Research Article

International Journal of Gastroenterology and Hepatology

Application Of A Combined Endoliphatic Administration Of Antibiotics And Immunomodulator Of Polyoxidonium And The Following Ultrasonic Cavitacium Of The Regions Of Pancreatogenic Destruction

d.m.s. S. A. Alekseev[1], A. V. Tarasenko[1], D. S. Alekseev[2] and O. A. Frenke[1*]

[1]UO "Belarusian State Medical University, Department of General Surgery, Minsk

[2]UO "Vitebsk State Order of Friendship of Peoples Medical University", Vitebsk, Republic of Belarus

Corresponding Author:
O. A. Frenkel,
UO "Belarusian State Medical University, Department of General Surgery, Minsk
Email: arkadij-frenkel@yandex.ru

Received Date: 07 May 2024
Accepted Date: 22 May 2024
Published Date: 30 May 2024

Citation:
O. A. Frenkel. Application Of A Combined Endoliphatic Administration Of Antibiotics And Immunomodulator Of Polyoxidonium And The Following Ultrasonic Cavitacium Of The Regions Of Pancreatogenic Destruction. International Journal of Gastroenterology and Hepatology 2024.

1. Abstract

A method of combined endolymphatic administration of an antibiotic immunomodulator of multicomponent action polyoxidonium with subsequent ultrasonic cavitation in 21 patients with acute destructive pancreatitis has been developed and introduced into the clinic. There was a decrease in the indices of endogenous intoxication, the severity of the condition according to the SAPS and APACHE II scales, against the background of an increase in the absolute values of the main values of T-lymphocytes and immunoregulatory index, immunoglobulins of class A and M, phagocytic activity of neutrophils by the 7th and 14th days of treatment, and a decrease in the number of repeated relaparotomies and necrsequestrectomies, the total mortality rate was 4.46 times, the length of hospital stay was 1.73 times.

2. Key words:
acute destructive pancreatitis, endolymphatic administration, ultrasonic percutaneous cavitation, cellular and humoral immunity, assessment of the severity of the condition, treatment time, general mortality

Acute pancreatitis is one of the most pressing problems in emergency surgery. In recent years, there has been a constant increase in the incidence against the background of an increase in its destructive forms in 15-20% of patients characterized by a high mortality rate reaching 26-30% [5]. In 40-70% of patients with diagnosed pancreatic necrosis, infection of the foci of necrotic destruction is further observed [6]. Among the main causes of death in patients with destructive pancreatitis, various infectious complications account for up to 80% [4]. They are largely due to the development of combined immunodeficiency, including disorders of the cellular, humoral, phagocytic links and cellular cytotoxicity [1, 2, 8]. One of the methods to increase the effectiveness of the treatment in acute destructive pancreatitis (ADP) is the endolymphatic administration of antibiotics, which, even after a single administration, creates a constant bactericidal concentration in the lymph for 48 hours, exceeding its value in the blood by 5-6 times [4]. In addition, the endolymphatic administration of immunotropic drugs ensures their optimal contact with immunocytes, which is not achievable with other routes of administration. Percutaneous application of ultrasound in a continuous mode of a certain intensity is accompanied by the stimulation and migration of T-lymphocytes in the area of local exposure, improved microcirculation and increased resorption processes [3]. At the same time, in the available literary sources there is no indication of the combined use of endolymphatic administration of antibiotics and immunocorrectors, followed by percutaneous ultrasound exposure to the area of perifocal inflammation (parapancreatitis in ADP). The aim of the study was the development and clinical testing of a new method of combined endolymphatic administration of drugs (antibiotic + immunomodulator of multipoint interaction) with subsequent percutaneous cavitation in patients with ADP.

3. Materials and Methods

The method was applied in the complex treatment of 21 patients with ADP (group I). The comparison group (group II) included 19 non-operated patients with AP, of which 7 had parapancreatitis, 12 had ADP (sterile pancreatonecrosis). The nature of the lesion of the pancreas was determined by CT examination using Balthazar indices [9]. Treatment in groups was carried out taking into account the standards provided for patients with AP. In patients of group I, with the proposed method, additional administration of antibiotics was not prescribed; in group

