

ISSN - 2544-9346

OPEN ACCESS
PEER-REVIEWED JOURNAL

SCIENCE REVIEW

Scientific Edition
Published by:



RS **Global**

Open Access Peer-reviewed Journal

Science Review

9(16), October 2018

DOI: https://doi.org/10.31435/rsglobal_sr

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**Publisher Office's
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MEDICINE

SIGNIFICANCE OF BASIC CLINICAL TESTS CHANGING AFTER THE HIPEC PROCEDURE IN PATIENTS WITH GASTRIC CANCER AND SOME OTHER TUMORS

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DOI: https://doi.org/10.31435/rsglobal_sr/31102018/6191

ARTICLE INFO

Received 14 August 2018

Accepted 21 October 2018

Published 31 October 2018

KEYWORDS**ABSTRACT**

Hyperthermic intraperitoneal chemotherapy [3] is a popular method of palliative treatment in patients with malignant abdominal tumors. This review is devoted to trace changes in general clinical tests in patients with carcinomatosis. The patients were operated on at the Clinic of Reconstructive and Plastic Medicine of the Odessa National Medical University. All patients satisfactorily tolerated this procedure. The object of the study was to track those changes with patients that took place in the immediate (prior to discharge) postoperative period. 25 patients have recruited to the study. In the group changes in 11 basic clinical and laboratory parameters among those included were monitored in the study. Hemoglobin, leukocytes, platelets, total protein, bilirubin, serum glucose concentration, liver enzymes alanine aminotransferase and aspartate aminotransferase levels, thymol test and coagulogram indices. Thus, the most significant indicators, such as the concentration of hemoglobin, leukocytes and platelets, have not undergone significant changes after HIPEC. Hemoglobin decreased by 6 units (g / l), the concentration of leukocytes, on the contrary, increased by 2 units (T/l), platelet levels dropped by 61 units (also G/l). The concentration of total protein decreased by 7 units. The concentration of total bilirubin practically did not change, decreasing by about 1 unit. Indicators of AST and ALT did not increase, decreasing by 8 and 3 units, respectively. The average concentration value of blood glucose level slightly increased by almost 1 unit. Thymol levels have not changed. The prothrombin index decreased by 3 units; the concentration of fibrinogen in serum remained at approximately the same level. HIPEC procedure does not significantly affect the clinical and laboratory parameters. However, the tendency of this category of patients to hypercoagulation, hypoproteinemia and hyperglucosemia was noted.

Citation: Kirkilevsky S. I., Mashukov A. O., Yarema R. R., Zgura O. M., Maksimovskiy V. E., Rybin A. I., Bilenko O. O., Linkevich V. A., Osadchiy D. M.. (2018) Significance of Basic Clinical Tests Changing After the Hipec Procedure in Patients with Gastric Cancer and Some Other Tumors. *Science Review*. 9(16). doi: 10.31435/rsglobal_sr/31102018/6191

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Introduction. Intra-abdominal hyperthermic perfusion is a popular method of palliative treatment in patients with common abdominal tumors. The technique is mainly used in ovarian cancer [2], mesothelioma, peritoneal pseudomyxoma, colorectal cancer, and stomach cancer. The indication is macroscopically detected abdominal carcinomatosis, or positive flushes from the peritoneum with verified cancer. It is performed both during cytoreductive surgery and as a component of the “Second look” procedure, as well as in the adjuvant mode in the absence of carcinomatosis. HIPEC has not become a standard treatment method, and multicentre randomized studies are regularly conducted on this topic. Such as for example PRODIGE 7, PROPHYLOCHIP, COLOPEC, COMBATAC, GASTRIPEC, GASTRICHIP and others (HIPECT4, GYMSSA trial).

