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Analysis of the Bioelectrograms of Bronchial Asthma Patients

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Abstract

An analysis of the data which examines 247 patients with bronchial asthma compared to 56 practically healthy people is presented to demonstrate a practical medical application of gas discharge bioelectrography. 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 gas discharge visualization (GDV) are reviewed. A summary of recommendations for GDV bioelctrography for medical applications is presented. This paper is designed for physicians (especially pediatricians, pulmonologists and allergists), reflexo-therapists, homeopaths, other physiotherapists and psychotherapists, and all those who commonly manage bronchial asthmatics and other chronic conditions with an acute exacerbation component.

Introduction

The Gas Discharge Visualization (GDV) Bioelectrography (BE) technique is a practical application of the new fundamental direction for biomedical sciences - quantum informational biophysics [Korotkov, 1998, 2002]. BE enables the practitioner to record and quantitatively estimate the glow arising close to the surface of a subject exposed to a high voltage electromagnetic field (i.e. GDV). This includes investigation of photons, electrons and other evoked or emitted particles upon stimulation by this electromagnetic field and gas discharge. Biologic emissions become stronger under gas discharge influences and can be captured and visualized. The resultant gas discharge image (GDI) represents a spatially distributed group of glow areas having relative, and different brightness characteristics. The computer analysis of changes in the GDV-gram includes characteristics of its general and local parameters and sector deviations; hence, the basis for parametric analysis leading to clinically relevant data involves research into amplitude and spectral characteristics of the GDI video-signal.

The foundation for sector analysis lies in traditional Chinese medicine's (TCM) identification of energetic body channels which perform the function of energoinformational communication both inside individual organs and systems, between functional systems (FS) and between the organism and the associated environment.

A GDV-gram evaluation is a non-invasive, painless and quick examination; it fosters ready compliance, and thus can be performed in serial analysis tracking courses of therapy or under the influence of various factors.

Because of the high sensitivity of the GDV-gram to changes of a patient's state, various prerequisites for its use in monitoring of functional status and individual reactions to various clinical situations are required. Situations such as loading tests, medications and methods of treatment [Alexandrova et. al., 2001; Savitskaja, 2001] and for screening examinations including the estimation of health status of sportsmen, people in professions requiring high endurance and to diagnose functional systems with weak energy prospectively so as to design preventive strategies are but three examples. Overall, GDV-graphy applications can contribute to the rise and effectiveness of complementary informational therapy [Alexandrova et. al., 2001].

Integration of the GDV technique into practical medicine is often perceived as difficult because of the frequent non-specific character of changes in its integral parameters for various diseases. The lack of interpretation methods which define deviations in energo-emission process levels is yet another. A fundamental precept of the individual GDV-gram's parameter changes is its unique characterization of a particular patient's energy state rather than a nosologic form. In fact, the energo-information profile of the whole organism in its interaction with the environment can influence the electrical properties of the skin and depends upon the patient's age, psycho-emotional state, severity of underlying pathologic processes amongst other factors [Korotkov, 1998, 2002].

The present study was based upon a four year experience with GDV-grams to study diagnostic opportunities of 247 patients with bronchial asthma (BA). Experience generated now allows for a recommendation on a protocol for the characterization of application and analysis of GDV BE for this group, relative to a normative group of 56 practically healthy people.

Description of the method

The GDV-gram is registered from the finger-tips of hands of the investigated person. Recording of the GDI and its processing are performed using "GDV Camera" complex and "GDV Processor" and "GDV Diagram" software (developed by «Kirlionics Technologies International», St. Petersburg, Russia). This medical instrument used to perform the GDV-graphy analysis conforms to the requirements of safety normative documentation, and its clinical application authorized by the Committee of New Medical Equipment of Ministry of Health of Russia, and the state standard of Russia from 1999.