International Journal of Gastroenterology and Hepatology

II, antibiotic therapy was used by administration of fluoroquinolones (ciprfloxacin) in combination with metronidazole. The assessment of the severity at admission was assessed by the APACHE-II scale and SAPS Me (LQ; UQ). The severity of the condition was estimated at 17 (16-19 ‰) points for the edematous form and 21 (19-23 ‰) points for the destructive form ($p < 0.05$), according to the SAPS scale the values were 22.7 ± 4.2 and $23, 1 \pm 3.9$ points, respectively. The comparison groups did not differ in severity ($z = 0.13$; $p = 0.896$). The proposed method provides for the isolation of a lymphatic vessel in the subcutaneous fatty tissue of the anterior surface of the thigh (in the projection of the conditional bisector-angle formed from the top by the line of the inguinal fold and from the outside by a vertical line drawn perpendicular to the inguinal fold downward from the point determined by the pulsation of the femoral artery) under local anesthesia 0, 2% lidocaine solution.In those cases when there was a non-main type of structure of the lymphatic vessel and its catheterization became impossible ($n = 3$), the femoral lymph node of Pirogov - Rosenmüller, located in this zone, was isolated, with careful removal of its internal contents with a Volkmann spoon (depulpation). A 0.05 mm diameter microcatheter for epidural anesthesia (Figure 2, 3) was inserted into a lymphatic vessel (less often, a lymph node depulped in three cases) (Figure 1) into a lymphatic vessel (less often - a lymph node depulped in three cases) (Figure 1).

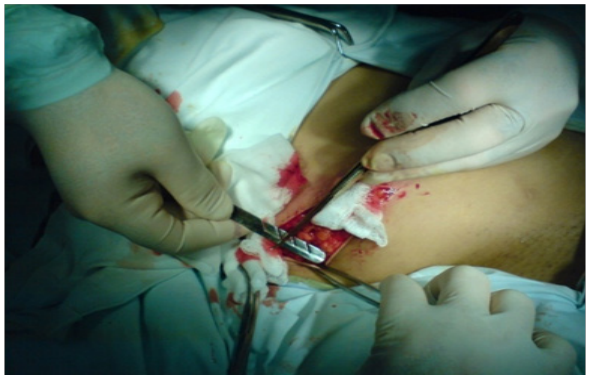


Figure 1: The stage of isolation and retention on a special fixator of a lymphatic vessel

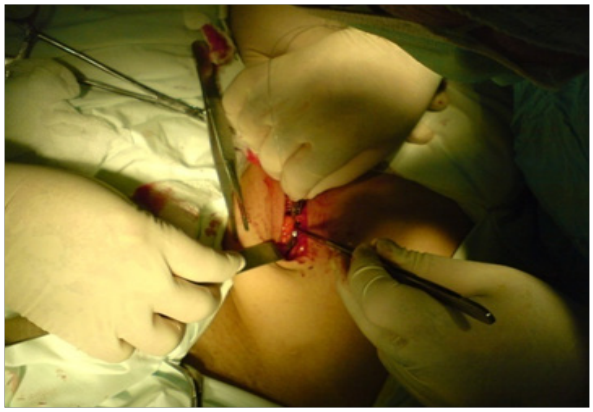


Figure 2: The stage of insertion of the microcatheter into the lymphatic vessel fixed on the holder

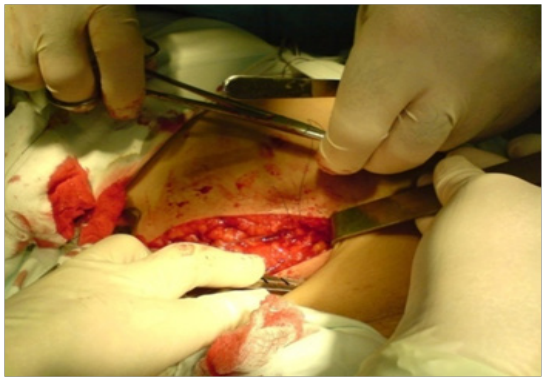


Figure 3: Stage of fixation in the lymphatic vessel of the microcatheter

Figure 4.) and then connected to an automatic syringe pump "DSh-8 TU RB 28628757.007" (RB) or to an infusion pump (Figure 5.).

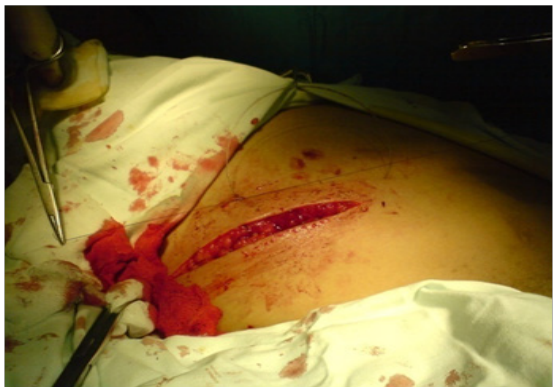


Figure 4: The stage of introduction and fixation on the skin of a peripheral microcatheter

