

THE USE OF ENTEROSORPTION IN THE COMPLEX TREATMENT OF ACUTE INTESTINAL OBSTRUCTION AND ASSESSMENT OF ITS EFFECTIVENESS

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✓ Resume

In modern medicine, one of the most difficult and urgent problems in abdominal surgery is the diagnosis and treatment of acute intestinal obstruction. AIOs with developed peritonitis disrupt the work of the gastrointestinal tract, metabolic processes, which leads to the development of intestinal paresis with the formation of toxins that overwhelm the intestines and lead to intestinal insufficiency syndrome, which is a complex symptom complex with a violation of all intestinal functions. Various types of intestinal therapy together in naso-intestinal decompression are considered to be an effective method for correcting intestinal insufficiency syndrome.

Key words: intestinal obstruction, syndrome of intestinal insufficiency, enterosorption, zerotox.

ИСПОЛЬЗОВАНИЕ ЭНТЕРОСОРБЦИИ В КОМПЛЕКСНОМ ЛЕЧЕНИИ ОСТРОЙ КИШЕЧНОЙ НЕПРОХОДИМОСТИ И ОЦЕНКА ЕЕ ЭФФЕКТИВНОСТИ

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✓ Резюме

В современной медицине одной из самых сложных и актуальных проблем абдоминальной хирургии является диагностика и лечение острой кишечной непроходимости. ОКН при развившемся перитоните нарушают работу желудочно-кишечного тракта, обменные процессы, что приводит к развитию пареза кишечника с образованием токсинов, которые переполняют кишечник и приводят к синдрому кишечной недостаточности, который представляет собой сложный симптомокомплекс с нарушением всех кишечных функций. Различные виды кишечной терапии вместе при назо-кишечной декомпрессии считаются эффективным методом коррекции синдрома кишечной недостаточности.

Ключевые слова: кишечная непроходимость, синдром кишечной недостаточности, энтеросорбция, нольтокс.

O'TKIR ICHAK TUTILISHINI KOMPLEKS DAVOLASHDA ENTEROSORBSIYONDAN FOYDALANISH VA UNING SAMARALIGINI BAHOLASH

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Zamonaviy tibbiyotda qorin bo'shlig'i jarrohligining eng qiyin va dolzarb muammolaridan biri o'tkir ichak tutilishini tashxislash va davolashdir. Rivojlangan peritonit bilan og'rigan O'IT oshqozon-ichak traktining ishini, metabolik jarayonlarni buzadi, bu esa ichaklarni to'ldiradigan toksinlar hosil bo'lishi bilan ichak parezining rivojlanishiga olib keladi va ichak etishmovchiligi sindromiga olib keladi, bu barcha buzilishlar bilan murakkab simptomlar kompleksidir. ichak funksiyalari. Nazo-ichak dekompressiyasida birgalikda turli xil ichak terapiyasi ichak etishmovchiligi sindromini tuzatishning samarali usuli hisoblanadi.

Kalit so'zlar: ichak tutilishi, ichak etishmovchiligi sindromi, enterosorbtsiya, zerotoks.

Relevance

Diagnosis and treatment of acute intestinal obstruction (AIO) is considered one of the most pressing problems of modern surgery. Despite modern advances in this field of medicine and many methods of postoperative intensive care, the results of treatment of patients with AIO remain not satisfactory enough, since the mortality rate from this pathology is 17-21% [1, 2, 3, 9, 10].

Disruption of the gastrointestinal tract and metabolic processes is facilitated by the progression of AIO and peritonitis of various etiologies, which leads to the development of intestinal paresis, toxic substances are formed and the intestinal lumen is overwhelmed with toxic contents. Toxic factors and increase in intraluminal pressure lead to disturbances of microcirculation in the intestinal wall, have a detrimental effect on the nerve elements and musculature of the intestinal wall and together with other numerous pathogenetic changes in homeostasis cause the translocation of microorganisms and endotoxins from the lumen of the intestine to the systemic circulation [4, 6, 7, 9, 13]. This justifies the generally accepted opinion that the development of the syndrome of intestinal insufficiency (SII) is one of the main mechanisms of the onset and progression of endogenous intoxication in the dynamics of the inflammatory process in the abdominal cavity and in the case of AIO against the background of intestinal paresis [3, 5, 12]. SII is a complex symptom complex, accompanied by a violation of all functions of the intestine, resulting in the latter becomes the main source of intoxication and development of multiple organ failure (MOF) [4, 7, 8, 10, 15].

