



## **SOME BIOCHEMICAL PARAMETERS AND BLOOD CIRCULATION IN THE KIDNEYS WITH AIO**

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### **RESUME**

In the experiment, renal hemocirculation was studied in obturative and strangulation forms of the disease in acute intestinal obstruction.

According to the results of biomicroscopy, the integrity of the vessels in the renal parenchyma changes, there are tumors around the vessels, burns.

Along with changes in blood circulation, biochemical changes in the deposit also lead to the breakdown of the antioxidant defense system.

Intestinal obstruction 1.5-9.4% of all diseases of the abdominal organs. According to the results of the analysis of statistical data that determine the state of abdominal surgery for 1993 - 2012. a pattern has been established that is characteristic not only for our country, but also for the CIS states: a steady increase in the number of emergency operations on the abdominal organs, which does not depend on population growth. To say that in 2012, compared to 1993, the population growth in the Republic of Uzbekistan was 1.4 times, while the number of operations for intestinal obstruction was 6 times. The initial manifestations of intestinal obstruction are associated with a violation of the intestinal passage. The main pathogenetic mechanism that determines the transition to the next stage of the pathological process - Disruption of compensatory mechanisms and access to the organismal level - is a violation of intramural hemocirculation in a more or less extensive segment of the intestine. The severity of hemodynamic changes determines the degree of change in the functional state of the intestine, water-electrolyte homeostasis, endotoxemia, dysbiosis, general and secretory immunity, tropisms of the intestinal wall with an outcome in necrobiosis.

With intestinal obstruction, hemodynamic and volemic disorders come to the fore, due to a reduction in arterial inflow and a violation of venous outflow due to compression of the mesenteric vessels (strangulation forms of obstruction) or intramural vessels (all forms of obstruction).





Despite significant advances in the diagnosis and treatment of AIO, many aspects of the mechanism of MHC disorders in various organs, factors and causes of the increase in endotoxemia and their relationship with functional and metabolic changes in cellular structures remain unrevealed. All of the above predetermined the need for this study.

**Purpose of the study:** in the dynamics of experimental acute obstructive and strangulated intestinal obstruction, to study the features of microhemocirculatory (MHC) changes in the kidneys, to establish their relationship with the functional and metabolic parameters of these organs.

**Materials and research methods.**

The experiments were carried out on 100 white outbred male rats of a mixed population with an initial weight of 180-200 g.

MHC of the kidneys by the method of intravital biomicroscopy on a luminescent microscope "LUMAM-IZ" (St. Petersburg, Russia). The model of the obstructive form of acute intestinal obstruction was reproduced by ligation of the small intestine in the middle third, and strangulation-AOI, by ligation of the intestine along with the adjacent mesentery. The studies were carried out 2, 4, 6, 12, 24 hours after the model was reproduced. The content of malondialdehyde (MDA) (Andreeva A.I. et al., 1988), the activity of superoxide dismutase (SOD) (Mkhitaryan V.G. and Badalyan G.E., 1979) and catalase (Korolyuk M A. et al., 1988). The results of the study were processed by the method of variation statistics using a software package. The study of the MHC of the kidneys in the first hours of the obstructive AIO showed the integrity of the vascular architectonics, the structure of the blood flow did not change. After 6 hours, a slight deformation of the contours of the vessels, a thickening of the tubular apparatus were revealed, apparently due to the release of the liquid part of the blood into the interstitium. The blood flow of the functioning vessels was somewhat intermittent due to the increased aggregation of blood corpuscles and a decrease in the blood flow velocity. Subsequently, the number of functioning capillaries decreased, there was a violation of the contours of blood vessels, stagnation of blood, small areas of punctate hemorrhages were revealed in the parenchyma, plasma soaking of the basement membrane of capillaries and the walls of the proximal convoluted tubules. (Fig. 1). With strangulation AIO, after 2 hours, changes in blood flow were revealed in the form of small cell aggregates in the lumen of capillaries, a decrease in the degree of contrast of the boundaries between vessels and tubules. Subsequently, MHC - disorders increased: the deformation of the vascular bed of the cortical layer of the kidney worsened, the number of functioning capillaries significantly decreased, the integrity and shape of individual groups of microvessels





with precapillary hemorrhages were impaired. At the later stages of the experiment, scattered small foci of infiltrates and areas with a loosened homogeneous structure were revealed throughout the parenchyma of the organ. The parenchyma around the destruction foci acquired a darkish tint, plasma impregnation and deformation of the tubular apparatus were found everywhere. (Fig. 2). Regardless of the type of acute intestinal obstruction, a wide range of changes with sequential and increasing over time intravascular, vascular and extravascular disorders were observed in kidney microcirculation.

The earliest and deepest changes were characteristic of strangulation AIO. The results of biomicroscopy of the liver and kidneys indicated a certain staging mechanism for the development of MHC - disorders in the dynamics of AIO.