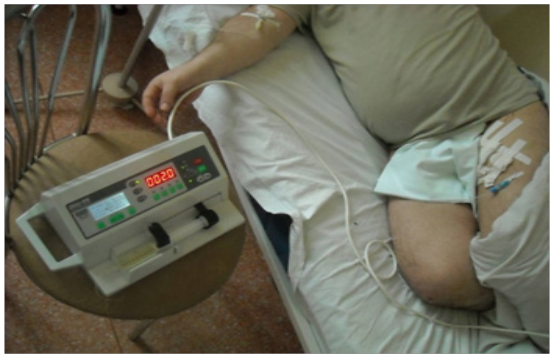


Figure 5: The stage of dosed endolymphatic administration of drugs with a syringe pump of the DSh-8 type TU RB 28628757.007-98

Then, 30-35 milliliters of 0.9% sodium chloride solution with the addition of 2 g of meropenem (or another antibiotic of the carbapenem series), 12 mg of the immunomodulatorpolyoxidonium, 10 ml of 5% solution of mexibel (or mexidol) were injected into the microcatheter during the day with a dosed rate of 0.1 - 0.2 milliliters per minute. 20 - 24 hours after the first endolymphatic administration, the first session of percutaneous ultrasonic cavitation of the projection of the main zones - parapancreatic

International Journal of Gastroenterology and Hepatology

and paracolic tissue involved in ADP, as well as immunocompetent zones (liver and spleen) with an ultrasonic flow intensity of 0.2 - 0.4 W / cm2 for 2.0 - 2.5 minutes (for each zone), but no more than 9 - 10 minutes in total for the entire procedure. (Figure 6.) In total, up to 3 repeated ultrasound sessions were performed at intervals of 20-24 hours.

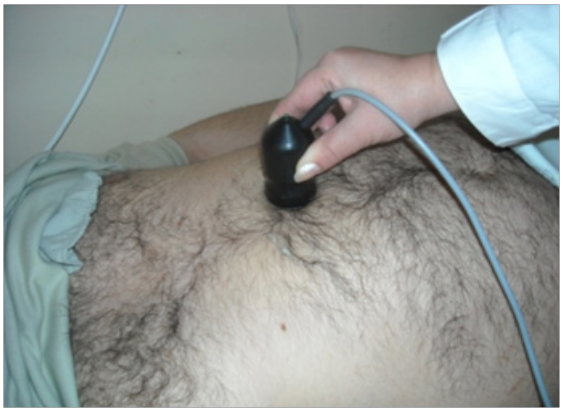


Figure 6: The stage of percutaneous ultrasonic cavitation of the projection of immunocompetent organs (liver, spleen) and parapancreatic and retroperitoneal tissue 24 hours after endolymphatic administration of drugs)

Evaluation of treatment results in patients with OP in the compared groups was performed on the 7th and 14th days after admission to the hospital, taking into account the indicators of the level of endogenous intoxication, the severity of the condition (APACHE-II and SAPS), immunological status, ultrasound and CT studies, accession of purulent-septic complications, general terms of treatment. A control immunological study was carried out before treatment and on the 14th day (after treatment) by assessing the main immunological parameters of the T- and B-cell link of immunity with the calculation of the relative and absolute number of total T-lymphocytes and their main subpopulations. Phagocytic activity was assessed by the method Zemskova A.M. The main biochemical parameters were established by the method of V.S. Kamyshnikov. Statistical processing was performed using the STATISTICA software package (Version 10 for Windows). Determined the arithmetic mean (M) and the mean square root error (m). To identify significant differences, the following nonparametric Wilcoxon tests for paired comparisons were used; to compare the study and control groups by one indicator - the Mann-Whitney U-test. Differences were considered significant at $p < 0.05$.

4. Results and discussion

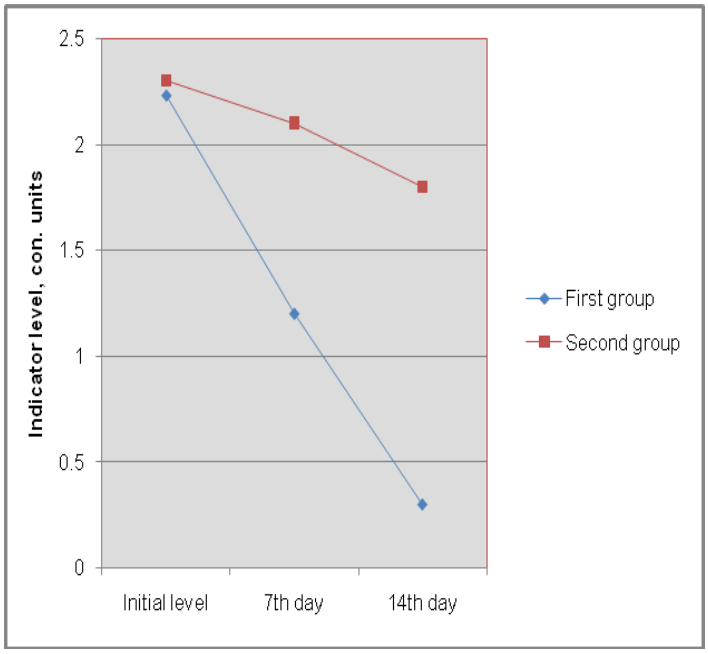
When comparing the main indicators of endogenous intoxication on the 7th and 14th days in patients of both groups, it was found that the initial level of LII Kalf-Kalif did not significantly differ among themselves ($z = 0.59$; $p = 0.55$) (Table 1.).

