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Monitoring Energy Levels during Treatment with GDV Technique

Abstract

The general field of energy medicine is growing strongly but is still in great need of reliable monitoring instruments to assess the relative energetic state of humans with respect to a healthy/pathology ratio. It is therefore quite natural that commercial devices for evaluating the condition of the meridian energy state would be seriously considered by those involved in CAM.

In this paper, we report on experimental results using ElectroPhotonic Imaging (EPI) technique, based on Gas Discharge Visualization (GDV) Device, a sophisticated modern-day version of Kirlian photography. Specifics addressing the effectiveness of its application, ability to estimate appropriate dynamics and parameters of this disease process, and assessment of various therapies' effectiveness as measured by EPI technique are reviewed. Presented clinical results demonstrate that parameters of EPI-grams reliably differ for practically healthy people and patients with chronic abdominal pathology and depend on the gender and age of patients. The parameters of EPI-grams are connected with the functional status of the organism and, to a certain extent, reflect the severity of the somatic state of patients with abdominal pathology.

The parameters of EPI-grams reliably change in response to the operative trauma, and their dynamics depend on the severity of the somatic state of patient, which allows using the technique for functional monitoring of patients in postoperative period, as well as for the assessment of the operative stress. The ElectroPhotonic Imaging technique is mostly advisable for the dynamic assessment of the functional state of patient in perioperative period.

INTRODUCTION

Complementary, energy, vibration medicine, various forms of healing are inevitably becoming one of our life issues. Serious debates on the efficiency of the given "non-chemical" methods of the influence on the organism are gradually coming down due to the statistically valid clinical data, conceptual approaches and practical applications of acupuncture, homeopathy, CAM and low-energy treatments. The process of CAM treatment may be very complicated having several different phases with often worsening of symptoms in the process of treatment and slow improvement of overall patient's condition. During this process it is very important to have means for objective monitoring of patient's condition. This may help both in correction the treatment process and in demonstrating the positive effect of treatment to the patient. The latter would help to encourage the patient in effectiveness of the CAM therapy that lead to better results due to the influence of positive mood and belief of a patient. Surprisingly, but in modern medicine we have quite a few instruments, which allow constant monitoring of patient's condition in non-invasive, non-expensive way. Mostly in use are instruments for monitoring the activity of a cardio-vascular system. Other means may be extremely useful for analysis but for the monitoring purposes they are either invasive (X-ray, ultrasound, blood tests) or very complicated and expensive (MRI, PAT). New technique of human functioning analysis – ElectroPhotonic Imaging (EPI) technique, utilising Gas Discharge Visualization (GDV) Device based on quantum biophysical approach offers a set of unique opportunities for CAM practice.

METHOD

The EPI camera is presently the state-of-the-art in bioelectrography. It utilizes a high frequency (1024 Hz), high-voltage (10 kV) input to the finger (or other object to be measured), which is placed on the electrified glass lens of the EPI camera. Because the electrical current applied to the body is very low, most human subjects do not experience any sensation when exposing their fingertip to the camera. In practice, the applied electric field is pulsed on and off every 10 microseconds, and the fingertip is exposed for only

0.5 seconds. This causes a corona discharge of light-emitting plasma to stream outward from the fingertip. The light emitted from the finger is detected directly by a CCD (charge-coupled detector), which is the state-of-the-art in scientific instruments such as telescopes to measure extremely low-level light. The signal from the CCD is sent directly to a computer, and software analysis is done to calculate a variety of parameters that characterize the pattern of light emitted, including brightness, total area, fractality, and entropy. The software can also provide color enhancement to enable subtle features such as intensity variations of the image to be perceived. The underlying principle of camera operation is similar to well-known Kirlian effect but modern technology allows to have reproducible stable data with quantitative computer analysis. Purposeful investigations allowed to find the parameters, optimal from the point of obtaining the information on the biological object state with the minimum of invasivity. These findings are described in more than 200 research works in the international scientific literature, 12 patents, 6 books in English, French, German, Italian, Russian, and Spanish.

In assessing human subjects, the BEO-grams (EPI emission patterns after computer processing) of all ten fingers are made and analyzed. A typical measurement from a normal healthy subject is shown in fig. 1. All 10 images from the fingers (EPI- grams) then undergo analysis via another software program creating the diagrams showing the energy distribution in the various organ systems (fig. 2). This is based on the map correlating the human fingers with different systems and organs of the body in accordance with Traditional Chinese Medicine (TCM) approach. This map was first proposed by Peter Mandel in Germany and then further developed by Korotkov by testing more than 6000 patients in control clinical conditions.