The novelty of the technique is connected with the sophisticated technology of computerized GDV-graphy, particularly with the application of digital video equipment and specialized mathematical methods which enable the quantitative analysis of patterns of energo-emission processes to be achieved [Korotkov, Korotkin, 2001]. Not only does this approach allow for individualized medicine through the estimation of a patient's state and approaches to treatments, but also the BE technique opens up novel opportunities to investigate the resultant effects of medications and therapies; a secondary, and as important byproduct of this study is the ability to forecast probabilistic side effects of these treatments.

Conditions of the GDV BE registration:

The following protocol was developed to best insure uniformity in data gathering, analysis and interpretation, and reproducibility for GDV techniques, based upon clinical experiences and empirical observations:

1. To obtain a reliable analysis, it is preferred to examine patients in the morning before breakfast or in the first part of the day.
2. Factors which may interfere with the analysis:
   * other diagnostic procedures being run concomitantly
   * medicines, natural substances and supplements

* food intake (preferred to wait at least 3 hours after meals)
* smoking
* alcohol and other drugs
* menstruation in women

3. For serial measurements, recurring registration of GDV-grams should be performed at the same time, by the same doctor, in the same room with constancy of temperature, humidity, air composition and maintenance thereof through ongoing ventilation and heating system controls.

4. It is necessary to establish comparable conditions of psychological and physical comfort for the patient, with specific attention to distractions and stressors; i.e. a quiet, calming environment.

5. It is important that routine employment of required GDV device calibrations be maintained, including that with the test-objects.

Methods of analysis of GDV-grams

Specially designed programs allow for easy calculation of GDV-gram parameters generated in the routine process of patient investigation.

To properly characterize the GDV-gram the following indices are used: **GDI background area, normalized area, integral area coefficient, emission coefficient, form coefficient, fractality coefficient** along with dispersions of all mentioned parameters.

GDI background area is an absolute value and is measured in pixels.

Normalized area is the ratio of GDI area to the area of the inner oval - a non-informative part of the image and is obtained as a result of placing the finger onto a GDV camera electrode; as essentially a background or baseline value, it is reported in relative units.

Integral area coefficient is a calculated characteristic according to the formula:

$$JgS = \ln\frac{S}{S_1} / \ln\frac{S'}{S'_1},$$

The constituents are: JgS – Integral area coefficient, S – GDV background area, S_1 – inner contour area, S' – are of ideal image, S'_1 – are of the inner contour of an ideal image.

Integral area coefficient is a relative value and shows the extent to which the GDV-gram area of the examined patient deviates to one or the other side from an ideal model. Naturally, this parameter can have a positive or negative value; moreover, in the case where it is equal to zero, it indicates that the test image and the area of the ideal model is the same.

Emission coefficient (EC) characterizes the power of small fragments deleted from the GDV-gram and is measured in pixels.

Form coefficient (FC) is calculated according to the formula: FC=L*2/S, where L is the length of the GDI external contour and S is the GDI background area.

Fractality coefficient (FrC) is calculated according to the algorithm of Mandelbro as a ratio of the lengths of GDI parameters, provided that the GDI is registered several times and averaged. Form and fractality coefficients show the degree of irregularity of the GDV-gram external contour.

In the process of research, separate measurements to obtain the values of these indices for each finger, average values of the indices for fingers of both hands, and particularly individual assessment for the right vs. the left hands is obtained.

For evaluation of the functional state of particular functional systems (FS) and organs, these parameters are calculated in the sectors of FS's projecting zones as introduced by P. Mandel [1986] and interpreted by K. Korotkov [1998]. Evaluation of functional states for different FS is done by estimating the heterogeneity of the GDV-gram in particular sectors, the degree of aggressive signs intensity on the right and left hands for different interconnected sectors, as well as for individual fingers. Based upon this evaluation and in consideration of the clinical picture of the disease, analysis is made and conclusions drawn.

It is noteworthy that GDV-gram parameters which fall within the zone of relative health as characterized by the average range determined for practically healthy people, do not exclude the presence of chronic diseases to which a patient may have good compensatory capabilities. Reductions in bioenergetic activities of the patient, e.g. in the phase of resolution of an exacerbation of chronic diseases during rehabilitation (such as resolving asthmatic crisis) might be the basis for prescribing methods of therapy. This might include promoting and activating energy homeokinesis and renewal of normal interaction of all the FS of the organism.