Considering the key role of the "intestinal" component of endotoxemia in case of AIO, the interest of clinicians in various methods of removing toxic substances from the intestinal lumen and detoxification becomes clear. Obviously, a sufficient effect of surgical treatment of AIO and peritonitis can not be achieved in most cases without complex correction of SII. The most effective variant of such correction is nasointestinal decompression combined with various methods of intestinal therapy [2, 5, 7, 13].

Nasointestinal intubation contributes to the evacuation of toxic intestinal contents, the reduction of intestinal pressure, the correction of the syndrome of SII due to the decrease of toxic content in the lumen of the gut during its evacuation through the probe and the reduction of the endotoxin substrate for bacterial translocation

(correction of the enterogenic component of the endogenous intoxication syndrome), the elimination of the syndrome, microcirculation in the intestinal wall, restoration of regional and systemic hemodynamics, and others [1, 5, 13]. Along with the mechanical removal of toxic compounds from the lumen of the small intestine, an important role is played by enterosorption [1, 6, 7, 14]. For this, drugs of sorption-detoxification action of various nature are used.

In recent years, information has appeared on the zerotox preparation of domestic production, obtained from the natural product - hydrolytic lignin husks of cottonseed, which has a high adsorption capacity not only to toxic products of exogenous and endogenous origin, but also to pathogenic bacteria with subsequent destruction (Ismailova M.G., Yunuskhodjaeva Kh.G. 2014). Information on the use of this drug in surgical practice, we did not find [11].

The aim of our study was the use of enterosorption in naso-intestinal decompression in the complex treatment of AIO complicated by intestinal insufficiency and to evaluate its effectiveness.

Materials and methods

The results of examination and treatment of 63 patients with non-tumor origin AIO, hospitalized in the surgical department of Multidisciplinary clinic of the Tashkent Medical Academy in 2016-2021 are analyzed. Patients were aged 21 to 81 years, of whom over 60 years old - 10 (15.9%) patients. The most common cause of AIO was adhesive intestinal obstruction - in 42 (59.1%) patients, and strangulation intestinal obstruction was diagnosed in 20 (28.2%) patients and obturation intestinal obstruction - in 9 (12.7%).

The collection of the history of the disease made it possible to establish that up to 6 hours from the onset of the disease 6 (8.4%) patients appealed, up to 12 hours - 7 (9.8%), up to 24 hours - 12 (16.9%), for 1-3 days - 33 (46.5%), after three days - 13 (18.3%). Thus, in most patients, the duration of the disease exceeded two days.

The results of the clinical examination showed that in all patients the main complaint was pain (100%). Abdominal distention was observed in 55 (77.5%) patients, gas retention in 44 (61.9%), stool in 40 (59.1%), nausea and vomiting in 48 (67.6%), thirst and dryness in the mouth - in 37 (52.1%), weakness and dizziness - in 33 (46.5%), body temperature increase - in 5 (7.1%). In the analysis of objective data, dryness and pallor of

the skin were revealed in 19 (26.7%), abdominal distension - in 52 (73.2%), with asymmetry - in 38 (53.5%).

Concomitant diseases in the form of cardiac pathology were diagnosed in 11 (15.5%) patients, 6 of them had cardiovascular insufficiency of different severity, 9 (12.6%) patients with diabetes mellitus were diagnosed with respiratory diseases - in 6 (8.4%). As a rule, most of these patients were elderly and senile.

It should be noted that the presence of concomitant diseases in patients required special attention in preoperative preparation. In addition to detoxification therapy, correction of water-electrolyte and other types of metabolic disorders, cardiovascular and respiratory systems, they prevented acute liver and kidney failure with mandatory consideration of the stage of SII and the degree of the syndrome of endogenous intoxication (SEI).