The reproducibility of the EPI patterns of emission and the calculated diagrams is less then 10% for fingers of mentally stable humans, and about 1-2% for materials. The 1-2% variability pertaining to materials testing is considered to be random error. However, the 10% variation with respect to human fingers reflects not only standard error, but the fluctuations in the energy dynamics of a living being, i.e., the "flicker of the flame of life." As it is shown in numerous studies, the pattern of emission, which determines the relative energy distribution in the person's organs, remains constant from day to day. That is, each adult displays an "energy pattern signature" in this method of testing.

At the present moment four main spheres where the EPI technique can bring unique information have been established:

- medicine[7,8,9,10,11]
- sport[12]
- consciousness research[13,14]
- investigation of water, vegetations[15] and materials[16,17] including homeopathy remedies[18]

EPI APPLICATIONS IN CAM

Scientific research in EPI carried out in medicine revealed correlations of EPI parameters with other measurable characteristics of the organism. Quite a few of such correlations have been found: first of all, with age; with the level of blood pressure and blood formula; with cardio variability indices, and others. Reliable statistical differences of EPI parameters of groups of healthy individuals and groups of patients with various nosologies have been observed (see Table 1).

We are presenting example of research in monitoring of patients in pre- and postoperative periods of abdominal surgery.

Research Methods

At the first stage, two groups were gathered: the control group, including 36 aapparently healthy people, and the main study group, consisting of 96 patients with chronic surgical pathologies in organs of the abdominal cavity. The differences in the EPI parameters for healthy people and patients were found, and the influence of various factors on the parameters was assessed (gender – fig. 3, age – fig.4, main pathology).

All patients were divided into three groups according to the degree of severity of their state, using criteria accepted in medical institutions of the Russian Federation.

I group was made up by patients having the 1st degree (least) severity of the somatic state.

II group consisted of patients with the 2nd degree of severity.

III group was made up by patients with the 3rd-4th degree of severity.

General characteristics of patients are given in table 2.

The EPI-gram parameters were compared with data received in the course of physical and instrumental examination of patients (integral rheography of the body, spirography). Multifactor regression and correlation analyses were used in order to reveal dependence between these parameters.

The patients were examined at the following stages:

I – the day before the planned operative intervention, with the purpose of detecting initial EPI-gram parameters;

II – in the closest postoperative period (during the first hour after the operation);

III-V – in early postoperative period from the 1st day to the 3rd day inclusive;

VI – on the 5th day of postoperative period.

For monitoring the state of patients in the postoperative period, including the evaluation of postoperative stress, all patients were divided into four groups depending on the anatomical area where the surgery was performed, and taking into account the technique of operation.

1st group. Surgical operations in gall-bladder and bile-excreting tracts by laparoscopy (laparoscopic cholecystectomy). 47 patients (30 women and 17 men).

2nd group. Surgical operations in gall-bladder and bile-excreting tracts by conventional cholecystectomy. 14 patients (8 women and 6 men).

3rd group. Surgical operations in abdominal area and duodenum. 18 patients (5 women and 13 men).

4th group. Surgical operations in different parts of the large intestine (mainly resection of the large intestine and rectum, hemicolectomy regarding cancer of colo-rectal localization). 12 patients (9 women and 3 men).

Subgroups depending on the severity of the somatic state in the preoperative period were distinguished within each anatomical group of patients. Only the 1st group (laparoscopic surgeries) included a subgroup of patients initially having the 1st degree of severity of the somatic state. The severity of the somatic state of all patients in other groups was assessed as the 2nd and 3rd-4th degree (II and III subgroups, respectively).

Anesthetic management of surgeries in gall-bladder and bile-excreting tracts (1st and 2nd group) was performed in accordance with the standard method (general combined anesthesia with intubation of trachea and artificial pulmonary ventilation). The epidural anesthesia and general combined anesthesia with intubation of trachea and ALV was used for the majority of abdominal surgeries (3rd group) and also surgeries in different parts of large intestine (4th group).