Clinical observations with GDV-bioelectrography when people have vegetative instability results in considerable asymmetry of parameters' values for the left and right hands (i.e. lateralization); this data can infer evidence of a decreased adaptation reserve of an individual's energy homeokinesis, and perhaps be viewed as predictive. If the 'weak zones' with the modified values of parameters in the presence of clinical symptoms and pathology are correlated with the corresponding FS, the patient could be assessed and managed for these dysfunctions and energetic imbalances through a composite program including both conventional and complementary modalities. GDV-bioelectrography could help assess the monitoring for efficacy and re-establishment of a normalized auric field such as found in practically healthy people.

Experimental Data

By performing daily monitoring the **repeatability of BE parameters' values** was investigated for 38 practically healthy people and in 30 bronchial asthma (BA) patients. For the healthy people the values of amplitudes of the GDV-gram parameters' fluctuations, daily average and average 10-minute, amounted to 4.1 and 6.6%, for BA patients - respectively - 8.6 and 7.7%. A group of individuals (10% of all examined, BA and healthy people) was identified in which the variability of the GDV-gram parameters registered considerably higher - up to 18% over the daily average value. In analyzing this group, a common trait distinguishing them was the pronounced lability of psychological status and vegetative instability. Significant correlations ($r>0.5$, $p<0.05$) were revealed between the indices of vegetative balance and parameters of the GDV-grams. This was interpreted to confirm the contribution of the vegetative (autonomic) nervous system to the mechanisms of system energo-informational regulation. Good repeatability and reproducibility of the GDV-grams' parameters were found for the absolute majority of the investigated healthy people and BA patients (in 90% of the cases).

Another consideration besides vegetative state is the high sensitivity of the GDV-gram to reflect changes in the psycho-emotional status of the patient; although acknowledged, this aspect is not covered in the present report. Dr. K.Korotkov [2002] devised a system of classification of GDV-grams which incorporates characteristic psycho-emotional states and their clear, distinguishable registrations and is referenced here.

The GDV-grams of a practically healthy individual with basal metabolism and in harmony with the environment (i.e. non-stressful situation), is characterized by a uniform fluorescent corona (fig. 1) and located as the middle ring (fig. 2) of the GDV diagram.

The GDV-gram of a patient with BA attack is distinguished by an 'outburst' of glow in the respiratory zone of the fifth finger (fig. 3,4). At the same time this notion has a non-specific character as a similar 'outburst' of glow in the respiratory zone of the fifth finger may be detected in a patient with a left-side pneumonia.

Average values of indices of the GDV-gram in the groups of patients and healthy people are given in table 1.

Groups of the investigated people	GDV parameters			
	FC	FrC	EC	Area
1. BA patients	132.8 ± 29.5	10.8 ± 2.41	1.23 ± 0.11	6740 ± 651.7
2. Patients with stomach and duodenum ulcer	109.9 ± 24.4	8.9 ± 1.84	2.5 ± 0.26	8450 ± 817.0
3. Healthy people	93.8 ± 20.9	7.47 ± 1.67	0.48 ± 0.05	10869±1051.1
Reliability of differences	–	–	$P_{1-3}< 0.001$ $P_{2-3}< 0.001$	$P_{1-3}< 0.05$

Table 1. Average values of the GDV-gram parameters in the groups of patients and healthy people

Diagnostically most informative are the indices which characterize the area of GDV-gram. As we see from table 1, area values for healthy people are always greater, as compared to that of unhealthy patients. For the BA group the GDI area is larger in proportion to greater severity cases, higher degrees of pulmonary obstruction and more pronounced dysfunctions of the microcirculation in the lungs as seen in diagnostic scintigraphic data. Emission coefficients (EC) statistically differ between the groups, as well, while fractal coefficients (FC and FrC) demonstrate less significant difference.

