DYNAMICS OF PHYSICAL PARAMETERS OF RED BLOOD IN PATIENTS WITH CHRONIC KIDNEY DISEASE ARTERIAL HYPERTENSIA

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Are investigated quantitative and quality indicators of red blood: hemoglobin, number of erythrocytes in litre, volume both their volumetric distribution and the contents at patients essential arterial hypertensia (AH), chronic illness of kidneys (CDK) and at combination CDK with AH. Presence of the unstated factor negatively influencing constants of erythrosytes changes at CDK and AH is marked, and also at their combination. Thus influence of this factor most considerably at essential AH
Key words: chronic diseases of kidneys, arterial hypertensia, erythrocytes indexes, hematocrit, hemoglobin

Urgency

Now authentic growth kydneys deseases in the world is marked, and the nonauthorized problem is prevention terminal kydney failure. Considerably отстрочить the death of kidneys is possible at small percent of patients which are at initial stage chronic kydney failure. Inevitable progressing of chronic desease of kidneys (CDK) connect with such factor as joined arterial hypertensia (AH).

The mechanisms started as damage kidney tissue so as AH, are not quite investigated. It is obvious, that the system of blood is not in this case only transfer part in these mechanisms. Therefore special interest is caused with physical parameters of erythrocytes in conditions of hemopressive influences as propeliative, so as in interrelation with renal stimulus at CDK

Materials and methods

As object of research venous blood of patients with CDK, AH and a combination of these pathologies was used. Research was carried out on hematological analyzer VS-3200 of firm Mindray.

Parameters of red blood were defined: the maintenance of hemoglobin (Hb), amount erythrocytes (RBC), hematocrit (HCT), average erythrocyte volume (MCV), the average maintenance of hemoglobin in erythrocyte (MCH), the average maintenance of hemoglobin in 100 ml erythrocytes (MCHC) and factor of distribution erythrocytes on volume (RDW-CV).

The statistical analysis of the received data was carried out with use of a package of applied programs STATISTICA version 6.0 in view of the computing methods recommended for biology and medicine.

The analysis of the received data included calculation of average arithmetic variational lines (M) and its error (m). For revealing interrelations between investigated parameters and establishments of force of these connections, have been designed factors of Pirson's pair correlation (r).

Results of own researches

Results of research of parameters of red blood of sick surveyed groups are submitted in table 1.

The analysis of the results submitted in table 1 has shown, that the highest maintenance of hemoglobin was observed in blood of patients with essential AH, making 255,67 g/l, that on 60 % exceeds the top border of normal values.

The maintenance of hemoglobin in blood of patients with combination of AH and CDK, also exceeded normal values for this parameter, but is less expressed and has made 178,56 gramm per liter. The maintenance of hemoglobin in blood of patients with CDK has made 148,84 g/l.

The contents of hemoglobin in blood of patients with combination AH and CDK, also exceeded normal values for this parameter, but is less expressed and has made 178,56 g/l. The contents of hemoglobin in blood of patients with CDK has made 148,84 g/l.

Table 1. Parameters of red blood of patients with CDK, AH and with combination CDK and AH

	Hb g/l	RBC $\times 10^{12}$ /Liter	HCT %	MCV fл	MCH pг	MCHC g/L	RDW-CV %
Referencive values	110-160	3,5-5,5	37-50	82-95	27-31	320-360	11,5-14,5
CDK (n=23)	148,84 ±0,57	4,88± 0,016	44,92± 0,13	86,89 ± 0,16	31,59±0, 048	352,61± 0,19	13,07± 0,03
AH (n=10)	255,67 ±0,30	7,98± 0,01	72,50± 0,09	90,90± 0,02	31,97±0, 01	352,67± 0,06	12,47± 0,01
AH+ CDK (n=10)	178,56 ±0,72	5,31± 0,02	49,78± 0,19	93,86± 0,07	33,56±0, 03	357,78± 0,10	12,24± 0,01

The increased contents of hemoglobin in blood of patients with AH can speak a condensation of blood that proves to be true high parameters of amount of erythrocytes and hematocrit. The condensation of blood at patients of this group can be estimated as compensatory reaction to increase blood pressure (BP) with purpose to reduce volume of a circulating liquid and to lower pressure.Calculation of erythrocytes indexes has shown, that the greatest average volume of erythrocyte was observed in group of patients with combination AH and CDK. Thus in the given group the least value of parameter RDW-CV reflecting erythrocytes anisocytosis was marked.

In group of patients with CDK the return picture was observed - value of parameter RDW-CV was maximal on all sample, and average volume of erythrocyte - the least.

The contents of hemoglobin in erythrocyte in all groups exceeded value of norm, but the most essential difference was observed in group of patients with combination CDK and AH. The contents of hemoglobin in 100 ml erythrocytes, also was maximal in group of patients with combination CDK and AH.

Thus, the analysis of parameters of red blood has shown various deviations in characteristics of erythrocytes in patients with CDK, AH and a combination of these pathologies.

Now change erythrocytes` indexes of blood basically connect with development of anemias (hypo-, normal-or hyper) or malignant diseases of blood

At the same time, it is necessary to forget, that erythrocyte-one of the major data carriers about processes of fabric structures of an organism proceeding at a level (Kozinets G.I., 1998).

For revealing dependence of researched parameters among themselves, the pair correlation analysis with definition of size and the importance of correlation has been carried out.

Results of the correlation analysis of parameters of red blood of patients with ХБП are submitted in table 2.

The analysis of correlations of parameters of red blood of patients with CDK has shown, that between parameters MCH and MCHC the expressed dependence (r=0,9 is observed at p <0,05).

