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LONG-TERM RESULTS OF COMPLEX TREATMENT OF CHILDREN WITH POSTOPERATIVE INTRA-ABDOMINAL INFILTRATES

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Abstract

Introduction. Based on the results of our own clinical studies, we have developed a program for comprehensive diagnosis and treatment of postoperative intra-abdominal infiltration in children with appendicular peritonitis by using a diagnostic algorithm and complex saving measures in a hospital setting and at the stage of ambulatory-polyclinic treatment. **Aim:** To study the remote results of children's treatment with postoperative intra-

abdominal infiltrates. **Material and methods.** With the help of quasi-monitoring, we have received information about the state of 109 children one year after inpatient treatment. Complex treatment of children was carried out according to the program we have developed. **Results.** Combined use of therapeutic and physical factors in the complex treatment of children with PII, using the developed program in conditions of inpatient and outpatient treatment favorably affected the restoration of impaired functions of the child's body in general and specifically of the abdominal organs, providing a higher effect compared to patients receiving limited complex treatment **Conclusions.** Disappearance of palpated "tumor", ultrasound signs of intra-abdominal infiltration and the occurrence of adhesive intestinal obstruction can be considered as the main clinical response throughout the treatment process. Final analysis of the late period results of integrated treatment indicated a probable increase in the number of MG patients with an overall assessment of the outcome of the treatment as "good" (95.1% of children versus 72.1% in the CG) and a decrease in the "unsatisfactory" outcome of treatment in 2 times among children of MG (2.4%) against children of the CG (4.4%). Primary laparoscopic intervention in children (CS 2, MS 2) contributed to the favorable course of the disease, and after ambulatory-polyclinic treatment resulted in the absence of "unsatisfactory" results.

Key words: long-term results, complex treatment, children, postoperative intra-abdominal infiltrates.

ВІДДАЛЕНІ РЕЗУЛЬТАТИ КОМПЛЕКСНОГО ЛІКУВАННЯ ДІТЕЙ З ПІСЛЯОПЕРАЦІЙНИМИ ІНТРААБДОМІНАЛЬНИМИ ІНФІЛЬТРАТАМИ

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Резюме

Вступ. Спираючись на результати власних клінічних досліджень, ми розробили програму комплексної діагностики та лікування післяопераційного інтраабдомінального інфільтрату у дітей з апендикулярним перитонітом шляхом використання діагностичного алгоритму та комплексних ощадливих лікувальних заходів за умов стаціонару та на етапі амбулаторно-поліклінічного лікування. **Мета:** вивчення віддалених результатів лікування дітей з післяопераційними

інтраабдомінальними інфільтратами. **Матеріал і методи.** За допомогою квазімоніторингу отримали інформацію про стан 109 дітей через рік після стаціонарного лікування. Комплексне лікування дітей проводилося за розробленою нами програмою. **Результати.** Поєднане використання лікувальних та фізичних чинників у комплексному лікуванні дітей з ПП за розробленою програмою в умовах стаціонарного та позастаціонарного лікування сприятливо впливало на відновлення порушених функцій організму дитини взагалі та конкретно органів черевної порожнини, забезпечувало більш високий ефект у порівнянні з хворими, які отримували комплексне лікування обмежено. **Висновки.** Зникнення пальпованої «пухлини», ультразвукових ознак інтраабдомінального інфільтрату та виникнення спайкової непрохідності кишечника можна розглядати як основну клінічну відповідь усього процесу лікування. Підсумковий аналіз результатів віддаленого періоду комплексного лікування свідчив про вірогідне підвищення кількості хворих ОГ із загальною оцінкою результату лікування як «добрий» (95,1 % дітей проти 72,1 % у КГ) та зниження «незадовільного» результату лікування у 2 рази серед дітей ОГ (2,4 %) проти дітей КГ (4,4 %). Первинне лапароскопічне втручання у дітей (КП 2, ОП 2) сприяло благоприємному перебігу захворювання, а після амбулаторно-поліклінічного лікування приводило до відсутності «незадовільних» результатів.

Ключові слова: віддалені результати, комплексне лікування, діти, післяопераційні інтраабдомінальні інфільтрати.