The reaction of the organism to the trauma was investigated based on the dynamics of the main EPI-gram indices in addition to changes in the clinical picture, hemodynamics, and biochemical indices of blood (glucose, aminotransferases, etc.).

Possible application of the EPI technique for a prognosis of unfavorable flow in the early postoperative period was assessed in the final stage of this research. Patients with acute postoperative pancreatitis (OPP) were distinguished from the main group. EPI-gram parameters of the OPP group were compared with patients showing usual postoperative processes.

Results of research

1. Assessment of individual characteristics of EPI-gram parameters

Comparison of the control group of healthy people with the subject group showed statistically significant difference in the EPI parameters of area, brightness, density, and irregularity of the outer contour of the glow between two groups.

EPI parameters demonstrated pronounced dynamics with age in the majority of cases. With age increase of EPI Area, decrease of density and brightness, and flatness of outside contour were statistically significant ($p < 0.01$). JS parameter changed reliably in all the age categories (fig. 4). This may be correlated with increase of organism entropy with age.

The differences obtained indicate that it is necessary to determine the age norm of EPI-gram parameters. Characteristic changes of EPI-grams in various age categories also gave us a key to the interpretation of dynamics of the same indices in perioperative period, since age rise of a series of EPI-gram parameters obviously corresponded to the age decrease of functional reserves of the organism.

The most informative parameters in this analysis were JS in the EPI Diagram program, parameters of "area", "total density" and "average brightness" of glow, as well as irregularity of the EPI-gram outer contour (fractality and, to a greater extent, entropy). Mathematical evaluation of all these parameters is based on image processing technique. Parameter JS is calculated as follows:

$$JS = S_f/S_{fio} - S_s/S_{sio}, \qquad (1)$$

where S_f – area of finger glow (in pixels); S_{fio} – area of the finger inner oval ("fingerprint"); S_s – area of the "statistical" finger for the particular age group; S_{sio} - area of the inner oval for the "statistical" finger.

The individuality and variability of EPI-gram parameters indicate that it is necessary to study the differences of these parameters in equivalent groups.

We compared parameters of EPI-grams of practically healthy women and men with chronic abdominal pathology in one age category from 20 to 40 years. The results of analysis allowed distinguishing certain reliable differences between these groups. The amount of differences turned out to be lower than when the age and sex characteristics had not been taken into account.

EPI-gram parameters of patients with pathologies are different from healthy people. However, the EPI are very individual and depend not only on the pathological changes in the organism but also on gender and age, as well as, most probably, on environmental factors. At the present stage of development of the method, these considerations make it suitable not for the diagnostics of diseases, but rather for the dynamic observation of changes in the patient's bioenergy status.

2. Evaluation of functional state of patients in preoperative period with the EPI technique

EPI-gram parameters showed reliable differences depending on the degree of severity of the somatic state. Patients of the III group (most severe) were characterized by lower EPI-gram parameters. The EPI-grams of patients who had high values for the severity of somatic state were characterized by smaller area, JS index and brightness of EPI glow, as well as smoothness of its outer contour (direct correlation with fractality).

We can argue from the bioenergy point of view that the decrease in these parameters for patients with more severe somatic states is governed by low functional reserves of the organism. **The obtained data show that EPI-gram parameters reflect the severity of the somatic state of patients with abdominal surgical pathology.**

3. Monitoring of functional state of patients in postoperative period with the EPI technique

The dynamics of EPI-gram parameters, received during the first hour after different surgical interventions, was analyzed with the purpose of studying the possibility of using the EPI technique for the estimation of operative stress. Analysis of EPI-gram parameters in the postoperative period showed the most pronounced changes during the first day after the surgery. Most of the main parameters registered within the first hour after the surgery reliably increased, as compared to the preoperative measurements (fig. 5).

We suppose that such a dynamics of parameters of EPI-grams is connected with the strain of functioning of all the systems and organs in response to the operative trauma, i.e. with the operative stress.

The analysis of data given in the figures demonstrated that the most significant shifts took place after surgical interventions by cholecystectomy. Significant changes were found after all the gall-bladder, bile-excreting tracts, and abdominal surgeries, connected with the fact that the biggest amount of extended and simultaneous surgeries were performed in these groups. As a result, surgical interventions in the upper part of the abdominal cavity were the longest and most traumatic. The changes of parameters of EPI-gram area after large intestine surgeries were less expressed, and the changes of these parameters after laparoscopic surgeries were even smaller.