In pairs MCV-MCH and MCV-MCHC factors of correlation have made 0,53 and 0,56 accordingly.

Between parameter RDW-CV and parameters MCH and MCHC, correlation with r =-0,63 and r =-0,58, accordingly has been determined.

Also dependence between amount erythrocites and hematocrit (r=0,87 has been revealed at p <0,05) and the contents of hemoglobin and hematocrit (r=0,47 at p <0,05).

Thus, we can tell, that the parameters reflecting a saturation of erythrocyte by hemoglobin and them morphometric characteristics at patients with CDK are in linear de-

pendence from each other, that allows to assume absence of the additional factors influencing a condition эритроцитов in blood of patients of this group.

Results of the correlation analysis of parameters of red blood of patients with essential AH are submitted in table 3.

Table 2. Results of the pair correlation analysis (son) parameters hemogramma patients with CDK

	HGB	RBC	HCT	MCV	MCH	MCHC	RDW-CV
HGB	1,00	0,33	0,47*	-0,06	0,40	0,27	-0,18
RBC	0,33	1,00	0,87*	-0,20	0,06	-0,11	-0,02
HCT	0,47*	0,87*	1,00	-0,10	0,35	0,18	-0,22
MCV	-0,06	-0,20	-0,10	1,00	0,53*	0,56*	-0,37
MCH	0,40	0,06	0,35	0,53*	1,00	0,90*	-0,63*
MCHC	0,27	-0,11	0,18	0,56*	0,90*	1,00	-0,58*
RDW-CV	-0,18	-0,02	-0,22	-0,37	-0,63*	-0,58*	1,00

Notes
– Significance value
* p<0,05

Table 3. Results of the pair correlation analysis (r- factors Pirson) parameters of hemogramm in patients with essential AH

	HGB	RBC	HCT	MCV	MCH	MCHC	RDW-CV
HGB	1,00	1,00*	1,00*	-0,43	-0,49	0,17	-0,06
RBC	1,00*	1,00	0,99*	-0,51	-0,56	0,20	-0,12
HCT	1,00*	0,99*	1,00	-0,41	-0,48	0,13	-0,03
MCV	-0,43	-0,51	-0,41	1,00	0,97*	-0,58	0,80
MCH	-0,49	-0,56	-0,48	0,97*	1,00	-0,38	0,65
MCHC	0,17	0,20	0,13	-0,58	-0,38	1,00	-0,86
RDW-CV	-0,06	-0,12	-0,03	0,80	0,65	-0,86	1,00

Notes
– Significance value
* p<0,05

The analysis of correlations of parameters of red blood of patients with essential AH has shown strict linear dependence between amount of erythrocytes, contents of hemoglobin and a parameter of hematocrit. Pirson Factors in these pairs have made from 0,99 up to 1. In pair MCV-MCH the significant degree of the correlation which have made 0,97 at p <0,05 also has been determined. Thus parameters MCHC and RDW-CV did not give significant correlations with one of investigated parameters. At the same time, between these two parameters reveal correlation with r =-0,86, but with an insufficient significance value.

Results of the correlation analysis allow to assume, that in change erythrocytes indexes in blood of patients with AH brings the contribution the additional factor which value is not taken into account at calculation of an index. Change of the form erythrocytes, or their change electrical conduction can serve one of such factors, that will create additional errors at application of an inductive way of measurement of cells. Absence of a sufficient significance value of correlation between parameters MCHC and RDW-CV can be caused by presence of "emissions" of values or presence of several groups in the submitted sample. Revealing of this depend-

ence demands increase in sample of the data and the further analysis.

Results of the correlation analysis of parameters of red blood of patients with combination CDK and AH are submitted in table 4.

Table 4. Results of the pair correlation analysis (r- factors by Pirson) parameters of hemogramm of patients with combination CDK and AH

	HGB	RBC	HCT	MCV	MCH	MCHC	RDW-CV
HGB	1,00	0,90*	1,00*	0,31	0,35	0,38	0,72
RBC	0,90*	1,00	0,94*	-0,12	-0,08	-0,04	0,94*
HCT	1,00*	0,94*	1,00	0,23	0,27	0,29	0,77
MCV	0,31	-0,12	0,23	1,00	1,00*	0,92*	-0,43
MCH	0,35	-0,08	0,27	1,00*	1,00	0,95*	-0,39
MCHC	0,38	-0,04	0,29	0,92*	0,95*	1,00	-0,34
RDW-CV	0,72	0,94*	0,77	-0,43	-0,39	-0,34	1,00

Notes
– Significance value
*p<0,05

The analysis of correlations of parameters of red blood of patients with combination AH and CDK has shown presence of dependences characteristic both for CDK, and for AH. So, in group of patients with combination AH and CDK linear dependences between parameters MCH, MCV and MCHC with factors by Pirson from 0,92 up to 1,0 were marked. At the same time in this group high correlation between amount erythrocytes, the contents of hemoglobin and hematocrit, characteristic for group of patients with essential AH also was marked. Parameter RDV-CV was in dependence from the contents of erythrocytes (r=0,94 at p <0,05)

On the basis of the data of the correlation analysis we can assume, that parameters of an erythrocytes condition of patients with combination AH and CDK also are in dependence from some factor which is not taken into account at calculations erythrocytes indexes. Thus influence of this factor on erythrocytes patients of this group is less expressed, than at patients in group with essential AH.

Thus, the data of the carried out research have shown, that development AH is accompanied by action of some factor on erythrocytes blood that leads to change of the parameters reflecting their functionality. Thus action of such factor can be both the reason, and consequence of development AH. As one of applicants for a role of such factor change electrical conduction cells owing to change of structure of their membranes can be considered, but it demands independent studying.