Table 1: Indices of endogenous intoxication in patients with ADP in the compared groups on the 7th and 14th days of treatment (M ± m)

Indicator, unit of measurement	Normal value(n= 15)	Comparison groups		
		Initial level	7th day	14th day
LII Kalf-Kalifa, conditional. units.	0,67±0,5	(I)5,14±1,2	2,3±0,7	0,9±0,24
		(II)5,2±0,93	4,7±1,12	2,62±0,69
		z=0,59; p=0,55	z=2,07;p =0,038	z=3,41;p =0,0006
Toxic granularity of neutrophils		(I)2,023±0 ,62	1,2±0,52	0,3±0,1
		(II)2,3±0,5	2,1±0,68	1,8±0,3
		z=0,45;p= 0,65	z=3,15;p =0,0016	z=3,52;p =0,00044

* Note: (I) - main group (n = 17)
(II) - comparison group (n = 19)

By the 7th day of treatment in patients of group I, a decrease in LII Kalf-Kalif was established by 2.23, and by the 14th day - by 5.7 times to the initial value ($p < 0.001$) and 2.55 times to level 7 -x days ($p < 0.01$). In patients of group II, by the 7th day, a decrease in this indicator was established by 1.1 times, by the 14th day, by 1.98 times ($p < 0.01$) from the initial value. At the same time, the LII index of Kalf-Kalif on the 14th day remained 3.8 times higher than the norm ($p < 0.01$), and exceeded the indicator of group I by 2.9 times ($z = 3.41$; $p = 0.0006$). The initial level of toxic granularity of neutrophils in patients of both groups on admission did not differ significantly from each other ($z = 0.45$; $p = 0.65$). By the 7th day of treatment in patients of group I, a decrease in this indicator was established by 1.69 times ($p < 0.05$), while in patients of group II, a decrease was observed only by 1.1 times. By the 14th day in group I, there was a further 4-fold decrease in the level of toxic granularity ($p < 0.001$), while in patients of group II, the decrease was observed only by 14.8%. The values of the indicator by the 14th day differed in the compared groups by 6 times ($z = 3.52$; $p = 0.00044$) (Figure 7.).



International Journal of Gastroenterology and Hepatology

Figure 7: Dynamics of the indicator of toxic granularity of neutrophils in patients with ADP in the compared groups on the 7th and 14th days of treatment (M ± m).

When comparing the indicators of the severity of patients on the SAPS scale, it was found that the baseline level in the compared groups did not have a significant difference (z = 0.13; p = 0.896) (Table 2.).

Table 2: Indicators of the severity of patients with ADP in the compared groups on the 7th and 14th days of treatment (M ± m)

Severity indicator, points	Comparison groups		
	Initial level	7th day	14th day
SAPS	(I)22,7±4,2	12,1±2,9	6,7±1,12
	(II)23,1±3,9	20,8±3,7	18,6±3,7
	z=0,13;p=0,896	z=2,35;p=0,018	z=3,35;p=0,0008
APACHE-II	(I)16,4±0,3	10,2±2,4	8,7±1,31
	(II)16,8±0,91	15,9±2,74	14,1±2,53
	z=0,09;p=0,92	z=2,25;p=0,024	z=2,42;p=0,016
Detectability of signs of SNP (appearance of one sign or their combination)*	(I)32,2±7,3	21,4±6,2	16,3±4,16
	(II)34,1±4,7	58,3±4,7	40,6±7,1
	z=0,49;p=0,67	z=3,07;p=0,021	z=3,56;p=0,0037

* Note: PON included signs of respiratory, renal, hepatic, cardiovascular failure, metabolic disorders, coagulopathy, septic conditions.