All patients after the diagnosis was carried out a set of conservative medical measures aimed at eliminating the AIO. The unsuccessfulness of these measures for two hours served as a testimony to the performance of emergency surgery, the choice of which depended on the operational finding and the cause of the AIO. When performing surgery, preference was given to the mid-median laparotomy, after which a revision of the abdominal cavity and the main stage of the operation in volume, depending on the nature of the pathology, were performed. The surgical intervention was terminated by intubation of the small intestine with a polyfunctional two-channel probe, which during the operation and from the first hours of the postoperative period was used for decompression, lavage and enterosorption. Antibiotic therapy was carried out with preparations of a wide spectrum of action, followed by correction, after clarifying the type of microflora.

The most frequent type of surgical intervention was dissection of adhesions performed by 29 (40.8%) patients. Seven (9.8%) patients with this pathology underwent intestinal resection with an anastomosis "side-to-side" type. In addition, intestinal resection was performed in 8 (11.2%) patients in connection with necrosis (gangrene) of the intestine (in all cases, the small intestine was resected with an interstitial anastomosis of the type "side-to-side"): 1 (1.4%) patient with nodulation, 2 (2.8%) with intussusception, 2 (2.8%) with small bowel turn, 2 (2.8%) with strangulated hernia, 1 (1.4%) with foreign body of the small intestine.

Another 3 (4.8%) patients underwent intestinal resection due to colon necrosis (colon turn with perforation and foreign body - in 2) and necrosis of the invaginated division of the small intestine (small intestine intussusception). In connection with the diffuse purulent peritonitis (terminal stage) and the risk of imposing large intestine anastomosis patients underwent ileostomy.

It is important to note that in many cases, SII was accompanied by peritonitis, especially in cases of bowel necrosis: diffuse peritonitis was detected in 26 (36.6%) patients, diffuse in 5 (7.1%). In 12 (16.9%) patients, the effusion was serous, 14 (19.7%) had serous-fibrinous effusion, and 5 (7.1%) had purulent effusion. These patients required adequate treatment of acute peritonitis both during surgical intervention and in the early postoperative period.

Depending on the treatment measures used, patients were divided into 2 groups: 25 patients made up a control group without sorbent, 38 patients with enterosorbent were included in the main group.

Patients of the control group received treatment according to the traditional method adopted in the clinic with an active post-operative decompression of the intestine (DI) and intestinal lavage (IL) in the early naso-intestinal probe. In the early postoperative period, active DI and IL were performed. The latter was carried out by dropping 1500 ml of saline solution (identical in its electrolyte composition to the small intestine) through a small lumen of the naso-intestinal probe, with an exposure of 30 minutes and subsequent active aspiration.

Patients of the main group received a complex of therapeutic measures supplemented with enterosorption. As an enterosorbent, a zerotox preparation based on hydrolytic lignin of cottonseed husks (manufactured by the A. Sultanov Uzbek Scientific Research Chemical and Pharmaceutical Institute, Tashkent) was used. To do this, a suspension was prepared based on 10.0 g zerotox powder per 1000 ml of a 0.9% sodium chloride solution. Enterosorption was started with a drip injection into the naso-intestinal tube. Single volume of sorbent was 500 ml. After the administration of the drug, the exposure was created for 30 minutes and active aspirating was carried out from the large lumen of the probe. In the future, every 8 hours (3 times per day) in the intensive care unit or the after-care ward conducted series of enterosorption. The rest of the time, the naso-intestinal probe was in the DC mode. Enterosorption was performed depending on the above parameters for 3-5 days.

Prior to the operation and during postoperative follow-up, the volume of gastrointestinal contents of patients with AIO, obtained with the help of a naso-intestinal probe, was estimated.

The condition of the patients before and after the operation in the dynamics was evaluated by ultrasound, which, being the most accessible, cheap and highly informative research method for the diagnosis of AIO, along with the reduction in the time of examination of patients and providing the possibility of safe dynamic observation, reveals the presence of swollen loops and intestinal motility, free fluid in the lumen of the intestine and in the abdominal cavity. The sonography was performed on an ultrasonic instrument "Aloka SSD-500" using convection and sector sensors with a frequency of 3.5 and 4.0 MHz.

