

## Correction of enteral insufficiency syndrome at ileus of different genesis

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### ABSTRACT

The present work was aimed to improve the results of treatment of patients suffering from acute ileus at the expense of elaboration of enteral therapy methods providing rapid restoration of morpho-functional status of intestinal hemato-enteral barrier. Observations have been carried out on 80 patients who underwent surgical operation due to acute ileus of different genesis. Has been stated that administration of enteroprotectors has positive influence on morpho-functional status of hemato-enteral barrier and leads to the cessation of syndrome of enteral insufficiency in the early postoperational period. Application of complex method of enteral therapy decreases mortality rate more than 2 times in patients suffering from ileus with different genesis.

**KEYWORDS:** *ileus, hemato-enteral barrier, glutamine, arginine, 3-omega fatty acids, enteroprotectors, endotoxycosis*

Nowadays, acute ileus remains as a formidable task and still unsolved problem in urgent surgery. Topicality of this problem is determined by high postoperational mortality rate that in case of developed septic shock and polyorganism insufficiency constitute 70-100% [5].

In postoperational period all patients with acute ileus suffer from syndrome of enteral insufficiency, which is the main cause of unsatisfactory results of treatment of the above-mentioned pathology. It is manifested by the firm and combined disorders of all gastrointestinal tract (GIT) functions [6]. At the same time, disorder of integrity of hemato-enteral barrier leads to unlimited translocation of toxic enteral content in the blood with development of grave endogenous intoxication, which in turn determines unfavorable outcomes of this pathology [5,6].

Undoubtedly, improvement of treatment results of acute ileus should be facilitated and supported by the rapid restoration of morpho-functional status of hemato-enteral barrier. It should be achieved at the expense of both, eradicate of bacterial overgrowth and intrainestinal administration of preparations having cytoprotective effect on intestinal main cell – enterocyte. Intrainestinal administration of enteroprotectors is related with the ability of enterocytes to provide own vital activity in certain situations at the expense of apical entry of essential substances from intestinal lumen [8]. In case of grave acute ileus the mentioned way for metabolic support of these cells is the basic due to intestinal wall ischemia developed as a result of local microcirculatory disorders [6,8].

Thus, the aim of our investigation was to improve the results of treatment of patients with acute ileus at the expense of elaboration of enteral therapy methods providing rapid restoration of morpho-functional status of intestinal hemato-enteral barrier.

### MATERIAL AND METHODS

Observations have been carried out on patients who underwent surgical operation due to acute ileus of different genesis. The control group consisted of 38 patients. They underwent naso-gastro-intestinal intubation using the three-lumen tube in an attempt to correct intrainestinal status according to method elaborated in

our clinic and including antiseptic, enterosorption and eubiotics [4]. In the basic group were involved 42 patients. In postoperational period they were subjected to complex method of enteral therapy elaborated in our clinic. The method included naso-gastro-intestinal intubation, correction of intrainestinal status and administration of enteroprotectors in an attempt to improve the morpho-functional state of hemato-enteral barrier. The nature of pathology in groups was relatively equal.

Manifestations of acute ileus in patients of both groups were evaluated by the results obtained after investigation of toxicity of intestinal discharge using the test-object *Nitella flexillis* [9], level of "mean molecules" (MM) in blood [2], absorption ability of small intestine by D(+) xylose [1]. The nature of morphological changes of intestinal walls was defined with the use of U-sound Philips HDI 5000 in BOWEL regime [10].

### RESULTS AND DISCUSSION

Considering the fact that deep tissue hypoxia of intestinal wall is one of the basic elements in pathogenesis of ileus severe forms, the medical preparation able to correct the mentioned situation has been selected. The most appropriate for this purpose is ozonized physiologic salt solution. Physiologic salt solution with perfect anti-hypoxic effect has local antimicrobial influence as well. Consequently, we decided to start enteral therapy with administration of this solution. Concentration used physiologic salt solution was 3-4 mg/l. 400 ml of solution was administered in each canal of tube.

The important role in intestinal wall's pathobiologic deviations at ileus, along with tissue hypoxia, play toxins of microbial and tissue genesis. In this connection the next step in intrainestinal therapy was enterosorption. We used water-soluble carbon-fibered sorbent "Uglesorb" (0,1 g/1 kg) with high sorption potential [3].