Thus, we can conclude that the EPI technique can be used for the evaluation of the degree of operative stress.

The analysis of dynamics of EPI-gram parameters in early postoperative period after similar surgeries in different severity subgroups demonstrated that stronger changes were expressed for patients with the 1st degree of severity (least severity, see fig.6). This strong response was specially registered after the surgeries by laparoscopy (I group), including all the three severity subgroups. Similar dynamics were shown in the group of patients who bore traditional (laparotomic) cholecystectomies (II group). A less expressed reaction of GDI "area" parameters in response to surgery was registered for patients with a more severe state (subgroup III), reflecting the decrease of compensatory possibilities for reaction in the organism. In addition, parameters of EPI-gram area declined after larger and longer surgeries (abdominal and large intestine surgeries, 3rd and 4th groups, respectively).

While the changes of EPI-gram parameters in response to the considered surgeries in severity subgroups I and II were characterized by an increase of "area of glow", a significant decrease of this index was registered for patients of the most severe subgroup III in the 3rd (abdominal) and 4th (intestinal) anatomical groups (fig.7). They all had complications in the recovery period after the surgery, including lethal outcome for two people

We assume that such a decrease of "area of glow" after large surgery interventions characterizes the state of distress and reflects low functional reserves. The consequence was often a longer period spent in intensive care and therapy units (ICTU) and generally a longer stay in a hospital, as well as more frequent development of complications and lethal outcomes in the early postoperative period (table 3).

Thus, based on the obtained data, we can conclude that the EPI technique provides for monitoring the functional state of patients in a postoperative period.

4. Assessment of possibility of application of the EPI technique for the prognosis of unfavorable flow of the early postoperative period

The ***"unfavorable prognosis"*** assessment was made on the basis of the clinical picture, data of laboratory and instrumental diagnostics for 12 patients. It was confirmed by the calculation of the diagnostic index according to the method acknowledged in the clinic of anesthesiology, reanimation, and intensive therapy of the Saint Petersburg Medical Academy.

The EPI parameters of these ***"unfavorable prognosis"*** patients were compared with the data received for patients with a usual flow of the postoperative period. Reliably high values of the parameters "area of glow", "density", and "fractality" of EPI-grams were characteristic of the ***"unfavorable prognosis"*** patients. The "average brightness" parameter was reliably lower for the ***"unfavorable prognosis"*** patients. These differences were already registered in the preoperative period, and had the most pronounced character in the first day after the surgery, when there were not yet reasons to make the ***"unfavorable prognosis"*** assessment from the results of the clinico-laboratory analysis. These data provide evidence that the

EPI technique is quite a sensitive method, enabling to identify possible inadequate reaction of the organism to a surgical challenge. However, further research is needed for a complete interpretation of the obtained results.

Thus, the results of our research, on the whole, allow maintaining that the EPI technique is a perspective method to be applied in surgery and anesthesiology departments for the functional examination of patients and monitoring of their state in perioperative period.

CONCLUSIONS

1. The parameters of EPI-grams reliably differ for practically healthy people and patients with chronic abdominal pathology.

2. The parameters of EPI-grams are connected with the functional status of the organism and, to a certain extent, reflect the severity of the somatic state of patients with abdominal pathology.

3. The most informative parameters of the EPI technique are: "integral area JS" of the "EPI Diagram" program, "area", "total density" and "average brightness", as well as irregularity of the outer contour of the image.

4. The parameters of EPI-grams are individual and depend on the gender and age of patients, which confirms the necessary of determining their norm range[2,5].

5. The parameters of EPI-grams reliably change in response to the operative trauma, and their dynamics depend on the severity of the somatic state of patient, which allows using the technique for functional monitoring of patients in postoperative period, as well as for the assessment of the operative stress.

6. The ElectroPhotonic Imaging technique is mostly advisable for the dynamic assessment of the functional state of patient in perioperative period. Not all the fingers may be used, at that, but only one finger of each hand. For example, the fourth finger, where the changes are the most significant.

MONITORING ENERGY LEVELS DURING TREATMENT WITH GDV TECHNIQUE

Table 1. Difference in EPI parameters between groups of healthy individuals and groups of patients[9].

