

## Free radical processes in the blood of patients with cervical cancer receiving various postoperative treatment modalities

I. Goroshinskaya, N. Popova, A. Menshenina, L. Nemashkalova, A. Shikhlyarova, E. Frantsiyants, I. Neskubina, E. Surikova, O. Kit, M. Gusareva, A. Pustovalova

### Objective.

The purpose of the study was a comparative analysis of the intensity of lipid peroxidation (LPO) and antioxidant system in the blood of cervical cancer (CC) patients receiving treatment with and without xenon therapy.

### Material and methods.

The study included 20 CC patients (T1B-T2BN<sub>x</sub>M0). After extended panhysterectomy, 13 patients received 5 sessions of xenon inhalation therapy, while 7 patients were controls. Blood levels of malonic dialdehyde (MDA) and diene conjugates (DC), the activity of superoxide dismutase (SOD), catalase and glutathione system were measured by standard spectrophotometric methods. The data were analyzed using Statistika 6.0 programs, Student's t-test and Mann-Whitney U test.

### Results.

Before treatment, CC patients showed increased levels of MDA in plasma by 101.8%, in erythrocytes by 59.7%, DC in plasma by 4.4 times, in erythrocytes by 6.6 times, compared to non-cancer women (p<0.01-0.05).

LPO intensification was accompanied by a decrease in activity of SOD by 31.4%, catalase by 21.7% (p<0.001) in erythrocytes on day 2-3 after the surgery. Increased activity of glutathione peroxidase (GPO) by 102.7% before surgery and by 63.4% after surgery (p<0.001-0.01) probably was compensatory. Xenon therapy led to a decrease in the plasma LPO intensity: DC levels were 2.5 times lower than before treatment, and MDA levels were significantly lower by 25.2% than in patients without xenon therapy. This correlated with partial normalization of antioxidant enzyme activity – SOD activity was 1.9 times higher than in patients without xenon therapy (p=0.0005), catalase activity 13.7% higher, and GPO activity decreased by 30.6% compared to initial levels (p=0.005), while patients without xenon therapy showed increased GPO (81.6% higher than the norm, p=0.003) accompanied by statistically significant decrease in reduced glutathione level.

### Conclusions.

Xenon therapy decreases LPO, initially increased in CC patients. This is facilitated by partial normalization of the activity of the main antioxidant enzymes.

groups	MDA (nm/ml)		DC (u/ml)		SOD (u act/ml)	Catalase (µmH <sub>2</sub> O <sub>2</sub> /min. ×mg Hb)	Glutathione (µm/ mg Hb)	GPO (IU/ mg Hb)
	plasma	erythrocytes	plasma	erythrocytes				
donors	7,1±0,7	4,5±0,4	0,3±0,07	0,18±0,05	110,8±4,7	2673,8±60,7	35,8±2,2	232,9±33,7
initially	13,5±1,9 <sup>1</sup>	7,2±1,1 <sup>1</sup>	1,3±0,3 <sup>1</sup>	1,2±0,4 <sup>1</sup>	76,1±5,0 <sup>1</sup>	2093,8±131,2 <sub>1</sub>	32,7±2,9	472±42,9 <sup>1</sup>
after surgery	14,3±2,2 <sup>1</sup>	7,6±1,2 <sup>1</sup>	1,1±0,4 <sup>1</sup>	0,23±0,02	77,5±5,7 <sup>1</sup>	2462,6±129 <sup>1</sup>	31±2,4	380,5±31,7 <sup>1</sup>
with xenon therapy	11,7±1,4 <sup>1</sup>	7,7±1,7 <sup>1</sup>	0,5±0,03	0,1±0,03	90,4±6,7	2246,7±90,4 <sup>1</sup>	35,7±5,3	327,7±33,6 <sup>1</sup>
without xenon therapy	15,7±1,4 <sup>1,2</sup>	6,5±1,4 <sup>1</sup>	0,8±0,16 <sup>1,2</sup>	0,4±0,03 <sup>1,2</sup>	48±6,8 <sup>1,2</sup>	1975,2±273,7 <sup>1,2</sup>	24,4±3,6 <sup>1,2</sup>	422,9±23,8 <sup>1,2</sup>

1 - significant difference compared to donors; 2 - significant difference compared to patients with xenon therapy

**Tabl.1 - Content of lipid peroxidation products, activity of antioxidant enzymes and glutathione-dependent enzyme in plasma and red blood cells of patients with cervical cancer during treatment**