By the 7th day in patients of group I, there was also a decrease in the level on the SAPS scale by 1.88 times, in patients of group II, this indicator decreased only by 10%, the differences among themselves were 1.72 times (z = 2.35; p = 0.018). By the 14th day of treatment in patients of group II, the SAPS indicator decreased by 10.6% compared to the 7th day, and by 19.5% to the initial level, while in group I - by 1.9 times. and 3.39 times, respectively (p <0.01). At the same time, the difference in this indicator by the 14th day in the compared groups reached more than 2.8 times (z = 3.35; p = 0.0008). The severity state of patients in the compared groups on the ARACNE-II scale at admission was quite severe and did not have significant differences (z = 0.09; p = 0.92). By the 7th day of treatment in patients of group 1, the value of the ARACNE-II index decreased by 1.6 times, and by the 14th day - by another 1.17 times. In relation to the initial level, there was a decrease in the indicator 1.9 times (p <0.05).In patients of group II, by the 7th and 14th days of treatment, the indicator decreased by 5.4% and 11.3%, respectively (p <0.05). When comparing these indicators in both groups, the values of the ARACNE-II level on the 7th and 14th days differed by 1.56 and 1.62 times, respectively (p = 0.024; p = 0.016) (Figure 8.).

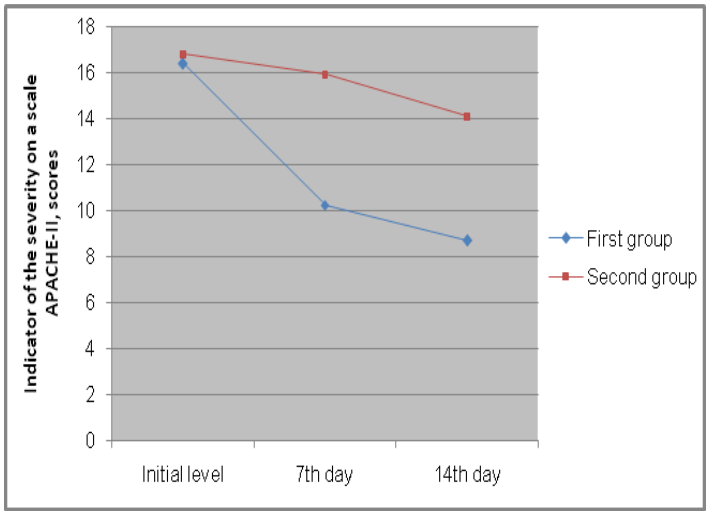


Figure 8: Dynamics of the severity of patients with ADP according to the ARACNE-II scale in the compared groups on the 7th and 14th days of treatment (M ± m).

When assessing the signs of MOI, 32.2% of patients in group I and 34.1% of patients in group II showed signs of failure in one or more organ systems (z = 0.49; p = 0.67). As a result of the treatment, by the 7th day in patients of group I, the presence of signs of MOI was established in 24.4% of cases, by the 14th day - in 16.3% of cases. In group II, by the 7th day, the number of patients with symptoms of MOI increased by 1.7 times with a further tendency to decrease by only 30.4% on the 14th day. By this time, the difference in the number of patients with SNF in the compared groups was 2.5 times (z = 9.56; p = 0.0037). When analyzing immunological parameters in patients with ADP, the initial level of the absolute number of total T-lymphocytes (E-ROC) in the compared groups I and II was lower than normal values by 1.83 and 1.79 times, respectively, and practically did not differ from each other (z = 0.39; p = 0.69) (table 3). On the 14th day of treatment in patients of group I, there was a tendency for this indicator to increase by 1.41 times, while in patients with OP in group II, the increase occurred by 4.5% (z = 3.06; p = 0 , 0022). In relation to normal values, the absolute content of total T-lymphocytes by the 14th day of treatment remained reduced in group I by 22.6%, in group II - by 41.7%, which corresponds to the 2nd degree of SID (according to this indicator) ... The initial level of the absolute content of T-helpers in groups I and II, in relation to the norm, was reduced by 1.71 and 1.76 times, respectively, and practically did not differ among themselves (z = 0.2; p = 0.85). By the 14th day of treatment in patients of group I, the indicator increased by 1.5 times, in group II - only by 12.8%. In relation to normal values in group I, the decrease in the absolute content of T-helpers by the 14th day was at the level of "-12.5%", in the second, a decrease in the number of T-helpers at the level of "-34.7" was recorded, which corresponded to 2nd degree VID (for this indicator).