The GDV-gram of BA patients both overall, and in the restorative phase after acute exacerbation is characterized by lower values of area indices and the area integral coefficient (JgS) as compared to practically healthy people. JgS values for healthy people are 0.56±0.35 on the left and 0.54±0.33 on the right, whereas for BA patients 0.42±0.64 on the left and 0.51±0.69 on the right (P=0.01). The conjugacy of JgS changes can be revealed in sector or zone analysis by correlations with the respiratory meridian notion in TCM. Table 2 demonstrates the difference in JgS average value in these zones, which do, and do not correspond to the respiratory system. Table 3 illustrates a reliably significant correlation between JgS values in the zones for respiratory systems.

Zones	Transverse colon*	Small intestine	Thorax zone of spine*	Sacrum	Respiratory system	Kidneys
	1	2	3	4	5	6
JgS average value	0.07	0.39	0.07	0.50	0.07	0.52
Reliability of differences	$P_{1-2}< 0.01$		$P_{3-4}< 0.001$		$P_{5-6}< 0.001$	

Table.2 Difference of JgS average values of zones, which correspond* and which do not correspond to the respiratory system for BA patients (n=122)

Zones	Transverse colon	Thorax zone of spine	Respiratory system
Transverse colon		0.69 p< 0.0001	0.65 p< 0.0001
Respiratory system	0.65 p< 0.0001	0.61 p< 0.0001	

Table.3 Coefficients of correlation of JgS values in the zones, corresponding to the respiratory system for BA patients (n=122)

This data confirms the clinical significance and high correlation for sector diagnostics in the analysis of the GDV-gram.

Monitoring of the dynamics of change of GDV-gram's parameters applying one-time medical treatment and in the process of course therapy.

Observations pre and post daily therapy as well as day-to-day monitoring via GDV-grams could detect substantive changes which correlate with the clinical course and effects of both medications and treatment modalities. In several instances it was able to forecast possible side effects of therapy. Correlations were able to be established between GDV-patterns' transformations and the dynamics of leading pathogenetic processes for BA patients, including external respiratory dysfunction, microcirculation in the lungs, and other markers of bronchial inflammatory processes [Alexandrova et. al., 2001].

GDV parameters registered energoinformational changes which demonstrated reliable differences on the influence of glucocorticosteroids relative to the ways of their injection: positive under inhalation and inhibitory under intravenous infusion. This significant depression of bioenegetic activity due to intravenous infusions suggests yet another rationale for limiting its application as a type of therapy so as to avoid side effects systemically from treatment.

Noteworthy was the positive influence in bioenergetic activity measures for the patient after a course of medical acupuncture. Reliable increase of JgS in the process of reflexotherapy preceded positive functional shifts in clinical treatment outcome. Speculation that energoinformational regulation of the patient 's activity is one of the main mechanisms for the acupuncture effect observed.

Yet another modality, the homeopathic medication "Pumpan" administered to 22 BA patients with cor pulmonale rendered positive and clinically distinct energoinformational effects relative to both 'placebo' and inhibitory agents such as Nitrosorbid. Improvements in bioenergetic activity for patients was noted within two hours after Pumpan, and accompanied by the increase of peak speed of expiration ($p<0.01$), decrease in right atrium burden, and improvement of the process of repolarization of the heart ventricles with diffusive character ($p<0.05$). These studies using GDV bioelectrography gave further evidence for the recommendation that Pumpan be used as an additional remedy for complex treatment approaches for BA patients with the subset of cor pulmonale.

In another clinical application, GDV techniques performed on 70 BA patients with pathologic gastroduodenum zone findings (e.g. erosive gastroduodenitis, stomach and duodenum ulcer) reflected changes on the system character of inflammation of mucous membranes of patients - atopics with a characteristic energoinformational exchange. This analysis demonstrated similarity in the dynamics of an inflammatory process shared by both the bronchi and the gastroduodenum zones. Moreover, a result of the GDV technique for this group of patients provided further energetic support for the use of acupuncture as a method to reverse and rebalance both conditions. Complex therapy with the application of acupuncture for BA patients with pathology of gastroduodenum zone was accompanied by a more pronounced improvement of patency of airways, the decrease of levels of the bronchi inflammation markers, and recovery of the disturbed balance of energy exchange according to BE data ($p < 0.05$).