Studies of the species composition of the microflora of the exudate of the abdominal cavity and intestinal contents in patients with AIO were conducted at the Department of Microbiology of the Tashkent State Dental Institute. The material was taken during the operation, then after the operation at 1-, 3-, 5-, and 7th days with the observance of the rules of aseptic and antiseptic. Taken exudate and intestinal contents were delivered to the laboratory in the same volume with a thioglycolic medium (a universal medium for maintaining the viability of aerobes and anaerobes) for 2 hours, a number of serial dilutions were prepared from them in the laboratory. Quantitative assessment of the content of microorganisms in various media was performed using the Gould sector method for highly selective nutrient media. When working on a modified procedure, the result was taken into account with the latest dilution, in which bacterial growth was obtained. The number of microbes of each species was expressed in lg CFU/ml.

Results and its discussion

Dynamic monitoring of the clinical status of patients showed the following. The use of

enterosorption facilitated faster normalization of the condition, decreased intensity and disappearance of pain, changes in body temperature, restoration of intestinal motility, determined by clinical signs in the postoperative period.

The positive process was also revealed in ultrasound pictures in dynamics. Most of the researchers in the traditional ultrasound study for patients with ICD are guided by the following main echoes indicating this pathology: an increase in the diameter of the intestinal loops, changes in the nature of intestinal contents, visibility of the folding of the intestinal mucosa, thickening of the intestinal wall, the nature of peristalsis, free fluid in the abdominal cavity and etc. (Leontyev S.N., Sovtsov SA, Podshivalov V.Yu., 2002). All these indicators were normalized 1-2 days earlier in patients receiving zerotox.

As can be seen from Table 1, the volume of gastric contents of patients with AIO before surgery was up to 1 L and decreased in the postoperative period up to 5 days. The use of zerotox accelerated this process for almost 2 days.

The results of the study also showed that the indices of the inflammatory process - leukocytosis and ESR were the highest at admission, i.e. at the height of the disease, and returned to normal only 7 days after the operation. In patients who received enterosorption, the norm was achieved 2 days earlier.

LII in the blood of patients on the day of surgery, showing a 3-fold increase in the leukocyte shift pattern, characterized the severity of the process, largely a marker of bacterial aggression (Table 1). A day after the operation, except for the tendency to a certain increase, there were no special changes in this indicator. Subsequently, there was a gradual decrease in LII in the control group, approaching normal values only 5 days after the operation. While the use of enterosorbent statistically significantly reduced this period for 2 days.

Table 1.
The indicators of intoxication and immunological reactivity, as well as the volume of gastric contents of patients with AIO before and after surgery, M±m

Indicator	Norm	Intra operati on	Day after operation					
			1 st		3 rd		5 th	
			Contr.	Main	Contr.	Main	Contr.	Main
LII	0,5-1,5	5,2±0,4	5,5±1,0	5,1±0,9	3,9±0,3	2,3±0,2*	2,5±0,3	1,4±0,2*
PLTII	0,4-1,2	8,9±0,5	8,9±1,0	7,8±0,8	6,7±0,5	3,2±0,4*	2,8±0,3	1,6±0,2*
Lymphocyte Index	0,5-0,6	0,2±0,06	0,18±0,04	0,3±0,03	0,3±0,04	0,3±0,03*	0,4±0,06	0,3±0,05*
The volume of contents of the stomach by the probe, l	0,1-0,15	1,1±0,07	0,9±0,06	0,6±0,04	0,58±0,04	0,1±0,02*	0,32±0,02	-

Note. * - $P < 0,05$ in comparison with the parameters of the control group.

Lymphocytic response, reflecting the level of aggression of the influencing factor and the degree of the ongoing pathological process, according to the results of the research of the Institute of Applied Mathematics on SD. Khimich, in indirect form, indicates the strength and severity of the defensive reaction of the body. Normalization of this indicator is also established 2 days earlier when used in patients with enterosorbent.