The initial level of the absolute number of T-suppressors in groups I and II was lower than normal by 1.44 and 1.4 times, respectively, and practically did not differ between groups (z = 0.14; p = 0.89). By the 14th

day in patients of group I, the increase in the number of T-suppressors was insignificant and amounted to "+ 12.2%), in group II the increase was" + 24.5% ", which indirectly may indicate the extent of the lesion and the progression of destruction of the pancreas glands, or the addition of purulent-septic complications. IRI, which most accurately reflects the ratio of the main subpopulations of T-lymphocytes, was 1.19 and 1.23 times lower than normal in patients in groups I and II (z = 1.56; p = 0.12). As a result of the treatment, patients of group I showed an increase in the level of IRI by 1.31 times, and in group II there was a further decrease in the level of IRI by 1.14 times, due to a change in the ratio of the absolute number of the main subpopulations of T-lymphocytes and, first of all, T-suppressors , which together may indicate the progression of destructive and inflammatory changes in the tissue of the pancreas or parapancreatic tissue, as well as a decrease in the antibiotic-inducing effect of treatment. An analysis of the indices of the humoral link of immunity established a decrease in the initial level of the absolute number of B-lymphocytes (M-POK) in groups I and II by 1.36 times in the absence of significant differences between them (z = 0.07; p = 0.93). By the 14th day of treatment in group I, there was an increase in the level of the absolute content of B-lymphocytes (M-ROK) by 30.9%, while in group II, an increase in this indicator was recorded only by 8.3%, due to the fact that differentiation, activation of antigen-presenting cells, and inhibition of the antibody-forming function of the immune system in patients with ADP. The initial level of IgG content in patients of groups I and II slightly exceeded the norm - by 8.9% and 9.6%, without significant differences between themselves (z = 1.21; p = 0.23). By the 14th day of treatment, the IgG level increased in patients of group I by 1.7 times (p <0.05); in group II there was a decrease in the content of this indicator by 1.49 times, or 1.35 times in relation to the norm (Figure 9.). The difference in the content of the IgG level in the comparative groups was more than 2.4 times (z = 2.35; p = 0.0018).

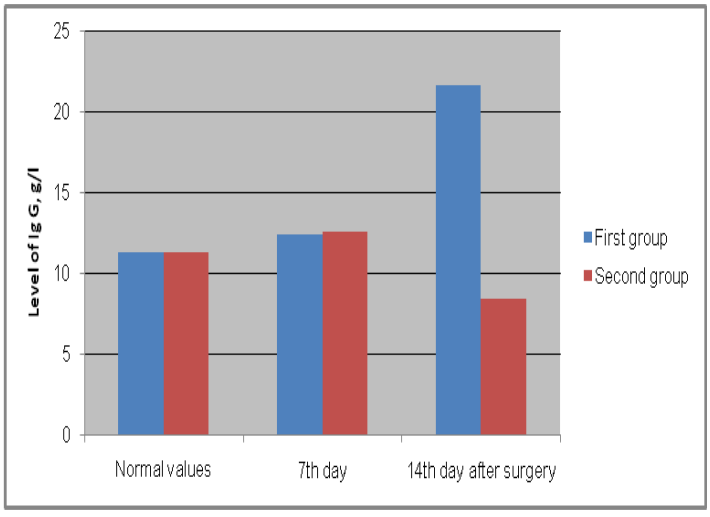


Figure 9: Dynamics of the IgG level in the compared groups on the 14th day of treatment (M ± m).

The initial content of IgA and IgM levels in the compared groups did not significantly differ from each other (p = 0.896; p = 0.64), respectively. At the same time, the initial level of IgA exceeded the norm in the compared groups by 1.21 and 1.22 times, respectively, which, apparently, was associated with the activation of the zones of antigen-presenting B-lymphocytes of the gastrointestinal mucosa against the background of persisting parapancreatic infiltration and antigenic stimulation. By the 14th day of treatment, the IgA level in patients of group I was practically normalized, while in group II it remained 2.1 times lower than normal (z = 2.5; p = 0.013). The initial content of the IgM level was lower in patients in the compared groups by 1.33 and 1.34 times (p = 0.64). As a result of the treatment in patients of group I by the 14th day, the IgM content increased by 1.55 times and slightly exceeded its normal values. In patients of group II, the IgM content continued to be reduced to the initial level by 1.27 times, remaining below the norm by 41.7% (II degree of VID for this indicator). When analyzing the treatment results by the 14th day, the IgM level differed in the compared groups by 2 times (z = 3.56; p = 0.0037). On the part of the phagocytic link of immunity, the main component of which is the level of phagocytic activity of neutrophils, it was found that the initial activity of immunocytes in patients of both groups was comparable (z = 0.09; p = 0.93) and was "-30.4%" and "-30.4%" of the norm. By the 14th day of treatment in group I, an increase in the phagocytic activity of neutrophils was established by 1.68 times, while in patients of group II, an increase in this indicator was observed only by 9.7%, which was "-22.9%" of its normal values (1st degree of VID for this indicator). In patients of group I (n = 17), according to the data of dynamic ultrasound of the abdominal organs (ABP) after treatment on the 14th day, the following were revealed: an increase in the contour and size of the pancreas in 7 (41.2%) cases, blurred contours and fusion with the surrounding tissues in 4 cases; the presence of formations of reduced echogenicity and the presence of fluid formations in the pancreas in 6 (35.3%) cases. According to the data of dynamic CT examination in patients of this group, a decrease in tissue density in the area of destruction foci on the 14th day was determined, it was higher than 12.4 U (Me (10.7; 14.2 ‰) according to the Housefield scale of this group.