Discussion

Indications and contraindications to the application of GDV technique.

It is advised that GDV bioelectrography be used as a screening exam to subclass relative groups at risk of BA development (e.g. individuals with food or medicine sensitivities or allergies, atopics with digestive system and/or skin disorders). This assists in prophylactically addressing these issues for BA prior to acute exacerbations and to bring under clinical control.

For BA patients, serial application of the GDV technique for the monitoring of the patient's functional systems during the process of treatment and rehabilitation can be valuable in correlating the energetic influence of medications and treatments, and earmark patients where prophylaxis against potential side effects of various therapies can be realized.

The GDV-gram information gleaned can also provide clinically relevant indications for non-medicinal and homeopathic (complementary) methods of treatment, and provide for tracking clinical efficacy in an objective fashion.

Indications for prescribing acupuncture as a treatment modality specifically included a decrement in bioenergetic activity and negative values of the JgS indices.

Although no adverse effects were documented it is, at this time, not recommended to routinely apply GDV bioelectrography for patients with acute myocardial infarction and for those with cardiostimulators [Korotkov, 2002].

Effectiveness of the GDV technique application.

Introduction of modern GDV bioelectrography techniques and software analysis into mainstream medical practice can enrich and expand the clinical assessment tools beyond that presently employed, and should be used in concert with both clinical acumen and existing diagnostic modalities to monitor clinical settings. Unique advantages include the understanding of the influence of medications relative to their energoinformative properties for individual patients. The results provide novel ground to better individualize the treatment regimen.

Owing to GDV technique's capabilities of multisystem evaluation, patients with multimorbid pathologies and synergies of disease processes, GDV can aid in assessing, monitoring and selecting appropriate therapies and determine their efficacies. Roles for non-standard modalities such as acupuncture and homeopathy can be legitimately assigned.

Conclusion.

Patterns of GDV-grams of fingers from BA patients correlate with known main pathogenic identifiers giving evidence of the clinical usefulness, informativeness of BE and its complementary role in clinical medicine. Introduction of this GDV technique into the medicine practice for BA considerably widens the objective diagnostics and clinical monitoring capabilities of the patient's global state; moreover, its use contributes to greater individualization of therapeutic options. An obvious result of this work is in its application to the study of mechanisms and outcomes for both traditional medical remedies as well as an array of complementary strategies such as acupuncture and homeopathy.

Possible new spheres for GDV bioelectrography could include the investigation of medical remedies, infections, and non-infection allergens upon the human body through the biologic fluid auras *in vitro*. Correlations could then be drawn between this subset and the whole organism. GDV-graphy as applied to professional activities competencies, sports medicine specialization, and in psychotherapeutic practice are but three further areas of potential study. Due to its portability, ease of use, and wide fount of diagnostic energetic data, an unlimited array of potential applications await the curious, and discerning clinicians and researchers in medical applications.

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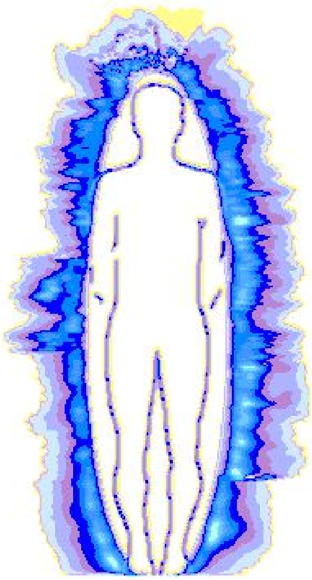