Groups of the investigated people	Number of people	EPI Area	EPI Fractality	EPI Entropy
1. Healthy people	86	10869±1051.1	0.48 ± 0.05	2.7 ± 0.05
2. BA patients	78	6740 ± 651.7	1.23 ± 0.11	3.5 ± 0.08
3. Patients with stomach and duodenum ulcer	54	8450 ± 817.0	2.5 ± 0.26	3.1 ± 0.11
Reliability of differences		$P_{1-3} < 0.05$	$P_{1-2} < 0.001$ $P_{1-3} < 0.001$	$P_{1-2} < 0.005$ $P_{1-3} < 0.007$

Table 2. General characteristics of patients.

Parameters	Groups		
	I	II	III
Number of patients	22	46	28
Male	9	13	14
Female	13	33	14
Somatic state of patient, degree	1	2	3-4
Middle age, years	32.1±2.6**. ***	53.2±1.4*. ***	62.9±2.4*. **
Body weight, kg	76.5±3.5	77.5±2.2	74.5±2.4
Height, cm	167.5±2.4	165.7±1.2	165.9±1.2

Note: * – p<0,05 in comparison with group I, ** – p<0,05 in comparison with group II, *** – p<0,05 in comparison with group III.

Table 3. Frequency of development of complications and lethal outcome in early postoperative period for patients of various groups

Parameters	**Subgroups of patients**		
	I	II	III
Number of patients	22	46	28
Extent and character of surgery, degree	2.08±0.08	2.51±0.12	2.71±0.14
Age, years	32.12±2.57	53.22±1.45	62.89±2.39
Days in bed in ICTU	0.83±0.21	2.49±0.35	4.21±1.21
Total amount of days in bed	6.62±1.42	21.35±4.64	27.35±5.23
Frequency of development of complications, absolute number	-	9	14
Lethal outcome, absolute number	-	-	2

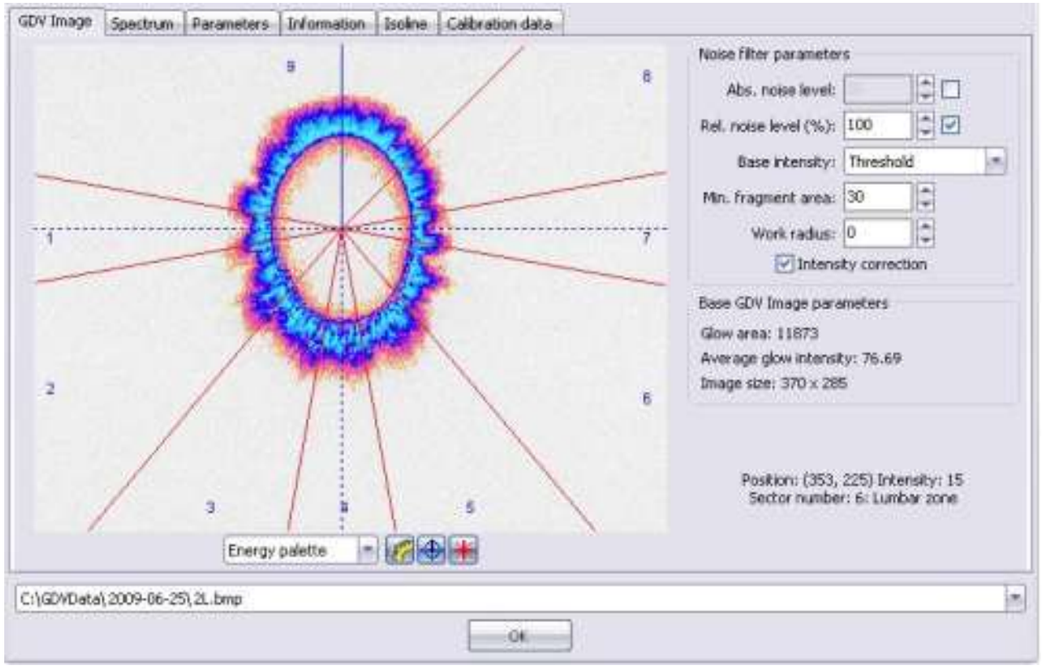

Fig. 1. BEO-gram of a finger with calculated parameters in accordance with mathematical principles of image processing presented in [5].