Materials and methods. This short review is devoted to such a seemingly trivial topic as changes in general clinical tests in patients with verified cancer and carcinomatosis, before and after the HIPEC procedure. Combined treatment was performed in 25 patients with tumors of the abdominal cavity complicated by disseminated abdominal carcinomatosis, which included: 1) removal of the primary tumor, in the volume of gastrectomy, distal subtotal gastrectomy, etc.; 2) a cytoreductive surgical procedure was performed, including peritoneoectomy; 3) during the same stage, as the final part of the procedure, HIPEC was performed with intra-abdominal chemotherapy and hyperthermia. All patients were operated on at the Clinic of Reconstructive and Plastic Medicine of the Odessa National Medical University. All patients satisfactorily tolerated this procedure. And the object of the study was to track those changes with patients that took place in the immediate (prior to discharge) postoperative period. In cases where this was required, the phenomenon of secondary anemia were treated with intra- or postoperative substitutive transfusions of red blood cells transfusion [1] and protein solution infusion; transfusion of thrombus suspension and leucoconcentrate was not performed.

Below is table 1, which contains indicators of quantitative changes in the total, biochemical analysis of blood and coagulogram.

Table 1. Changes in general clinical analyzes in patients underwent HIPEC.

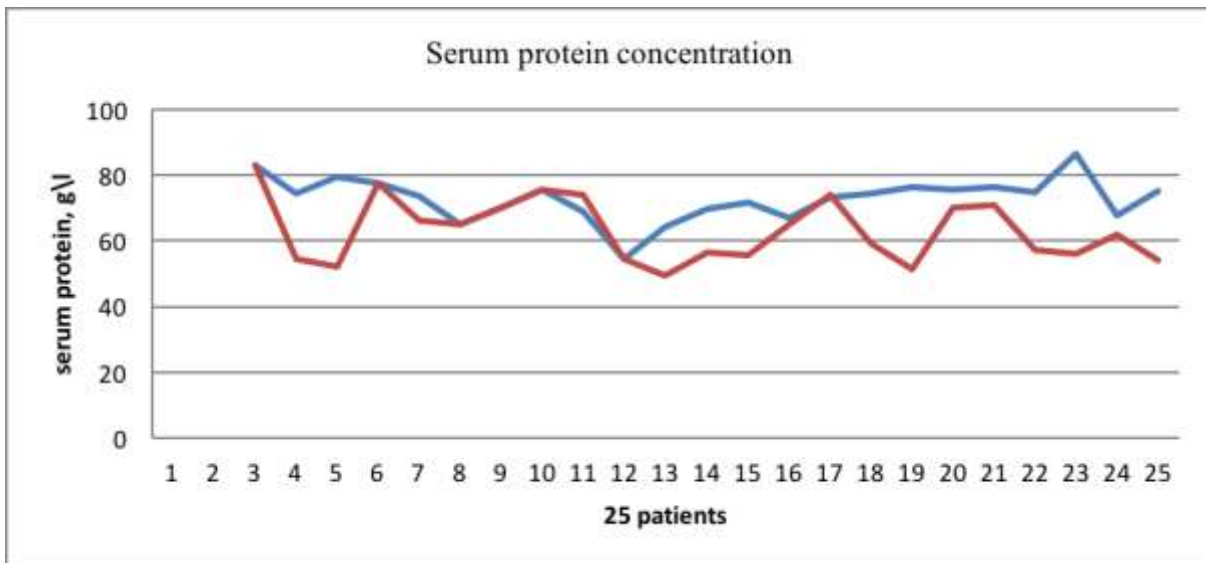
№	Hemoglobin (10 ⁹ /l)		White blood cells (10 ⁹ /l)		Platelets (10 ⁹ /l)		Serum protein (g/l)		Bilirubin (μmol/l)		ALT (u/l)		AST (u/l)		Glucose (mmol/l)		Thymol test (SH)		Prothrombin Index (%)		Fibrin (g/l)	
1	102	94	6,9	15,5	411	332	72,2	65,7	12,4	6,0	45	31	43	29	7,04	8,38	2,25	2,25	100	100	Отриц.	
2	131	131	4,4	4,4	184	184			16,8	16,8	21	21	26	26	5,47	5,47	1,25	1,25	102	102	2,66	2,66
3	95	95	2,6	2,6	190	190	82,8	82,8	15,9	15,9	21	21	20	20	5,36	5,36	1,5	1,5				
4	136	112	6,4	7,9	257	256	74,2	54,5	4,9	7,7	16	15	16	17	5,06	6,41	1,0	1,0	101	95	3,77	5,1
5	142	116	8,1	13,5	364	241	79,4	52,3	18,0	18,0	26	24	27	30	4,21	5,03	2,5	2,5	93	99	3,77	4,21
6	121	110	7,0	8,5	646	452	77,3	77,3	8,6	8,6	24	24	32	32	4,74	4,74	2,5	2,5	102	102	6,88	6,88
7	127	127	5,7	9,1	357	367	73,4	66,3	30,2	9,6	16	37	26	47	5,13	4,74	4,25	3,0	100	95	3,77	3,10
8	113	124	9,9	8,2	284	148	64,9	64,9	7,1	13	162	30	119	55	5,73	8,91	1,5	2,25	101	101	4,88	4,88
