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# Effect of Hibiscus Extract UTIRose on the State of Lipid Peroxidation and Antioxidant Defense in Patients with Gestational Pyelonephritis

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There is a substantial strengthening of lipid peroxidation in the background of reduced functional capacity of the antioxidant defense system in pregnant women with gestational pyelonephritis. Inclusion of drug Aflazyn (hibiscus extract UTIRose) in treatment helps to reduce the terms of normalization of clinical and laboratory manifestations of the disease due to resumption of mutual balance in oxidative-antioxidative system

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*Keyword:* Gestational Pyelonephritis, Aflazyn, Antioxidant, Lipid Peroxidation.

### 1. Introduction

Gestational pyelonephritis (GP) or pyelonephritis in pregnant is acute infectious inflammation with the predominant affection of the interstitial tissue, tubular apparatus and walls of cup-pelvis system of the kidney (usually the right), which was first developed during the current pregnancy. The frequency of this disease in obstetric practice is, according to various authors, 6-10% and usually occurs in young pregnant women in the II-III trimester of pregnancy (usually in terms of 20-28 weeks). The GP of pregnant affects the course of pregnancy and the fetus (high frequency of abortion, anemia, early gestosis and pre-eclampsia, growth retardation and fetal distress), and infants often have signs of intrauterine infection<sup>[1,4,5]</sup>.

In the pathogenesis of gestational pyelonephritis important place belongs to membranopathological

processes caused by activation of lipid peroxidation (LPO) and violation of antioxidant defense system (AODS)<sup>[3]</sup>. Therefore mutual balance in oxidant-antioxidant system is an important element in maintaining homeostasis, in general and in particular kidney disease and stipulate for inclusion in treatment the mediators of antioxidant action<sup>[2,3,6]</sup>.

The application of herbal remedies with high contents of bioflavonoids and antioxidant vitamins can be considered as long-range<sup>[7,9,10]</sup>. Bioflavonoids- is exogenous, natural, low molecular weight antioxidants which have the characteristic to prevent the emergence and neutralization of bioreactive oxygen species (ROS) by preventing lipid peroxidation and formation chelate complexes with metals. Flavonoids inhibit the activity of enzymes in the arachidonic acid cycle, reduce the formation of

ROS, interact synergistically with antioxidant vitamins (A, E,  $\beta$ -carotene), increasing their antioxidant potential. Structure of phenolic flavonoid molecule allows them to interact with free radicals, reducing the intensity of lipid peroxidation. This leads to the inhibition of the formation of the main negative factor - malondialdehyde. Flavonoids regulate the functional state of the capillary walls, reducing their fragility, which is important to restore the microcirculation in organs. They have anti-inflammatory, antibacterial, antispasmodic, antihypertensive, anti-proteinuric, antihematuric effect. The characteristic feature of flavonoids is the membrane-stabilizing action. They also inhibit platelet aggregation and adhesion to the endothelium of blood vessels, improves blood rheology, protect microcirculatory vessels and tissue from degradation, acting as hepatoprotector. Metabolic effects of flavonoids are associated with the stimulation of protein synthesis and accelerate the regeneration of damaged cells that have a dominant role for cell renewal. Flavonoids also exhibit anti-allergic, and diuretic effects. Finally, another positive feature of flavonoids is to potentiate the effect of ascorbic acid and the possibility of general prescription of physiologically active substances of plants (alkaloids, saponins, pectins and other)<sup>[3,6,8]</sup>.

Highly effective representative of bioflavonoids may be a drug Aflazyn® LLC "Pro-Pharma", Ukraine. Aflazyn® was chosen because it is composed of a patented extract of hibiscus UTIRose (Burgundy botanical extracts, France), which determines the pharmacological properties of the drug, is a source of organic acids (citric, oxyamber, pyrocatechinic, hibiscus), vitamins, polysaccharides, bioflavonoids, which determine the bacteriostatic effect of the drug against most pathogens of urinary tract infections (Staphylococcus spp., Streptococcus spp., Enterococcus faecalis, Escherichia coli, Enterobacter spp. Candida spp., and others). It has anti-inflammatory, decongestants properties, shows anti-adhesive effect that prevents adhesion (sticking) of microorganisms to the walls of the urinary tract, their development and reproduction.

It prevents the development of disuric phenomena.

However, the literature on the impact of drug Aflazyn® on lipid peroxidation and AODS in patients with gestational pyelonephritis we have not met.

**2. The aim:** of our study was to investigate the antioxidant activity of the drug Aflazyn® LLC "Pro-Pharma", Ukraine, in the treatment of patients with gestational pyelonephritis.