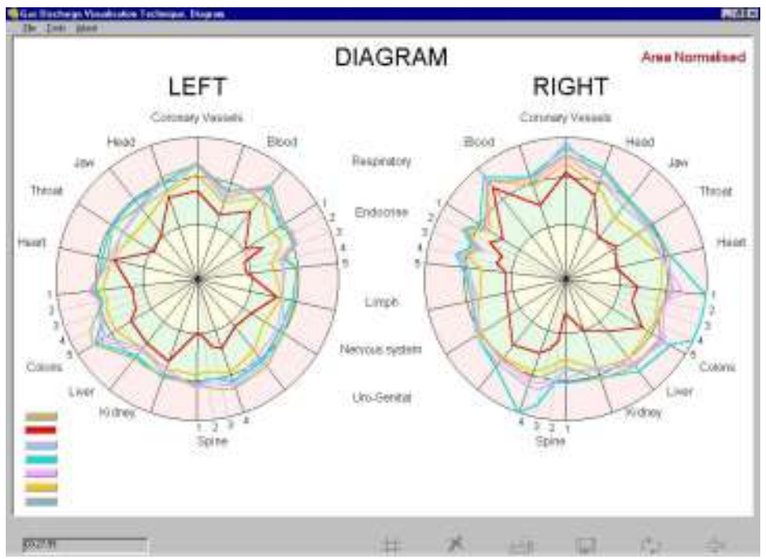

Fig.2. Diagrams showing the GDV parameter JS distribution for the various organ systems in accordance with the acupuncture principles of Traditional Chinese Medicine. Data taken from the same person during the year. Middle line – measurement taken a day before the appearance the influenza symptoms.