On the day of the operation, patients with AIO with a marked picture of intestinal failure against a background of high levels of intoxication, a significant drop in the lymphocyte index of L.Kh. Kharqavi arose. This circumstance indicates the failure of the immune system in the anti-infective control of the microbial flora, including inside the intestinal wall. However, this index begins to be restored 24 hours after the operation and if in the control group it reaches the lower limit of normal values only after 5 days from the operation day, the use of enterosorbent reduces this period by 2 days.

The results of studying the quantitative parameters of microorganisms in the contents of the intestine in patients with AIO are presented in Table 2. The study of the material taken during the operation revealed a picture of dysbiosis in the intestinal microflora. 24 hours after the operation in the flora of the intestine, the dysbiotic processes became even deeper. Thus, the number of lactobacilli decreased by 5 orders ($\lg 2.60 \pm 0.10$ cfu / ml at a rate of 7.6 ± 0.20 cfu / ml). In the optional group of microbes, the number of escherichia increased by 3 orders ($\lg 4.50 \pm 0.11$ cfu / ml at a rate of 1.90 ± 0.10 cfu / ml). On the third day after the operation, flora of the intestine showed positive changes, which captured both anaerobic and an optional group of microbes. However, these changes were in most cases unreliable. Positive changes in the flora of the intestine after the operation were most pronounced on the 7th day. In these terms, the elimination of such microbes as staphylococci and proteins has been found. It is known that precisely these microbes, due to their sets of pathogenicity enzymes, ensure the development of purulent-inflammatory complications.

The intestinal microflora after the application of enterosorbent was significantly improved already on the 5th day after the operation. So against the background of an increase in the number of anaerobic bacteria, the content of aerobic bacteria is significantly reduced. On the 7th day, the amount of anaerobic and aerobic microorganisms approached the norm.

Staphylococci, streptococci and proteus were not detected.

The results of the microbiological study of the abdominal exudate in the dynamics during and during the postoperative period are given in Table 3. During the operation, lactobacilli, peptostreptococci, escherichia, staphylococci, enterococci, proteus and fungi of the Candida genus from the indigenous representatives of the intestinal microflora were detected during the operation. This indicates that with AIO, the intestinal walls become permeable to microorganisms (horizontal bacterial translocation).

When examining exudate in patients of the control group, all the above types of exudate microflora were detected in the first day after the operation, however, the amount of this flora was somewhat larger than in the microflora of the previous fence. The number of lactobacilli decreased by 2 times. On the third day after the operation, a microbiological study revealed a significant change in the microbial landscape, anaerobes and aerobes in the exudate studied. Lactobacilli, the number of which increased in the first day, were not detected on the third day. Significantly changed the number of peptostreptococci (respectively, 2.0 ± 0.11 and 1.30 ± 0.10 , $p < 0.05$). A similar pattern was found in staphylococci (2.6 ± 0.12 and 1.30 ± 0.10 , $p < 0.05$) and in streptococci (1.85 ± 0.1 and 1.00 ± 0.01 , $p < 0.05$). There was an inconspicuous decrease in the number of enterococci, Escherichia, Proteus and fungi. In the exudate, seized on the 5th day after the operation, microorganisms were not detected. On the 7th day after the operation, exudate was absent. After enterosorption with zerotox, the absence of exudate in the abdominal cavity was observed on the 5th day, in contrast to patients without enterosorbent.

Examination of the abdominal cavity in patients with AIO revealed significant violations of local protective factors, as expressed at the height of the AIO, as well as in the early periods after the operation (Table 2). And the progression of intestinal dysbiosis was accompanied by more significant violations of local immunity. On the third day, when the indices of dysbiosis improve somewhat, in parallel, positive changes occur and local protection factors. In healthy people, the local factors of protection (lysozyme titer, phagocytosis index and sIgA level) in healthy subjects in comparison with biological fluids (blood, saliva) of other parts of the body changed insignificantly. However, with the onset of the development of AIO, these indicators due to

inflammation and translocation of the intestinal microflora significantly increase, which is evident from the exudate taken during the operation. At the same time, 24 hours after the operation, pronounced immunodeficiency occurs

in all the exponents of the abdominal cavity in all indices of local factors of protection, which was caused by the stressful situation and the use of narcotic drugs.