9	133	115	6,2	4,5	322	298	70,1	70	5,5	19	27	0,6	30	0,79	4,27	4,2	3,25	2,7	98	98	3,55	3,55
10	127	114	4,7	11,6	419	337	75,5	75,5	11,8	11,8	10	10	22	22	4,68	4,68	2,0	2,0	96	96	3,55	5
11	128	132	7,7	7,1	234	236	68,9	74,0	15,9	12,0	15	20	18	31	4,5	6,14	1,75	1,75	104	100	3,33	3,33
12	91	114	13,8	3,5	262	273	54,3	54,3	4,1	4,1	94	94	90	90	7,22	7,22	2,5	2,5	100	100	3,55	3,55
13	124	144	6,4	12,7	271	174	64,1	49,5	9	9	17	22	20	26	7,28	9,97	2,25	2,25	102	65	3,55	4,2
14	122	126	5,35	8,6	260	172	69,6	56,3	7,3	5,5	23	23	16	16	5,56	6,66			93	93	4,21	4,21
15	153	97	5,2	12,3	300	190	71,8	55,7	8,4	8,0	26	45	17	31	5,19	6,39	1,75	1,75	107	108	2,88	3,33
16	144	119	17,7	8,2	283	242	67,1	64,9	10,3	9,6	9	13	15	17	4,93	4,97	3,25	1,5	100	104	4,66	5,32
17	148	95	5,8	12,3	370	200	73,1	74	16,5	10	26	54	21	157	5,15	5,6	4,0	1,5	98	83	3,99	1,99
18	123	119	3,3	7,0	294	206	74,5	59,3	12,2	6,1	15	17	18	20	4,24	4,24	1,75	1,75	94	71	2,66	3,99
19	116	100	10,1	13,2	428	563	76,3	51,3	11,9	7,7	9	16	17	32	7,89	8,38	2,25	0,75	102	76	6,21	11,59
20	140	106	7,0	14,3	163	261	75,6	10,1	10,1	10,1	13	13	20	20	5,37	5,37	1,5	1,5	103	103	4,66	4,66
21	118	118	7,2	9,7	299	214	76,3	10,8	10,8	10,8	28	28	26	26	4,72	4,72	11,5	11,5	100	100	7,77	7,77
22	128	119	6,7	15,1	367	325	74,9	57,2	14,6	14,6	26	20	28	23	4,72	4,72	1,5	1,5	95	98	5,1	4,88
23	120	112	4,7	7,3	208	302	86,4	5,6	5,6	5,6	17	17	21	21	5,53	5,53	2,25	2,25	98	98	4,44	4,44
24	95	113	13,7	12,6	322	340	67,8	61,7	8,8	9,7	12	18	16	27	4,79	9,38	1,75	1,75	97	84	5,10	5,32
25	63	120	6,3	22	392	661	75	53,9	11,91	4,8	18	21	24	23	7,35	4,97	1,3	2,0	105	74	5,99	7,54

11 clinical and laboratory parameters among patients included in the study were tracked. Concentration of hemoglobin, leukocytes, platelets, total protein, bilirubin, serum glucose, liver enzymes alanine aminotransferase, aspartate aminotransferase, thymol test and coagulogram indices: prothrombin index and fibrinogen. Where, according to the table, the indicators remained unchanged, there was not enough data or the dynamics was not fully tracked. With the help of mathematical calculations, the main indicators of averages, sums and dynamics of changes in table 2 were calculated. Many patients after performing HIPEC were also given standard intravenous polychemotherapy. Therefore, the fact that the procedure did not significantly affect the state of the red and white blood bone marrow, the functional state of liver parenchyma, as well as the coagulation system of the blood caused optimism about its use and implementation.