Nowadays, the group of nutrients has been discussed as preparations for intestinal treatment [7]. In enterocytes they reveal cyto-protective effect at the expense of positive influence on metabolic processes. Glutamine belongs to the group of cytoprotectors and is essential component for nucleotides and proteinsynthesis; important energetic substrate for erythrocytes. Glutamine increases secretion of IgA and is precursore of strong antioxidant –

glutathione [7]. Another important enteroprotector is arginine. Clinicians have recognized this amino acid as essential and "conditional-irreplaceable" owing to its metabolic effects. Arginine is essential for tissue cell proliferation; intracellular production of energy; it is powerful immune-modulator [7].

Among enteral cytoprotectors 3-omega fatty acids are very important as well. They are structural components of cells and compact energy carriers (1 g – 9 kcal); have well-expressed immune-modulatory effect; in enterocytes appear via the passive diffusion without consumption of intracellular energy. 3-omega fatty acid is the widespread and available nutrient [7]. It is the basic component of linseed oil, which at intestinal administration produces local protective effect at the expense of coating feature. Thus, favorable condition for restoration of erosive mucous layer has been developed at the expense of prevention of toxic contents and intestinal mucous contact like "balm on granulating wound"

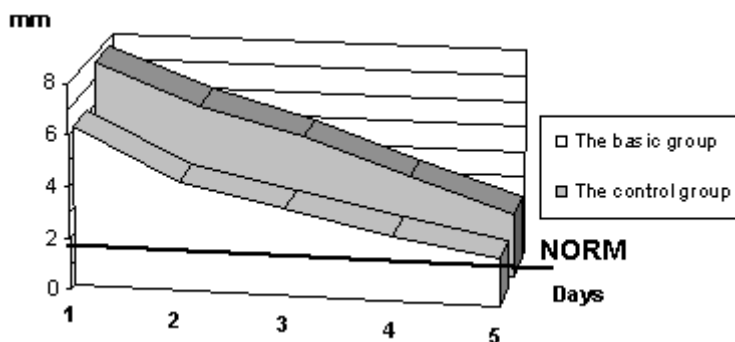
Glutamine has been used with the daily dose 10 g; Arginine – 20 g and 3-omega fatty acids – 120 g. For restoration of normal intestinal bacterial spectrum, along with enteroprotectors, the eubiotics "Baktolact" was used.

Enteral therapy was started during operation. After nasogastric-intestinal intubation and gastrointestinal tract

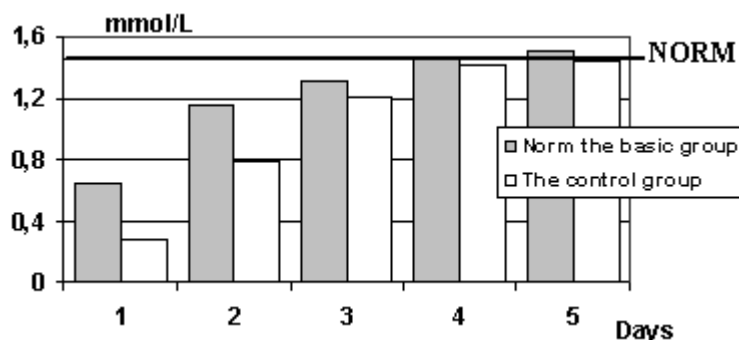
decompression for 1 hour in intestinal lumen the ozonized physiologic salt solution was administered. Thereafter, immediately, with the same exposition, enterosorbent was introduced. Enteroprotectors were used after operation. They were administered in intestinal lumen in cooperation with eubiotics after enterosorbent for 1 hour. Enteral therapy has been carried out every 12 hours.

Comparative study of dynamics of pathological process' clinical-laboratory manifestations in groups of patients has shown that intestinal discharge toxicity in samples obtained during operation in both groups exceeded the norm several times. Next day after operation the above-mentioned index in both groups started normalization. Decrease tendency in toxicity was maintained throughout the postoperative period and 5 days later after operation in the basic group it was 1,5 times less than in the control group.

