

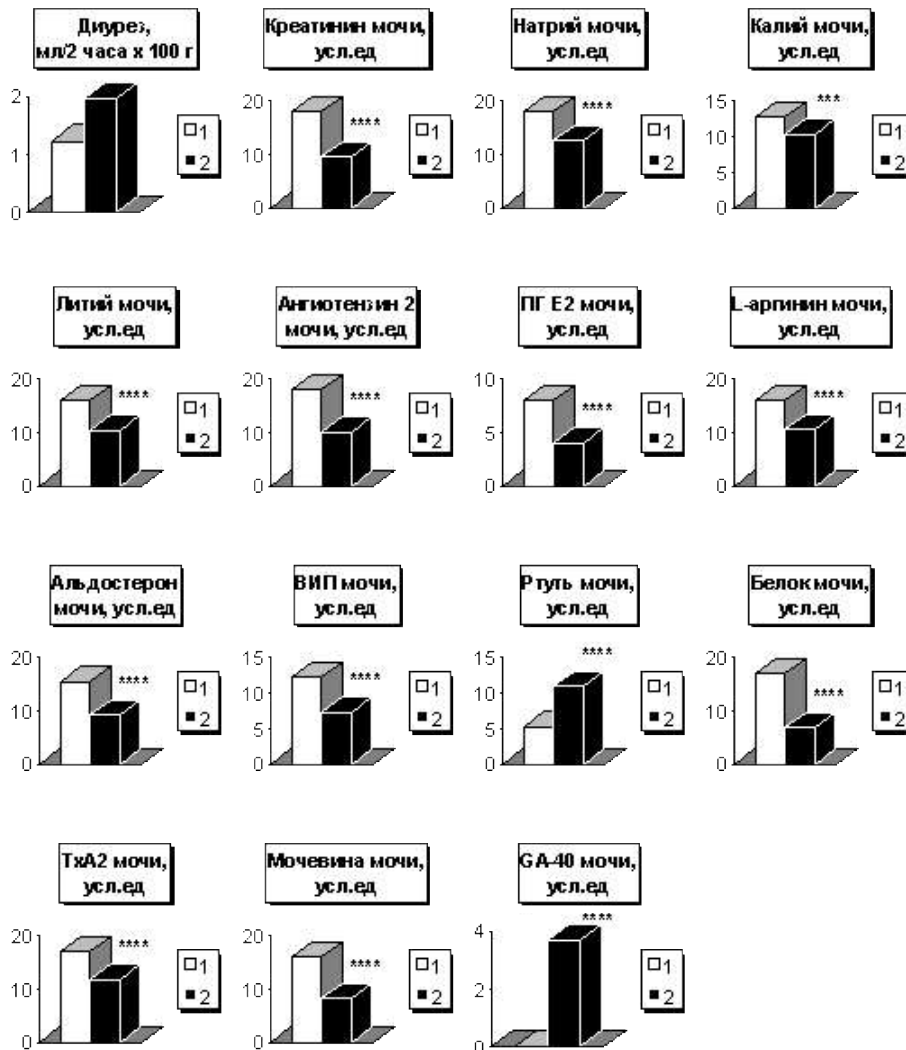
Pathophysiological analysis of diagnostics of the protective effect of GA-40 on the course of sublimite nephropathy in rats using autonomic resonance test "IMEDIS TEST +"

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Purpose of the study: to find out the possibilities of diagnosing the protective effect of GA-40 on the course of sublimite nephropathy in rats using the vegetative resonance test (ART) "IMEDIS-TEST +" under conditions of water diuresis.

In experiments on 24 sexually mature white male rats with sublimite nephropathy (administration of 0.1% mercuric chloride solution at a dose of 5 mg / kg), the protective effect of GA-40 (daily administration at a dose of 2 µg / kg) in oliguric (24 hours) and polyuric (72 hours) stage of acute renal failure. In the oliguric stage of sublimite nephropathy in rats of the low-sodium group, the GA-40 preparation caused a tendency to an increase in urine output, and the concentration in urine decreased: creatinine, ions sodium, potassium, lithium, angiotensin 2, PG E<sub>2</sub>, L - arginine, aldosterone, VIP, protein, TxA<sub>2</sub>, urea, the concentration of mercury in urine increased, and the GA-40 preparation was tested (Fig. 1).



Rice. one. Effect of GA-40 on the course of sublimite nephropathy in rats at the oliguric stage of the development of the pathological process 24 hours after administration

mercury chloride in the study of rats using ART "IMEDIS-TEST +" (1 - sublimate nephropathy; 2 - sublimate nephropathy + GA-40). Significance of differences in comparison with sublimate nephropathy was noted: \*\*\* p <0.01; \*\*\*\* p <0.001.