The satisfactory state of red and white blood indirectly indicated that there was no effect on the bone marrow, HIPEC - a local procedure.

To verify and clarify this preliminary conclusion, a comparison was made of the degree of reliability of differences in the series of figures characterizing the patient before and after the procedure. It was calculated using the f-test (Microsoft Office Excel, 2007). The data are shown in Table 2. Thus, a statistically significant dynamics of clinical and biochemical parameters was obtained in changes in the levels of total protein, ALT, hemoglobin, glucose, as well as in coagulogram data. In no case were critical changes in the analyzes obtained, which could be evaluated as leuco- or thrombocytopenia, coagulopathy, hypoproteinemia, etc. HIPEC did not significantly affect the GBT.

Discussion. Thus, the most significant indicators, such as the concentration of hemoglobin, leukocytes and platelets did not undergo significant changes after HIPEC. Hemoglobin decreased by 6 units (g/l), leukocyte concentration, on the contrary, increased by 2 units (10^9 per l), platelet count dropped by 61 units (also 10^9 per l). The total protein concentration decreased by 7 units. The concentration of total bilirubin almost did not change, decreasing by about 1 unit. Indicators AST and ALT did not increase, decreasing by 8 and 3 units, respectively. The average concentration value of the blood glucose level slightly increased by almost 1 unit. Thymol level did not change. The prothrombin index decreased by 3 units, the concentration of fibrinogen in the serum remained at about the same level.



Scheme 1. Graphs showing the proteinemia levels before and after HIPEC procedure. The horizontal axis shows the number of patients, the vertical axis - the concentration function of protein from 0 to 100 g / l. The blue graph is the protein concentration curve before the procedure, red is the curve of the change in protein concentration after HIPEC. Despite the active implementation of the Fast track surgery program, the earlier onset of oral feeding and i.v administration of aminoacid solutions, there was a tendency towards hypoproteinemia. This characterizes the severity of surgical trauma and the prevalence of catabolism over anabolic processes in the postoperative period. Blood protein standards 65-85 g/l. Hypoproteinemia was observed in 14 patients out of 25 in the immediate postoperative period, whereas before the operation there were only 3.

Table 2. Changes in the sums of average values in general clinical analyzes in patients undergoing HIPEC.