### 3. Materials and Methods

We conducted 58 examinations and treatment of pregnant women with gestational pyelonephritis. Patients were divided into two groups. The structure of group I (28 people) included patients who received conventional treatment (restoration of the passage of urine, an antibiotic of the cephalosporin group II or III generation and antispasmodic in typical therapeutic doses). The II group (30 persons) consisted of patients whose treatment included medication Aflazyn®. The drug was administered 1 capsule 2 times a day during 1 month. The average age of patients was  $25,8 \pm 2,6$  years. Comparison group consisted of 20 healthy pregnant women aged 18 to 40 years.

The diagnosis of gestational pyelonephritis is confirmed by clinical - laboratory tests, which included the study of inflammatory - intoxication, pain and disuretic syndromes. General clinical studies were conducted simultaneously with the quantitative studies of urinary sediment by the method of Nechyporenko, bacteriological examination of urine: the release of the causative agent, the quantitative determination of the level of bacteriuria and sensitivity of microorganisms to antibiotics. Renal function was studied by using the samples of Zimnitskiy, contents urea and creatinine in serum, and data instrumental examination: ultrasound diagnostic of kidneys with holding color mapping.

State of LPO and activity AODS was evaluated on the following criteria: content of malondialdehyde (MDA), sulfhydryl groups (SG) of protein and non-protein component of blood plasma, activity level of ceruleoplasmin and transferrin saturation with iron.

The data processed statistically. After a “Student”– Fisher’s table was determined the coefficient of reliability (p). Statistically significant difference was considered at p <0.05.

#### 4. Results and Discussion

Before the treatment, in patients with gestational pyelonephritis was revealed a significant strengthening of lipid peroxidation (MDA

increase of 47.9%) and decreased functional capacity AODS: deadaptation of ceruleoplasmin-transferrin system (increased activity of ceruleoplasmin by 45.4%, reducing the saturation of transferrin with iron by 21 3%), a decrease of sulfhydryl groups of proteins and non-protein component of blood plasma: general - by 32.1%, residual - by 47.2% and protein - by 29.5% (p <0.05) (Table 1).

**Table 1:** Dynamics of Indicators of Prooxidant-Antioxidant System of the Body in Patients with Gestational Pyelonephritis Influenced by Treatment

Biochemical indicators	MDA mmol/ml	Sulfhydryl groups mmol/ml			Ceruleoplasmin conv	Transferrin conv
		general	residual	Protein		
<b>Control n=20</b>	71,72±1,08	1,62±0,02	0,229±0,008	1,39±0,02	28,12±0,69	0,155±0,003
<b>I Group n=28</b>	1 115,26±2,38*	1,06±0,04*	0,122±0,01	0,945±0,03	42,56±1,28*	0,120±0,002
	2 97,82±1,38*	1,24±0,02*	0,142±0,005*	1,06±0,05*	38,08±1,36*	0,132±0,002*
<b>II Group (Aflazin®) n=30</b>	1 116,82±2,46*	1,07±0,04*	0,122±0,009*	0,942±0,05*	43,52±1,32*	0,122±0,002*
	2 81,48±1,38**	1,50±0,03**	0,196±0,006**	1,26±0,02**	29,68±1,16**	0,146±0,001**

Notes:

1. n – number of patients; 2. 1- before treatment, 2- after treatment;
3. \* Reliability of the difference of indicators of comparison group (p <0.05)
4. \*\* Reliability of difference between indicators of patients from Groups I and II (p <0.05)

After the treatment the positive dynamics of clinical and laboratory manifestations of the disease in patients of group II who received the drug Aflazyn accompanied by a significant decrease in the process activity of lipid peroxidation (MDA content reduced by 33.5% compared to baseline) and improved functional ability of AODS (restoration of almost complete mutual balance in ceruleoplasmin-transferrin system, and increase of general SG - by 23.2%, residual - by 17.9% and protein - 23.7% (p <0.05) (Table 1). Meanwhile it is not observed the normalization of free radical oxidation of lipids in patient of I group (Table 1).

The identified, during the study, changes of indicators of free radical oxidation of lipids in patients with gestational pyelonephritis: activation of lipid peroxidation and inhibition

AODS - coincide with the data in the literature<sup>[2,3]</sup>.

The use of conventional therapy helped to reduce clinical and laboratory manifestations of the disease. However, exists the high level of lipid peroxidation and lower antioxidant defense that means that there are conditions for further progression and chronic pathologic process after cessation of treatment.

Use of drug Aflazyn in patients of Group II promoted both normalization of clinical and laboratory parameters and reduction of processes of lipid peroxidation and recovery activities of AODS.

#### 5. Conclusions

Activation of lipid peroxidation in the background of decreased activity of AODS plays

an important role in the process of chronization and progression of gestational pyelonephritis.

Use of the drug Aflazyn in the treatment of patients with gestational pyelonephritis helps to reduce timing normalization of clinical and laboratory parameters due to recovering of mutual balance between LPO and AODS.

These results suggest the prospect of further study Aflazyn impact on all other important parts of pathogenesis of chronic pyelonephritis.

## 6. References

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