Ultrasound investigation of intestinal wall morphological changes in mesogastrum (left side from umbilicus) has shown that next day after operation its thickness in the basic group was  $6,1 \pm 1,1$  mm; in the control group –  $7,7 \pm 1,4$  mm (Fig.1). Two days later after operation the thickness of intestinal wall in the basic group was  $4,2 \pm 0,6$  mm, whereas in the control group it was  $6,1 \pm 0,9$  mm.



**Fig.1** Dynamics of changes of intestinal wall sickness.



**Fig.2** The active transport of blood D(+)-xylose in intestine.

72 hours later after operation the above-mentioned index in the basic group consisted  $3,3 \pm 0,4$  mm and in the control group –  $5,1 \pm 0,8$  mm. 4 hours later in the basic group on the background of enteral therapy normalization of intestinal wall sickness was observed, whereas in the control group this index was higher than normal value and consisted  $3,7 \pm 0,5$  mm.

It must be mentioned that the normalization of intestinal wall structure was accompanied with restoration of its function. Status of hemato-enteral barrier function has been evaluated with the use of D(+)-xylose test. Has been detected that next day after operation, this index in patients from the basic group was  $0,65 \pm 0,12$  mmol/L. It was two times higher than in the control group –  $0,28 \pm 0,06$  mmol/L (Fig.2). Two hours later after operation this tendency was maintained. As it has shown from the Fig.2, blood D(+)-xylose concentration in the basic group consists  $1,15 \pm 0,11$  mmol/L (whereas, in the control group it is  $0,79 \pm 0,09$  mmol/L).

Three hour later after operation the intestinal transport function in the basic group practically was normalized. Normalization of this index in the control group was detected only 5 days later after operation.

Investigation of MM in the blood as one of the criterion of severity of endotoxemia has shown that the decrease in metabolites of this group in the basic group was also more intense. Thus, control of endogenous intoxication syndrome in patients from the basic group was possible 4 days later after operation – the day earlier than in the control group.

Comparison of content indices of intubated regions of gastrointestinal tract and endogenous intoxication has shown that in case of high indices of toxicity of intestinal discharge, the level of decrease of endotoxemia in the basic group was more progressive. Such kind of results indicate significant decrease of translocation process of intestinal toxic contents in the blood as a result of restoration of hemato-enteral barrier's integrity in the early postoperational period. This conclusion has been confirmed by the results of morpho-functional tests.

In the early postoperational period in the basic group 3 patients have died. Two patients – with advanced ileus on the background of large intestine cancer, due to progressive polyorgan insufficiency, and one 84 years old patient – as a result of total mesenteric thrombosis. In the control group in the early postoperational period 5 patients have died. Three of them - due to progressive polyorgan insufficiency, and two elderly patients - as a result of heart failure. In the control group lethality consisted 11,4% and in the basic group – 4,8%.

### CONCLUSION

1. Administration of enteroprotectors has positive influence on morpho-functional status of hemato-enteral barrier and leads to the cessation of syndrome of enteral insufficiency in the early postoperational period.

2. Application of complex method of enteral therapy decreases lethality rate more than 2 times in patients suffering from ileus with different genesis.

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## Коррекция синдрома энтеральной недостаточности при илеусе различного генезе

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### Р Е З Ю М Е

Цель работы состояла в разработке методов направленных на улучшение результатов лечения пациентов, страдающих острой кишечной непроходимостью (ОКН), путем совершенствования методов энтеральной терапии, обеспечивающих быстрое восстановление морфо-функционального статуса кишечного гемато-энтерального барьера. Обследовано с более 80 больных, прооперированных по поводу ОКН различного генеза. Установлено, что применение энтеропротекторов оказывает положительное действие на морфо-функциональный статус гемато-энтерального барьера и ведет к устранению синдрома энтеральной недостаточности в раннем постоперационном периоде. Применение комплексного метода энтеральной терапии более чем в два раза сокращает уровень смертности среди больных с острой кишечной непроходимостью различного генеза.

**Ключевые слова:** острая кишечная непроходимость, гемато-энтеральный барьер, глутамин, аргинин, 3-омега жирные кислоты, энтеропротекторы, эндотоксикоз

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□ International committee of medical journal editors. Uniform requirements for manuscripts submitted to biomedical journals. Ann Intern Med 1997;126:36-47.

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