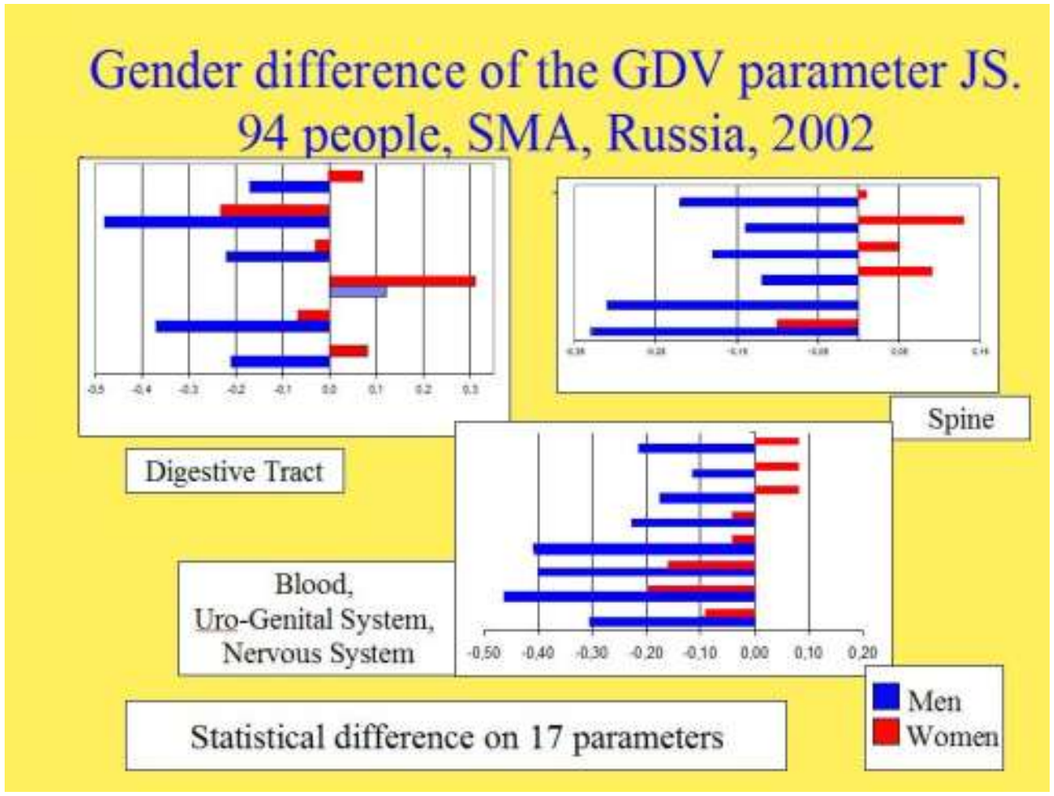

Fig. 3. Gender difference of the GDV-gram parameter JS for different systems

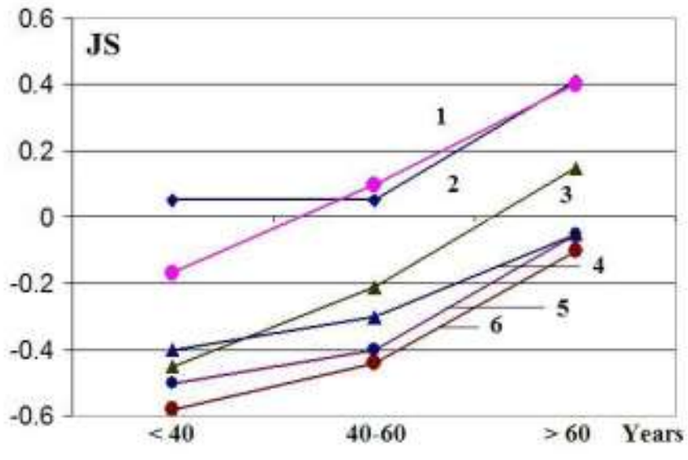

Fig. 4. Age dynamics of GDV-gram parameter JS for a group of 130 people. Body Systems: 1 – head; 2 – throat; 3 – colons; 4 – uro-genital; 5 – nerves; 6 – endocrine.

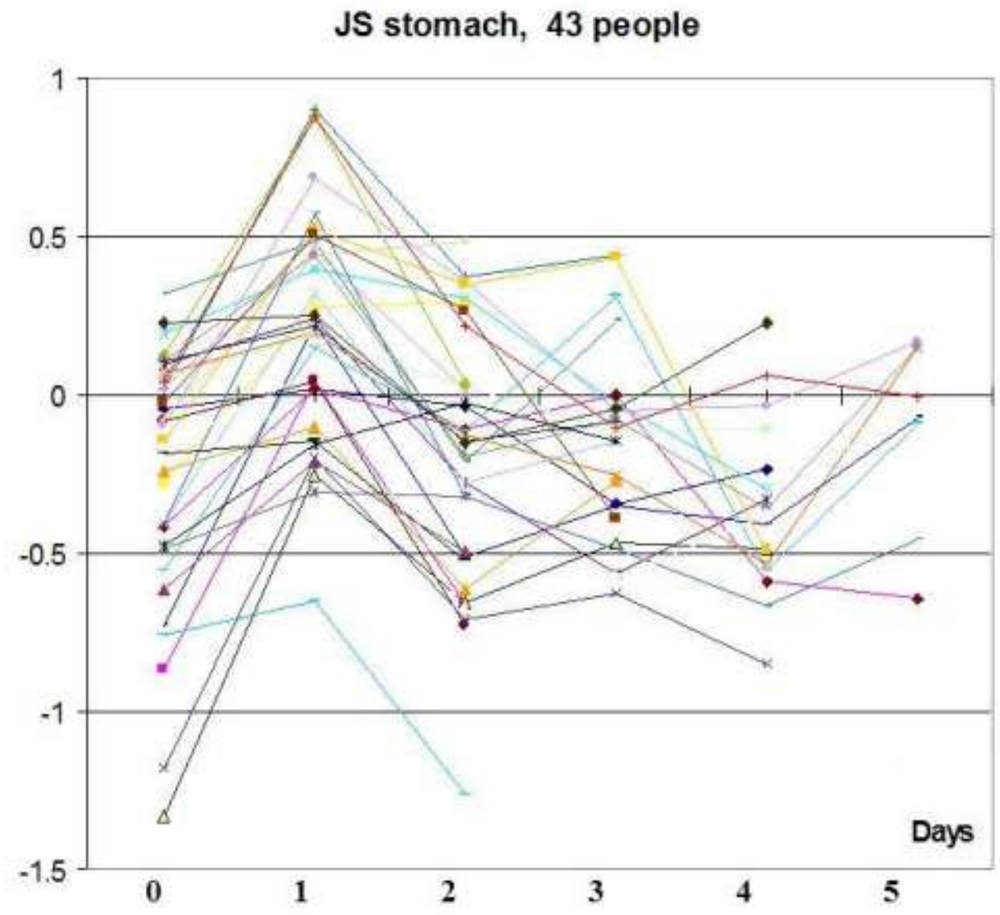

Fig. 5. Trend of JS index of GDV-grams for the right hand in early postoperative period for 43 people.
Stages: 0 – before surgery, 1 – first hour after surgery, 2-5 – days after surgery.