ОТДАЛЕННЫЕ РЕЗУЛЬТАТЫ КОМПЛЕКСНОГО ЛЕЧЕНИЯ ДЕТЕЙ С ПОСЛЕОПЕРАЦИОННЫМИ ИНТРААБДОМИНАЛЬНЫМИ ИНФИЛЬТРАТАМИ

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Резюме

Вступление. Опираясь на результаты собственных клинических исследований, мы разработали программу комплексной диагностики и лечения послеоперационных интраабдоминальных инфильтратов у детей с аппендикулярным перитонитом путем использования диагностического алгоритма и комплексных щадящих лечебных

мероприятий в условиях стационара и на этапе амбулаторно-поликлинического лечения. **Цель:** изучение отдаленных результатов лечения детей с послеоперационными интраабдоминальными инфильтратами. **Материал и методы.** С помощью квазимониторинга получили информацию о состоянии 109 детей через год после стационарного лечения. Комплексное лечение детей проводилось по разработанной нами программе. **Результаты.** Одновременное использование лечебных и физических факторов в комплексном лечении детей с ПИИ по разработанной программе в условиях стационарного и послестационарного лечения благоприятно влияло на восстановление нарушенных функций организма ребенка вообще и конкретно органов брюшной полости, обеспечивало лучший эффект в сравнении с больными, которые получали комплексное лечение ограниченно. **Выводы.** Исчезновение пальпируемой "опухоли", ультразвуковых признаков интраабдоминального инфильтрата и возникновения спаечной непроходимости кишечника можно рассматривать как основной клинический результат всего процесса лечения. Анализ результатов отдаленного периода комплексного лечения свидетельствовал о достоверном повышении количества больных ОГ с общей оценкой результата лечения как "хороший" (95,1 % детей против 72,1 % в КГ) и снижение "неудовлетворительного" результата лечения в 2 раза среди детей ОГ (2,4 %) против детей КГ (4,4 %). Первичное лапароскопическое вмешательство у детей (КП 2, ОП 2) способствовало благоприятному течению заболевания, а после амбулаторно-поликлинического лечения приводило к отсутствию "неудовлетворительных" результатов.

Ключевые слова: отдаленные результаты, комплексное лечение, дети, послеоперационный интраабдоминальный инфильтрат.

Introduction. One of the main factors determining the course of the postoperative period at acute surgical pathology of the abdominal organs in children is the involvement of a large omentum in the formation of an intraperitoneal inflammatory center [1, 4, 7, 8, 9, 10]. Compromised large omentum can complicate the course of the underlying disease and cause relaparotomy after surgical interventions in the abdominal organs in children, which, according to various authors, reaches 30-35% of the total number of urgent laparotomies [5, 6, 11, 12].

Based on the results of our own clinical studies, we have developed a program for comprehensive diagnosis and treatment of postoperative intra-abdominal infiltration in children with appendicular peritonitis by using a diagnostic algorithm (clinical and laboratory, instrumental data) and complex saving measures (drug therapy, preformed physical factors) in a hospital setting and at the stage of ambulatory-polyclinic treatment [2, 3].

Aim: To study the remote results of children's treatment with postoperative intra-abdominal infiltrates.

Material and methods. To study the long-term results of comprehensive treatment of children with postoperative intra-abdominal infiltrates (PII) through quasi-monitoring, we have received information about the state of 109 patients one year after inpatient treatment.

The main group (MG) was formed by 41 children with PII, who received the comprehensive stationary and ambulatory-polyclinic treatment developed by us. Of these, 25 patients, who were initially operated with laparotomy, made up the main subgroup 1 (MS 1), and 16 children, who were initially operated laparoscopically, were included to the main subgroup 2 (MS 2). To the control group (CG) were included 68 children, who received a traditional treatment in the hospital, and ambulatory-polyclinic treatment in these children consisted only of electrophoresis of potassium iodide. Of these, 53 patients constituted a control subgroup 1 (CS 1 - initially operated with laparotomy) and 15 entered the control subgroup 2 (CS 2 - initially operated laparoscopically). The average duration of follow-up for patients from comparator groups was one year. Differences between groups by age and gender were not noted.

The choice of treatment tactics of PII depended on the stage of the pathological process, the type and severity of the course of omentitis, which was determined comprehensively with the help of clinical, instrumental and laboratory research. In the absence of abscessing signs, treatment began with conservative measures; in situations where there were signs of abscess and peritonitis – was held a preoperative preparation with subsequent surgical intervention.

Complex treatment in the hospital was aimed at the rapid relief of inflammation in the abdominal cavity, prevention of abscess, maintenance of motor-evacuation function of the intestine, prevention of connective tissue formation in the abdominal cavity.