№	Hemoglobin (10 ⁹ / l)	White blood cells (10 ⁹ / l)	Platelets (10 ⁹ / l)	Serum protein (g/l)	Bilirubin (μmol / l)	ALT (u / l)	AST (u / l)	Glucose (mmol / l)	Thymol test (SH)		Prothrombin Index (%)	Fibrin (g / l)									
									2,25	2,25											
1	102	94	6,9	15,5	411	332	72,2	65,7	12,4	6,0	45	31	43	29	7,04	8,38	2,25	2,25	100	100	Отриц.
2	131	131	4,4	4,4	184	184	82,8	82,8	16,8	16,8	21	21	26	26	5,47	5,47	1,25	1,25	102	102	2,66
3	95	95	2,6	2,6	190	190	74,2	74,2	15,9	15,9	21	21	20	20	5,36	5,36	1,5	1,5			
4	136	112	6,4	7,9	257	256	79,4	52,3	4,9	7,7	16	15	16	17	5,06	6,41	1,0	1,0	101	95	3,77
5	142	116	8,1	13,5	364	241	77,3	77,3	18,0	18,0	26	24	27	30	4,21	5,03	2,5	2,5	93	99	3,77
6	121	110	7,0	8,5	646	452	73,4	66,3	8,6	8,6	24	24	32	32	4,74	4,74	2,5	2,5	102	102	6,88
7	127	127	5,7	9,1	357	367	64,9	64,9	30,2	9,6	16	37	26	47	5,13	4,74	4,25	3,0	100	95	3,77
8	113	124	9,9	8,2	284	148	70,1	70,1	7,1	13	162	30	119	55	5,73	8,91	1,5	2,25	101	101	4,88
9	133	115	6,2	4,5	322	298	75,5	75,5	5,5	19	27	0,6	30	0,79	4,27	4,2	3,25	2,7	98	98	3,55
10	127	114	4,7	11,6	419	337	68,9	68,9	11,8	11,8	10	10	22	22	4,68	4,68	2,0	2,0	96	96	3,55
11	128	132	7,7	7,1	234	236	54,3	54,3	15,9	12,0	15	20	18	31	4,5	6,14	1,75	1,75	104	100	3,33
12	91	114	13,8	3,5	262	273	64,1	49,5	4,1	4,1	94	94	90	90	7,22	7,22	2,5	2,5	100	100	3,55
13	124	144	6,4	12,7	271	174	69,6	56,3	9	9	17	22	20	26	7,28	9,97	2,25	2,25	102	65	3,55
14	122	126	5,35	8,6	260	172	71,8	55,7	7,3	5,5	23	23	16	16	5,56	6,66			93	93	4,21
15	153	97	5,2	12,3	300	190	67,1	64,9	8,4	8,0	26	45	17	31	5,19	6,39	1,75	1,75	107	108	2,88
16	144	119	17,7	8,2	283	242	73,1	74	10,3	9,6	9	13	15	17	4,93	4,97	3,25	1,5	100	104	4,66
17	148	95	5,8	12,3	370	200	74,5	59,3	16,5	10	26	54	21	157	5,15	5,6	4,0	1,5	98	83	3,99
18	123	119	3,3	7,0	294	206	76,3	51,3	12,2	6,1	15	17	18	20	4,24	4,24	1,75	1,75	94	71	2,66
19	116	100	10,1	13,2	428	563	75,6	10,1	11,9	7,7	9	16	17	32	7,89	8,38	2,25	0,75	102	76	6,21
20	140	106	7,0	14,3	163	261	76,3	10,8	10,1	10,1	13	13	20	20	5,37	5,37	1,5	1,5	103	103	4,66
21	118	118	7,2	9,7	299	214	74,9	57,2	10,8	10,8	28	28	26	26	4,72	4,72	11,5	11,5	100	100	7,77
22	128	119	6,7	15,1	367	325	86,4	5,6	14,6	14,6	26	20	28	23	4,72	4,72	1,5	1,5	95	98	5,1
23	120	112	4,7	7,3	208	302	67,8	61,7	5,6	5,6	17	17	21	21	5,53	5,53	2,25	2,25	98	98	4,44
24	95	113	13,7	12,6	322	340	75	53,9	8,8	9,7	12	18	16	27	4,79	9,38	1,75	1,75	97	84	5,10
25	63	120	6,3	2,2	392	661	71,32	64,22	11,91	4,8	18	21	24	23	7,35	4,97	1,3	2,0	105	74	5,99
Сред- нее	123	116,73	6,69	8,67	317,40	256,67	71,32	64,22	11,73	11	36,20	27,84	34,8	31,52	5,43	6,29	2,16	2,09	99,93	96,71	3,87
Дина- мика	6,27		-1,98		60,73		7,1		0,73		8,36		3,28		-1,16		0,07		3,22		-0,28
Р	0,02		0,23		0,35		0,0000000		0,17		0,0055		0,24		0,029		0,91		0,0000000		0,0000000

In addition to the already well-known HIPEC, other similar methods are also present in the world and are developing at a rather rapid pace, such as HITOK (pleural cavity perfusion), HIVEK (urinary bladder perfusion), as well as isolated hyperthermic chemoperfusion of extremities - ILP, etc. The last one is still considered a semi-experimental technique. Most often, these techniques are performed using the apparatus Performer 1-3 generations from the Italian company Rand (Modena).

Conclusions. There was a moderately pronounced tendency of patients to hypercoagulation, hypoproteinemia and hyperglucosemia. Summing up, we can say that the procedure of HIPEC did not significantly affect the clinical and laboratory parameters and general blood tests (GBT) of patients. This means that special complex treatment of this difficult group of patients can be continued, and systemic intravenous polychemotherapy can consolidate the effects of debulking surgery.

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