Fig.1. GDV-gram of a practically healthy person

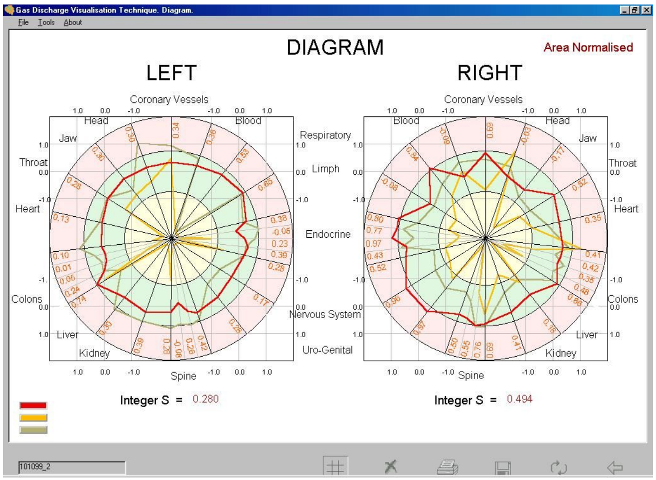


Fig.2. GDV-diagram of a practically healthy person

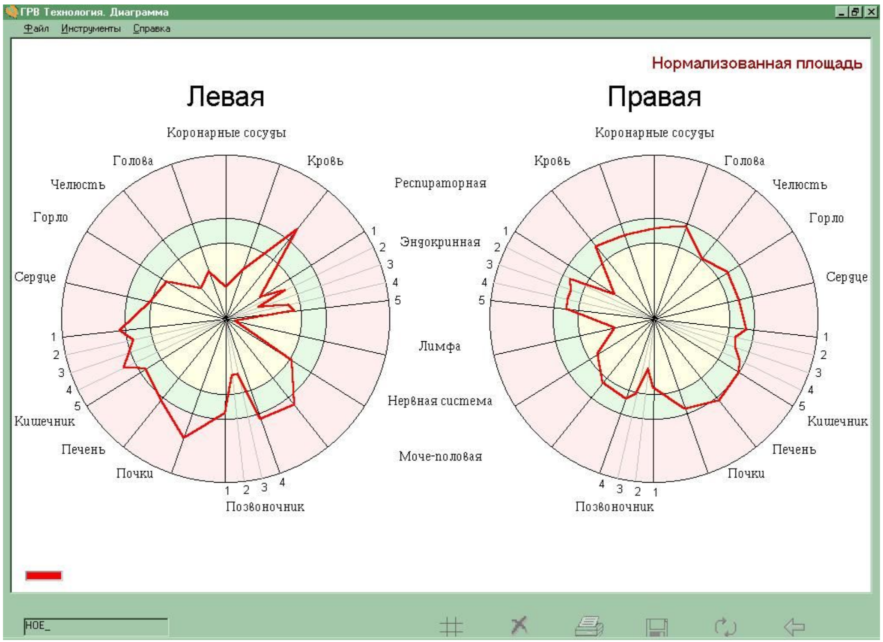
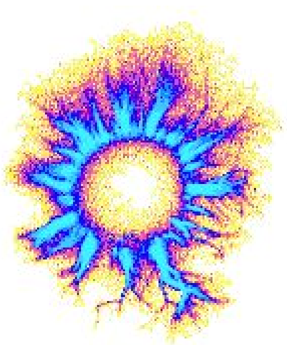


Fig.3. GDV-diagram of a person with bronchial asthma.



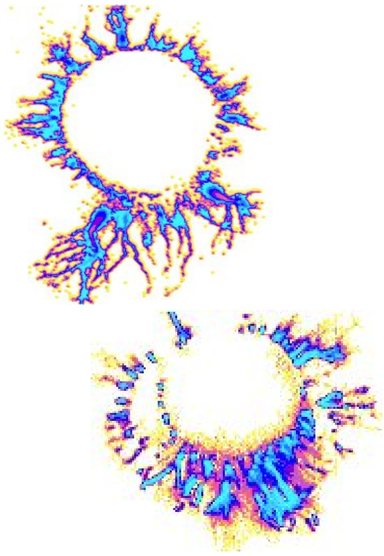


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Fig.4. GDV-grams of people with bronchial asthma.