At dense and friable PII, local conservative treatment was carried out using antibiotics and physical factors on the abdominal region: on the *first stage* was performed regional antibacterial electrophoresis and simultaneously was carried out microbial treatment microclysters (kanamycin, gentamicin) with 0.25% solution of dimethoxide 30-50 ml twice a

day; *second stage* included the impact of diadynamic therapy in the projection of infiltrate and non-steroidal anti-inflammatory drugs in the form of rectal suppositories (voltaren, diclofenac, etc.) in the age-appropriate dosage twice a day [2].

Further complex restorative treatment of children with PII was based on the general principles of medical rehabilitation and provided the use of therapeutic physical factors at the non-stationary stage in outpatient-polyclinic conditions. Treatment was carried out according to the program we developed using hardware physiotherapy and medicinal substances: electrophoresis with medicinal substances (lidaza or potassium iodide) was used in the projection of postoperative wound with the simultaneous application of Dystreptasis rectal suppositories; afterwards was conducted diadynamic therapy, an ultrasonic administration of hydrocortisone [3].

Clinical signs were determined on the basis of quasi-monitoring: abdominal discomfort, autonomic and physical activity induced abdominal pain, vomiting, palpated 'tumor', intestinal motility and intestinal obstruction, infiltration of the abdominal cavity or US-sign of intra-abdominal infiltration.

Long-term results in the observed patients were evaluated by three levels of result achievement: "good", "satisfactory" and "unsatisfactory". Under the "good" result, one understood that children did not have complaints, had no violations on the part of the gastrointestinal tract or infiltrates of the abdominal cavity. The "satisfactory" results were scored when children complained on discomfort and abdominal pain, sometimes there was a violation of the intestine function. "Unsatisfactory" results included the occurrence of severe complications - presence of infiltrate or abscess in the abdominal cavity or adhesion obstruction.

Results. During the year, all clinical signs in the observed children of all subgroups tended to decrease, especially in children, who received the proposed comprehensive treatment in the hospital and ambulatory. Children at CS 2 and MS 2, initially operated laparoscopically, differed by a more favorable course of the disease and decreased listed clinical signs in 1,5-2 times. Differences in all clinical features between patients in the main and control groups are statistically possible.

According to the data of the table 1, 32.1% of children of CS 1 and 13.3% of children of CS 2 complained on abdominal discomfort during the entire period of observation. Among MS 1 and MS 2 children experienced lesser abdominal discomfort, respectively in 16.0% and 6.3 % of cases.

All children of the MG, who received the proposed comprehensive treatment and were under observation for a year, had no complaints on abdominal pain and vomiting, while children from CG were periodically disturbed with abdominal pain (16.9% of patients from CS 1 and 13.3% of patients from CS 2), sometimes there was vomiting (5.7% of children from CS 1 and 6.7% from CS 2).

Table 1

Presence of clinical signs in children with postoperative intra-abdominal infiltrates depending on treatment in the late period

Presence of clinical manifestations	Control group, n=68				Main group, n=41			
	Control subgroup 1 (laparotomy), n=53		Control subgroup 2 (laparoscopy), n=15		Main subgroup 1 (laparotomy), n=25		Main subgroup 2 (laparoscopy) n=16	
	1		2		3		4	
	abs	%	abs	%	abs	%	abs	%
Abdominal discomfort	17	32,1	2	13,3	4	16,0	1	6,3
Abdominal pain	9	16,9	2	13,3	1	4,0	0	0
Provoked pain	15	28,3	4	26,7	2	8,0	0	0
Palpated "tumor"	2	3,8	0	0	0	0	0	0
Vomiting	3	5,7	1	6,7	0	0	0	0
Violations of bowel function	7	13,2	1	6,7	2	8,0	1	6,3
Propensity to constipation	5	9,4	1	6,7	1	4,0	1	6,3
Adhesive intestinal obstruction	3	5,7	0	0	1	4,0	0	0
US- signs of infiltrate	9	17,0	0	0	0	0	0	0

Note: $p_{1-2} < 0,05$; $p_{1-3} < 0,05$; $p_{2-4} < 0,05$; no differences in groups.

Exercise-induced abdominal pain was observed in only 8.0% of children of the MS 1, whereas in the control group this symptom was more often detected: CS 1 - 28.3%, CS 2 - 26.7%. The next comparative sign - palpated "tumor", which was not detected in any of the children in the main group, was detected in 2 children (3.8%) in CS 1.