Table 2.

Indices of local factors of protection in the exudate of the abdominal cavity in patients with AIO before and after surgery, $M \pm m$

Indicators of local protection factors	The number of microbes in 1 ml of exudate							
	Norm	Intra operation	Day after operation					
			1 st		3 rd		5 th	
			Contr.	Main	Contr.	Main	Contr.	Main
Titer of lysozyme, mg/%	10,1±0,2	13,7±0,1	3,2±0,2*	3,8±0,10*	5,1±0,1*	9,8±0,12	8,6±0,12*	With out exudate
Indicator of fagocytosis, %	37,8±2,1	41,2±1,2	18,7±1,3*	20,1±1,3*	21,4±1,3*	29,1±1,5*	30,0±1,5*	
sIgA,g/l	1,30±0,1	2,8±0,1	0,8±0,1*	0,6±0,10*	0,6±0,1*	1,1±0,1*	1,0±0,1*	

Note. * - $P < 0,05$ in comparison with the indicators per day of operation.

It is interesting to note that three days after the operation it is clearly visible that positive changes occurred in the exudate of the abdominal cavity, as most of the indicators of local factors tended to increase reliably. On the 5th day after the operation in the exudate of the abdominal cavity of patients with AIO, local defense factors were slowly restored.

Postoperative complications were observed in 7 (28%) patients, mainly with a severe degree of endotoxemia. The reason, in our opinion, was a slow decline in the level of EI in these patients, despite the spent in the postoperative period of DI and IL. In the control group, 2 patients (8%) died due to multiorgan insufficiency (Table 3).

In patients of the main group after the application of enterosorbent, on the 3rd day after the operation in the exudate of the abdominal

cavity the local factors of protection were restored, approaching the control values.

Analysis of the results of treatment showed that due to a differentiated approach to the treatment of AIO in the main group, postoperative complications occurred only in 5 (13.2%) patients 1 (2.6%) died of myocardial infarction.

Thus, based on the studies conducted in patients with IPC, the development of dysbiosis in the contents of the intestine, as well as microbial contamination in the exudate of the abdominal cavity in the presence of peritonitis, indicating a bacterial translocation. In the exudate of the abdominal cavity, the indicators of local factors of protection significantly increase in patients with AIO, which is associated with the development of the inflammatory process.

Table 3.

Structure of postoperative complications, abs. (%)

№	Indicator	Group		Total (63 patients)
		Control (25 patients)	Main (38 patients)	
1	Insolvency of seams	1(4%)	--	1 (1,6%)
2	Continuing peritonitis	1(4%)	--	1 (1,6%)
3	Eventrating	1 (4%)	--	1 (1,6%)
4	Enteric fistula	1 (4%)	--	1 (1,6%)
5	Early adhesive obstruction	1(4%)	1 (2,6%)	2 (3,2%)
6	Suppuration of the wound	1 (4%)	2 (5,3%)	3 (4,8%)
8	Pneumonia	1 (4%)	1 (2,6%)	3 (4,8%)
9	Miocardial infarction	--	1 (2,6%)	1 (1,6%)
	Total	7 (28%)	5(13,2%)	12 (19,04%)

Conclusion

When correcting endogenous intoxication in patients with AIO and peritonitis, nasointestinal intubation is an effective component; this is associated with a decrease in intestinal pressure and a decrease in the content of toxins in the intestinal lumen and reduces the risk of entering the systemic circulation.

The detoxifying effect of naso-intestinal intubation is confirmed by the dynamics of changes in EI indicators, early restoration of intestinal motility, and improvement in the general condition of the patient. The use of Zerotox leads to an improvement in the process of postoperative normalization of the patient's condition, temperature, restoration of intestinal peristalsis, a decrease in the intensity of pain, leukocytosis and ESR, indicators of intoxication and the intensity of the immune response for 2 days.

The quantitative and qualitative composition of the intestinal microflora significantly improves after the use of the enterosorbent Zerotox, there is an earlier cessation of exudation into the abdominal cavity, as well as positive changes in all indicators of local protection already on the 3rd day after the operation, which significantly reduces the number of postoperative complications and mortality.

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