Table 3: Basic immunological parameters in patients with ADP in the compared groups on the 14th day of treatment (M ± m)

Indicator, unit of measurement	**Normal values (n = 12)**	**Comparison groups**	
		Initial level	14th day of t reatment
Total T-lymphocytes (E-ROK), abs. x109 / l	1,15±0,2	(I)0,63±0,1	0,89±0,09
		(II)0,64±0,08	0,67±0,1
		z=0,39;p=0,69	z=3,06;p=0,0022
T-helpers, abs. x109 / l	0,72±0,04	(I)0,42±0,07	0,63±0,06
		(II)0,41±0,09	0,47±0,09
		z=0,2;p=0,85	z=2,96;p=0,003
T-suppressors,	0,52±0,03	(I)0,36±0,02	0,41±0,09
abs.x109 / l		(II)0,37±0,08	0,49±0,05
		z=0,14;p=0,89	z=0,74;p=0,46

International Journal of Gastroenterology and Hepatology

IRI, conventional units.	1,38±0,08	(I)1,16±0,06	1,53±0,07
		(II)1,12±0,04	0,98±0,03
		z=1,56;p=0,12	z=3,16;p=0,0001
B-lymphocytes (M-ROK), abs. x109 / l	0,15±0,03	(I)0,11±0,02	0,18±0,03
		(II)0,11±0,05	0,12±0,02
		z=0,07;p=0,93	z=2,42;p=0,016
Ig G, g/l	11,3±0,6	(I)12,4±0,3	21,6±1,1
		(II)12,5±0,8	8,4±0,2
		z=1,21;p=0,23	z=2,35;p=0,018
Ig A, g/l	1,9±0,07	(I)2.3±0.04	2,1±0,04
		(II)2,32±0,05	0,9±0,03
		z=0,13;p=0,896	z=2,5;p=0,013
Ig M, g/l	1,2±0,03	(I)0,9±0,03	1,1±0,03
		(II)0,89±0,02	0,7±0,02
		z=0,46;p=0,67	z=3,56;p=0,0037
Phagocytic activity of neutrophils, %	60,2±2,7	(I)41,7±2,56	69,9±4,3
		(II)41,9±3,12	46,4±2,7
		z=0,09;p=0,93	z=2,4;p=0,017

Note: (I) - main group (n = 14)
(II) - comparison group (n = 15)

In 3 (17.6%) patients of this group, 2 puncture-draining interventions were performed (of which in 1 case an open intervention was required - lumbotomy on the left with drainage of retroperitoneal tissue) and 1 "open" intervention. In the postoperative period, 1 (5.9%) patient died of progressive PON against the background of progression of retroperitoneal paracolicphlegmon and macrofocal subtotal pancreatic necrosis (more than 80% of the area). The average bed-day in this group was 21.3 ± 0.5 days (Table 4).

Table 4: Indicators of complications, number of operations, mortality, duration of treatment in patients with ADP in the compared groups.

Indicators, abs.%	Compared groups		Validity criterion when comparing values
	I (n=17)	II (n=19)	
Destructive fluid formations	6/35,3%	15/78,9%	p=0,021
Transition to purulent-destructive forms	3/17,6%	11/57,9%	p=0,0037
Surgical interventions including transcutaneous puncture and drainage	03-Feb	07-Feb	p=0,038
Repeated relaparotomies necr-, sequestrectomy	-	6	-
General mortality	1/5,9%	5/26,3%	p=0,004
Duration of treatment (average bed-day) (Me (P25; P75)	21,3 (20, 8;21,8)	36,9 (34, 8;38,9)	p=0,0363