Children of CG (13.2% - CS 1, 6.7% - CS 2) and MG (8.0% MS 1, 6.3% MS 2) sometimes complained on violation of mobility and regularity of bowel function, among these children was also noticed the tendency to constipation (respectively: 9.4% CS 1; 6.7% CS 2; 4.0% MS 1; 6.3% MS 2). Violation of the motor-evacuation function of the digestive tract, in our opinion, was connected with the adhesive process in the abdominal cavity, which led to

the late adhesive intestinal obstruction (LAIO): one (4.0%) child of the MS 1, which received a comprehensive treatment, was observed consecutively with LAIO, 3 (5.7%) children of CS 1 were re-hospitalized for late adhesion obstruction, of which 1 was operated.

At the control ultrasonography, nine (17.0%) children from CS 1 had final signs of the transferred PII in the form of thickening of the intestinal walls and its fixation in the right iliac region with a total size of 3-5 cm²; mentioned patients had no signs of intra-abdominal complications.

Thus, conducted analysis of differences between all clinical signs in the control and main groups in the remote period, presented in Table 1, reflected the superiority of developed program application of integrated treatment with the use of enhanced local pharmacological therapy and therapeutic physical factors at the inpatient and outpatient clinic in children with PII.

Analysis of generalized results in the remote observation period, presented in Table 2, confirmed efficacy of the treatment performed in the absence of palpated "tumor" and ultrasound signs of abdominal infiltration in patients, whereas in 9 (13.2%) children of the CG there were signs of PII during the year.

As can be seen from Table 2, children of MG during one year of observation have 4 times lower chances of experiencing abdominal discomfort compared with CG, and 7 times lower chances of self-induced and provoked abdominal pain appearance. In addition, the efficacy of performed complex treatment in the MG was confirmed by a decrease in the probability of bowel disorders in 1.7 times and the occurrence of adhesion obstruction almost in 2 times, which was observed in 2.4% of patients from the MG, while 3 (4.4%) children from CG in the late period had LAIO, of which 1 was operated.

Ultrasound examination of the right anesthetized area in children from MG, as a rule, indicated anatomical location of the abdominal cavity organs, absence of pathological fixation in the right anesthetic site and signs of infiltration, physiological mobility of organs.

9 (13.2%) children from CG had thickened and fixed intestinal loops in the right iliac region, pathological fixation of the abdominal cavity with adhesive process, limited intestinal mobility, resulting in disorders of the intestine function and the appearance of pain syndrome.

An example can be the following clinical observation.

Table 2

Chances of occurrence of clinical manifestations in children of studied groups after long-term treatment

Clinical manifestations		Control group, n=68		Main group, n=41		Odds ratio (95 % CI)	Estimation of differences	
		abs	%	abs	%		χ^2	p
Abdominal discomfort	Yes	19	27,9	3	7,3	4,91 1,35÷17,83	6,75	0,009
	No	49	72,1	38	92,7			
Abdominal pain	Yes	11	16,2	1	2,4	7,72 0,96÷62,2	4,93	0,02
	No	57	83,8	40	97,6			
Provoked pain	Yes	19	27,9	2	4,9	7,56 1,66÷34,45	8,75	0,003
	No	49	72,1	39	95,1			
Palpated 'tumor'	Yes	2	2,9	0	0,00	-	1,23	0,000
	No	66	97,1	41	100			
Vomiting	Yes	4	5,9	0	0,00	-	2,50	0,11
	No	64	94,1	41	100			
Disorders of bowel function	Yes	8	11,8	2	4,9	2,60 0,52÷12,89	1,46	0,23
	No	60	88,2	39	95,1			
Propensity to constipation	Yes	6	8,8	1	2,4	3,87 0,45÷33,36	1,75	0,18
	No	62	91,2	40	97,6			
Adhesive intestinal obstruction	Yes	3	4,4	1	2,4	1,85 0,19÷18,36	0,28	0,60
	No	65	95,6	40	97,6			
US- signs of infiltrate	Yes	9	13,2	0	0,00	-	5,92	0,015
	No	59	86,8	41	100			

Boy I., 6 years old (m / c number 345) was admitted to the hospital on the 4 day after the disease onset with a typical appendicular peritonitis clinic. Intraoperatively was detected delimited peritonitis and abscess III. Gangrenously altered appendix with perforation in rough plane adhesions, strain of fibrin on the intestine loops, presence of manure in the abscess cavity. Was performed appendectomy, sanation of the cell and small pelvis, drainage of the abscess cavity through the counterpuncture. In the postoperative period, the child received a comprehensive treatment, but for 5 days there were signs of PII, which was confirmed on the 6 day by the US study: dense infiltration of the right iliac region 6x4 cm without signs of abscess. Conservative treatment has been performed according to the developed program. The boy was discharged home in a satisfactory condition. After discharge from the hospital, he received ambulatory treatment. Ultrasound monitoring of the abdominal cavity was

performed at all stages of integrated treatment. One month after the operation an ultrasound examination found infiltration and thickening of the intestinal walls in the right iliac region, while a year after observation there was no infiltration, intestinal placement was normal, hyperperfection was not observed (Picture 1).



a) 6 days after the initial surgery;

b) discharge from hospital;



c) six months after surgery;

d) in a long-term period.