Against the background of microcirculation disturbance, which develops as a result of hypoxia, an intensification of lipid peroxidation in the studied organs was observed, which may be the cause of a violation of the structural integrity of biomembranes. We studied the dynamics of LPO processes (Table 1) and found an increase in the serum MDA level in both forms of AIO. With the aggravation of the pathological process and the development of peritoneal phenomena, the degree of hyperlipoperoxidation in the obstructive form increased sharply, exceeding the norm by 1 87.5%. With strangulation, the changes were more pronounced, were detected from the first hours of the experiment, and by the end of the experiment this excess was 346.9%.

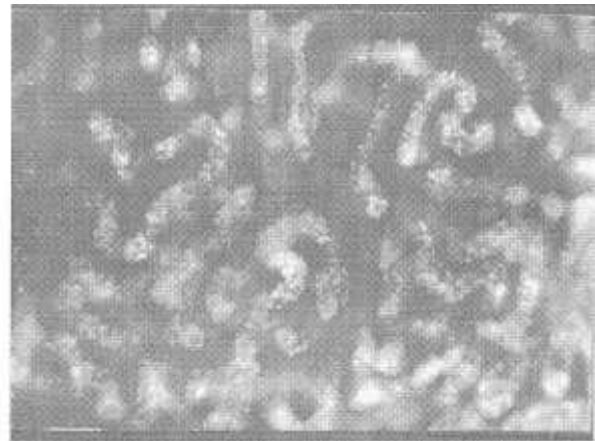
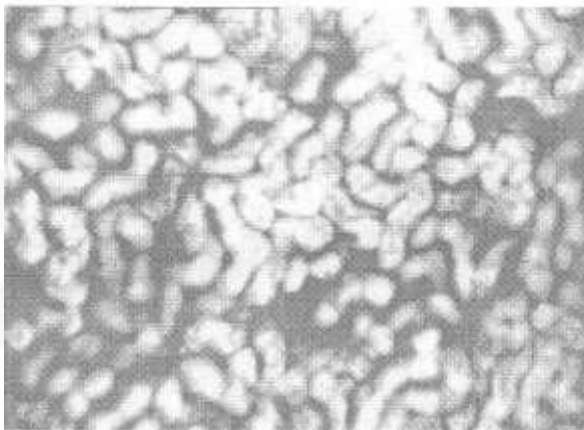


Fig. No 1.6 hours. Obturation OKN. Fig. No 2.6 hours. Strangulated OKN.

The level of MDA in the kidney homogenate in obstructive form of AIO began to increase after 4 hours. and by the end of the experiment this exceeded the control by 148.5%; with strangulation, the MDA level increased from the very first hours and progressively increased.





Serum MDA content (nmol / ml) of experimental animals with AIO

Study period	Study material	
	Blood serum	Kidney homohepatitis
<b>After 2 hours</b>		
- falsely operated	5,266 ± 0,632	0,104 + 0,019
- obstructive	5,522 + 0,633	0,106 + 0,016
- strangulation	6,355 + 0,763	0,131 ± 0,030*
<b>Через 4 час.</b>		
- ложнооперированные	5,466 + 0,656	0,106 ± 0,200
- обтурационная	6,138 + 0,737	0,138 + 0,031*
- странгуляционная	8,668 + 1,040*	0,154 ± 0,034
<b>Через 6 час.</b>		
- ложнооперированные	5,398 + 0,648	0,130 + 0,011
- обтурационная	9,122 + 0,730*	0,158 + 0,033*
- странгуляционная	11,120 + 0,89*	0,220 ± 0,044*
<b>Через 12 час.</b>		
- ложнооперированные	5,277 + 0,422	0,104 + 0,019
- обтурационная	9,511 ± 0,761	0,202 ± 0,043*
- странгуляционная	16,300 + 1,30	0,266 ± 0,057*
<b>Через 24 час.</b>		
- ложнооперированные	5,269 ± 0,422	0,107 ± 0,033
- обтурационная	15,150 ± 1,21*	0,266 ± 0,051
- странгуляционная	23,55 ± 1,884*	0,388 ± 0,071

It is known that the processes of free radical oxidation are under the control of the antioxidant defense system, the main ones in which are the enzymes SOD and catalase. Determination of SOD activity in the liver homogenate showed its inhibition in both forms of AIO, depending on the form of obstruction and the duration.

In the kidney homogenate, the activity after obturation of the animals increased in waves in 2-4 hours, inhibited after 6 hours, and again gradually rose by the end of the experiment. With the strangulation form of OKN, the enzyme activity remained within the control values at the beginning of the experiment, and was inhibited after 6-12 hours. increased by the end of the experiment. Catalase activity increased in both forms.

Thus, in the development of multiple organ failure in AIO, the leading role is played by MHC disorders, the earliest and most pronounced in the strangulated form of intestinal obstruction.



Kidney MHC disorders are progressive. Disorders of microhemocirculation, hemorheology and the degree of endotoxemia determine the severity of the imbalance in the LPO / AOD system. In the kidneys, especially in the strangulated form, the above changes progress.

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