In patients of the comparison group (n = 19) in 15 (78.9%) cases, the presence of fluid formations was noted, which statistically significantly differed from the indicators of dynamic ultrasound of the OBP in group I (p = 0.021). The average CT density of the tissue of the pancreas region and parapancreatic tissue in patients of this group was 21.7 U Me (20.3; 23.1 ‰) according to the Hausfield scale. In 11 (57.9%) cases of observation, fluid accumulations were determined in the omental bursa, retroperitoneal tissue (of which in 6 cases - with air bubbles) and in the free abdominal cavity. Surgical interventions for the arising purulent-septic complications were performed in 7 (36.8%) patients, or 2.1 times more often than in patients of group I (p = 0.0396). In 2 cases, in patients of this group, the first stage was performed puncture-drainage interventions, in 1 case it was later completed with laparotomy, necrsequestrectomy, omentobursostomy + lumbotomy and then with repeated relaparotomy and removal of Brook's jejunostomy (due to secondary destruction of the splenic angle of the colon retroperitoneal purulent-necrotic phlegmon). In 5 cases, the patients of this group underwent "open" interventions - laparotomy, necrsequestrectomy, drainage and tamponation of the omental bursa and retroperitoneal space through lumbotomy incisions. Out of 7 operated patients, 2 repeated interventions were performed in 4 cases for infected foci of pancreatic necrosis, parapancreatic tissue and retroperitoneal tissue, purulent parapancreatitis against the background of progression of endogenous intoxication; 2 more patients were operated on three times for progressive retroperitoneal phlegmon and arrosive bleeding. 5 (26.3%) patients died, which determined the postoperative mortality rate in this group at the level of 71.4%, and led to an increase in the overall legality by 4.46 times compared with patients of group I (p = 0.004). The average bed-day in patients of this group (excluding the deceased) was 36.9 ± 2.1 days, which is more than 1.73 times longer than in patients of group I (p = 0.0363).

5. Conclusions

1. The obtained results of treatment due to the use of elvabimuzk are due to the maintenance for 24-28 hours of the average therapeutic (bactericidal) concentration of the antibiotic in regional lymph nodes and lymphatic collectors, retroperitoneal tissue, foci of pancreatogenic destruction. The effectiveness of the method is also associated with the activation of T-lymphocytes that penetrate into the focus of inflammation and provide transport of a jointly used antibiotic and an immunomodulator with a pronounced immunostimulating effect, as well as normalization of T-lymphocyte subpopulations and an increase in the synthesis of immunoglobulins of the main classes. Additional application of ultrasound cavitation allows to obtain a fine cytosol that activates the diffusion and active transport of administered drugs by the formation of secondary cellular messengers.
2. The proposed method in patients with ODP allowed for 14 days of

treatment to reduce the rate of severity scales APACHE II and SAPS 3.39 and 1.9 times; with a simultaneous increase of the content of the absolute number of total T lymphocytes and T helper and increase of Iran; the content of immunoglobulin classes G, M, activate the phagocytic immune cells, which was accompanied by a decrease in overall mortality 4.46 times (p=0.004) and treatment duration 1.73 times (p=0,00363) compared with the control group.

References

1. Vinnik, Yu. S. Features of the immune status and blebbing of the plasma membrane of lymphocytes in severe acute pancreatitis / Yu. S. Vinnik [et al.] / / Collection of proceedings of the conference dedicated to the anniversary of the Moscow State Medical University. Semashko "Charisma of my surgery" edited by A. B. Larichev-Yaroslavl, 2018. - No. 1-pp. 85-87.
2. Vinnik, Yu. S. Assessment of the severity of pancreatogenic immunodeficiency / Yu. S. Vinnik, S. S. Dunaevskaya // News of surgery-2003, 21 (No. 4) - from 40-44.
3. Dovganyuk, A. P. Ultrasound therapy / A. P. Dovganyuk // Physiotherapy, balneology and rehabilitation. - 2008. - №3 - from 45-52.
4. Krasilnikov, A. V. Multicomponent endolymphatic therapy in the prevention and treatment of postoperative pancreatitis / A. V. Krasilnikov [et al.] / / Coll. trudovNauchno - prakt. conference of the Association of surgeons // SPb, 2002 - pp. 222-224.
5. Kubyshkin, V. A. Acute pancreatitis // Tikhookeanskiy honey. Zhurnal – 2009 – №2 – With 48-52
6. Nesterenko, Yu. a. Diagnostics and treatment of destructive pancreatitis / Y. A. Nesterenko, V. V. Laptev, Mikhaylusov S. V. // M: Binom - press, 2004 - 304s.
7. Saveliev, V. S. variants of the course of pankreonekrose determining the choice of optimal tactics of surgical treatment / V. S. Savel'ev [et al.] / Ann.
8. Tarasenko, A.V. Espresso diagnostics of the T-cell link of immunity and dynamic immunocorrective therapy in acute destructive pancreatitis / A.V. Tarasenko, A.V., S. A. Alekseev / / News of surgery-2010. - No. 3-p 47-57.
9. Balthazar, E. I. Imaging of the pancreas/ Acute and Chronic pancreatitis / E. I. Balthazar, A. I. Medibov, Mucelli R. Pozzi / / Springer-2009-p. 64-87.
10. Frenkel Oleg Arkadyevich MTS +375336535225 Tarasenko Alexey Viktorovich MTS 8033-662 98 37. Minsk Sukharevskaya str. 46-104. Alekseev Sergey Alekseevichwelk. 8029-685-96-02.