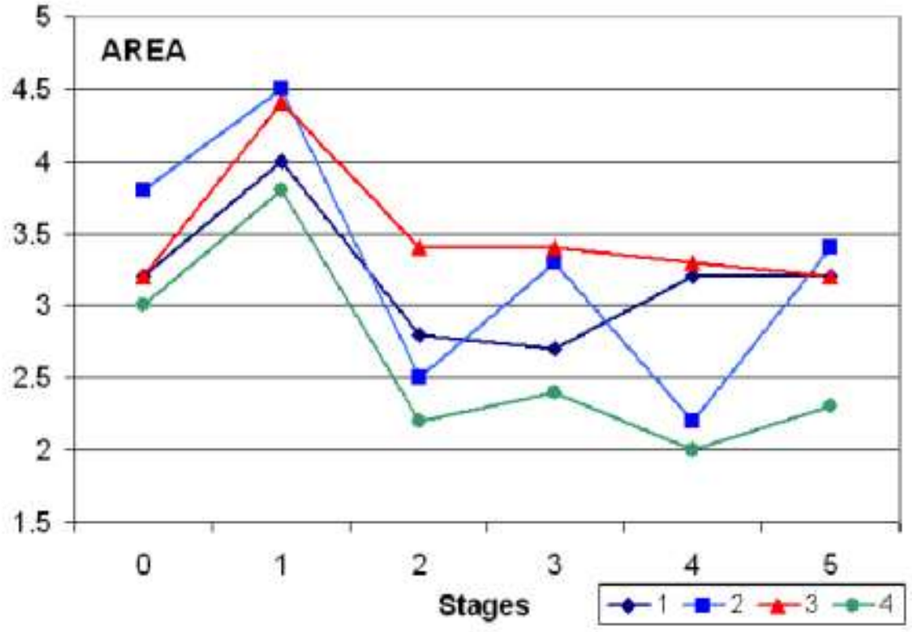

Fig. 6. The dynamics of "Normalized Area" for the right hand in postoperative period after different surgeries for patients of II group.
Stages: 0 – before surgery, 1 – first hour after surgery, 2-5 – days after surgery. Groups: 1 – Laparoscopic cholecystectomy; 2 – Cholecystectomy; 3 – Stomach and duodenum surgery; 4 – Large intestine surgery.

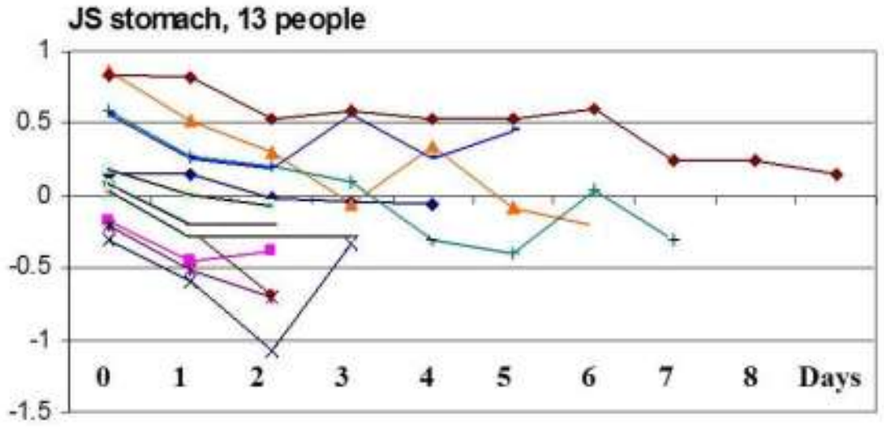

Fig. 7. Trend of JS index of GDV-grams for the right hand in early postoperative period for patients of the most severe subgroup III in the 3rd (abdominal) and 4th (intestinal) anatomical groups. All patients had complications in the recovery period after the surgery, including lethal outcome for two people
Stages: 0 – before surgery, 1 – first hour after surgery, 2-8 – days after surgery.

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