Picture 1. Ultrasound monitoring of postoperative intra-abdominal infiltration of boy I., 6 years (m / c number 345).

Thus, by means of ultrasound was confirmed the positive effect of complex treatment in children with PII. We believe that the absence of any signs of abdominal infiltration and excessive intraabdominal spike formation (LAIO) in the remote observation period can be considered as the main clinical response achieved by the developed comprehensive program for the treatment of PII in children with appendicular peritonitis.

Long-term results (Table 3) ($p < 0.0001$) of complex treatment of children during the observation year were considered "good" in 95.1% of children of MG receiving treatment under the developed program in a hospital and in a polyclinic, while "unsatisfactory" result had one child (2.4%) from this group, who showed signs of LAIO during a year (conservative treatment).

Table 3

Long-term results of complex treatment of children with postoperative intra-abdominal infiltrates

Group	«Good»		«Satisfactory»		«Unsatisfactory»		Togeth er
	abs	%	abs	%	abs	%	
Control group (n=68)	49	72,1	16	23,5	3	4,4	68
	CI 60,5÷81,4		CI 18,6 ÷39,5		CI 1,5 ÷12,2		
Control subgroup 1 (laparotomy) (n=53)	36	67,9	14	26,4	3	5,7	53
	CI 54,5÷78,9		CI 16,4÷39,6		CI 2,0÷15,4		
Control subgroup 2 (laparoscopy) (n=15)	13	86,7	2	13,3	0	0	15
	CI 62,2÷96,3		CI 3,7÷37,8				
Main group (n=41)	39	95,1	1	2,4	1	2,4	41
	CI 83,8÷98,6		CI 0,4÷12,5		CI 0,4÷12,5		
Main subgroup 1 (laparotomy) (n=25)	23	92,0	1	4,0	1	4,0	25
	CI 70,0÷97,8		CI 0,7÷19,5		CI 0,7÷19,5		
Main subgroup 2 (laparoscopy) (n=16)	16	100,0	0	0	0	0	16
	CI 80,6÷100						
Together	88		17		4		109

Children of the CG, since they did not receive the full course of integrated treatment, showed an "unsatisfactory" long-term result in 4.4% of the cases (children with definitive US-signs of infiltration and one child operated on LAIO).

In addition, according to Table 3, children of the control and main groups in the primary laparoscopic intervention with regard to appendicular peritonitis in the distant period didn't show an "unsatisfactory result", namely: 13 children out of 15 in CS 2 - a "good" result, 2 children - "satisfactory"; all 16 children at MS 2 - a "good" result. The above proves the efficacy of laparoscopic intervention and favorableness of the postoperative period.

Thus, conducted treatment of children with PII, based on the comprehensive program, provided a higher effect compared with patients receiving limited complex treatment (in the hospital - UHF therapy, in the clinic - electrophoresis with potassium iodide). Thus, in the main group, the "good" result was determined in 95.1% of children, and in the control group only 72.1%.

Conclusions. Summing up the above, we consider it necessary to emphasize that the combined use of medical and physical factors in the complex treatment of children with PII using the developed program in the conditions of inpatient and outpatient treatment favorably

affected the restoration of impaired functions of the child's body in general and specifically of the abdominal organs, as evidenced by the following:

1. Reduced presence of palpated "tumor", ultrasound signs of intra-abdominal infiltration and occurrence of adhesive intestinal obstruction can be considered as the main clinical response throughout the treatment process.

2. Final analysis of the late period results of integrated treatment indicated a probable increase in the number of MG patients with an overall assessment of the outcome of the treatment as "good" (95.1% of children versus 72.1% in the CG) and a decrease in the "unsatisfactory" outcome of treatment in 2 times among children of MG (2.4%) against children of the CG (4.4%).

3. We consider it necessary to emphasize that the primary laparoscopic intervention in children (CS 2, MS 2) contributed to the favorable course of the disease, and after ambulatory-polyclinic treatment resulted in the absence of "unsatisfactory" results.

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