±1,62	164,3±11,31***	155,9±8,5***	159,5±7,89***	152,1±6,03***
3.	Total cholesterol, mmol/l	4,7±0,08	5,5±1,45	5,1±1,32	5,4±1,43	5,0±1,25
4.	Total protein, g/l	69,6±1,35	63,3±1,68**	66,2±1,39	62,1±1,42***	64,1±1,20**

* - the differences are significant in relation to the indicatorsof the control group (**- P<0,01,* * * - P<0,001)

Table 5: Dynamics of changes in the general blood test

No	Indicators of the general blood test	Control group (n=20)	1st group (Alltrombosepin(n=55)		2nd-group (Curantyl)(n=50)	
			1st day	10th day	1st day	10th day
1.	Hemoglobin, g / l	127,3±1,89	103,3±2,28***	106,2±2,01***	99,6±3,54***	102,8±3,21***
2.	Red blood cell, g / l	4,1±0,09	3,6±0,066***	3,7±0,06***	3,6±0,09***	3,6±0,08***
3.	Leukocyte	7,1±0,12	7,0±0,13	7,1±0,12	7,5±0,14*	7,4±0,13
4.	Platelet, g / l	228,8±2,59	230,6±3,77	222,7±2,91	221,8±4,6	219,5±3,58*

* - the differences are significant in relation to theindicators of the control group (*- P<0,05, * * - P<0,01, * * * - P<0,001)

performed, such as biochemical analysis, general blood analysis, platelet aggregation, and coagulogram. The formula "CKD-EPI" was used in determining the glomerular filtration rate, which determines the functional state of the kidneys. The Russian-made BIOLA "Alat-2 aggregation analyzer" was used to evaluate platelet aggregation. In both groups examined, patient complaints were collected on the first day of treatment before antiplatelet therapy and the tenth day of treatment.

The practical application package of the computer "Statistica for Windows 7.0" was used for statistical processing of the research results.

RESULTS AND DISCUSSION

There was a decrease in patients ' complaints of discomfort on the tenth day compared to the first day (Table 3).

As can be seen from Table 3, changes were observed in all patient complaints, which means that both groups achieved good indicators for reducing complaints. Urea, creatinine, total cholesterol, and total protein in the blood of patients were studied in the study of the effect of antiplatelet drugs on the functional state of the kidneys in patients with CKD. Depending on the amount of creatinine in the blood, the functional state of the kidneys was evaluated. Examinations were performed on the first and tenth days of treatment and, for comparison, the results were evaluated (Table 4 and Figure 1).

As can be seen from Table 4, both groups that participated in the study, the biochemical indicators of blood changed for the better. In particular, in the first group, the urea scale decreased from the 10th day of study to 9.6% compared to the first day, while in the second group there was a decrease of 7.52%. Moreover, the amount of creatinine in the blood improved by 5.1% on the tenth day compared to the first day in the first group, while in the second group there was an improvement of 4.6%. As can be seen from changes in blood turbidity, it is known that the effectiveness of Allotrombosepine in traditional treatment is higher than that of dipyridamole.

When determining GFR based on biochemical tests, 103.1±4.99 ml/min was observed in the control group. At the same time, on the first day of treatment, GFR was equal to 44.1±1.77 * * ml/min in patients receiving Allotrombosepin in the group 1, on the tenth day of treatment, an increase of 46.3±2.06*** ml/min was observed. During the 10-day course of treatment of the disease in this group, there was an improvement in GFR indicators-4.9%. However, in 2 groups of patients who received dipyridamole as antiplatelet therapy, on the first day of treatment, GFR was 42.2±2.23 * * ml/min, on the tenth day of treatment, this indicator was 44.7±2.64**ml / min. However, in this group, after a 10-day course of treatment, there was an increase in GFR-by 5.9%. As can be seen from these indicators, we can see that from the changes in GFR when we give the drug dipyridamole, used as an antiplatelet treatment in standard treatment, the changes in GFR when the drug Altrombosepin is given are close to each other. Changes in the above GFR are described in the form of a diagram (Table 5).

In our case, a general blood test was performed in all control groups. As a result of the tests, it was found, including the general blood test after a 10-day course of treatment, that haemoglobin was observed in the first group by 2.8% on the tenth day compared to the first day, and in the second group by 3.2% improvement. The number of red blood cells in the first group improved by 2.8% on the tenth day compared to the first day, and in the second group-by, 2.7%. In the first group, there was a decrease in the number of chromatids by 3.4%, in the second group-a decrease of 1.1% (Table 5 and Figure 2).

In our controlled group aggregation of platelets was one of our main goals of verification.

In the first group, spontaneous platelet aggregation improved to 59.6±1.15**on the 10th day of treatment, while on the first day of treatment, it was 53.5±1.10**.In this group, there was a decrease

in platelet aggregation by 10.23%, and in our second group (dipyridamole) there was an improvement of 59.1±2.1**on the first day of treatment, to 53.4±1.88**on the 10th day of treatment. On the tenth day of treatment, there was a decrease of 9.6%. Both groups showed improvement in platelet aggregation.

CONCLUSION

Based on the changes identified in the analysis, the following conclusions have been made: All patients with chronic kidney disease have changes in the hemostatic system. This leads to a decrease in the functional state of the kidneys and a decrease in GFR. Based on the above changes and the results obtained, it is possible to understand the importance of antiplatelet therapy for patients with chronic kidney disease. When studying the comparative effectiveness of the drug Allthrombosepin produced in the Republic of Uzbekistan with dipyridamole, which is used as an antiplatelet treatment based on modern standards, its effectiveness as an antiplatelet is important because it does not lag behind the results achieved by the drug dipyridamole.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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