Table 1

The effect of GA-40 on the concentration of creatinine in the blood plasma, mercury, TNF and hormonal - messenger systems of homeostasis of sodium ions in the renal cortex in the polyuric stage of sublimate nephropathy in the study of rats with using ART "IMEDIS TEST +" (x Sx)

Indicators	Sublimate nephropathy - 72 hours (n = 6)	Sublimate nephropathy - 72 hours + GA-40 (n = 6)
Plasma creatinine concentration, standard units	17.66 0.333	4.83 0.307 p <0.001
Mercury content in renal cortex, conventional units	10.33 0.421	3.83 0.307 p <0.001
The content of angiotensin II in the renal cortex, conventional units	17.16 0.307	8.50 0.223 p <0.001
Thromboxane A content <sup>2</sup> in the cortex of the kidneys, conventional units	15.83 0.401	8.83 0.307 p <0.001
The content of L-arginine in the cortex of the kidneys, conventional units	18.83 0.401	6.66 0.210 p <0.001
Prostaglandin content E <sub>2</sub> in the cortical substance of the kidneys, conventional units	6.33 0.333	2.50 0.223 p <0.001
Content vasointestinal peptide in the renal cortex, standard units	14.33 0.333	8.83 0.307 p <0.001
The content of tumor necrosis factor-alpha in the renal cortex, standard units	15.00 0.365	5.16 0.307 p <0.001

p - reliability of differences in comparison with sublimate nephropathy; n is the number of observations.

In the polyuric stage of sublimate nephropathy, GA-40 reduced the level of retention azotemia by reducing the concentration of creatinine in the blood plasma, content of mercury, angiotensin 2, thromboxane A<sub>2</sub>, tumor necrosis factor-alpha, L-arginine, PG E<sub>2</sub>, VIP in the renal cortex (Table 1). Correlation analysis revealed direct links between blood creatinine - mercury of the renal cortex and PGE<sub>2</sub> renal cortex - tumor necrosis factor-alpha of the renal cortex (Table 2).

table 2

Correlation analysis of relationships between creatinine concentrations, content mercury and PGE<sub>2</sub> in the renal cortex 72 hours after the injection of mercuric chloride in the study of rats using ART "IMEDIS TEST +" (x Sx)

Correlation pairs		Coefficient correlation, r	Credibility correlation
Blood creatinine	Mercury crustal kidney matter	0.896	p <0.05
PGE2 cortical kidney matter	TNF cortical kidney substances	0.729	p <0.05

The protective effect of GA-40 is due to its ability to cause harmony between the processes (sympathicus - catabolism - acidity) or (parasympathicus - anabolism - alkalinity), as a result of which mercury dichloride damage to the proximal nephron decreases, which is confirmed by an increase in mercury, a decrease in the concentration of protein, ions sodium and lithium in urine (lithium ions are reabsorbed exclusively in the proximal nephron). A decrease in the damaging effect of mercuric chloride on the proximal nephron is accompanied by a decrease in the delivery of sodium ions to the macula densa of the distal nephron with a decrease in the reactivity of tubulo-glomerular feedback and ischemic activation of lipid peroxidation in the renal cortex, as indicated by

decrease in angiotensin 2, aldosterone, thromboxane A<sub>2</sub> in the urine. Decreased urinary PGE<sub>2</sub>, VIP, L-arginine reflects a decrease in the tone of vasodilators in response to decreased tone of vasoconstrictors angiotensin 2 and thromboxane A<sub>2</sub>. A decrease in urinary creatinine and urea levels indicates a lower level retention azotemia under the influence of GA-40.

The revealed decrease in the content of mercury and tumor necrosis factor-alpha in the renal cortex in the polyuric stage of sublimite nephropathy indicates the protective effect of GA-40 on the proximal nephron. This is accompanied by a decrease in the reactivity of tubulo-glomerular feedback with a decrease in the level of vasoconstrictors angiotensin 2 and thromboxane A<sub>2</sub> in the renal cortex with a decrease in the level of retention azotemia by creatinine in plasma blood. Decrease in the level of vasodilators in the renal cortex PGE<sub>2</sub>, VIP, L-arginine indicates the absence of development of not only renal reperfusion injuries under the influence of GA-40, but probably the most polyuric stage due to the elimination of the necessary complex of previous kidney damage during treatment with this drug. The positive correlation between the mercury content and blood creatinine is due to the development of retention azotemia due to damage to the proximal nephron and activation of the tubulo-glomerular feedback. Direct correlation between PG E<sub>2</sub> and tumor necrosis factor-alpha in the polyuric stage of sublimite nephropathy due to reperfusion injury of the proximal tubule.

Conclusions:

1. The preparation GA-40 has a protective effect on the course of sublimite nephropathy both in the oliguric and polyuric stages of the pathological process, which is accompanied by an accelerated excretion of mercury from the body with urine, a decrease in its content in the renal cortex, a decrease in the degree of retention azotemia due to the normalization of the balance of hormonal-messenger systems of sodium ion homeostasis.
2. The method of vegetative resonance test "IMEDIS-TEST +" makes it possible to identify the GA-40 preparation in the urine of rats to which it was previously injected.

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