Health Diagnostic Option for Telemedicine System

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Abstract: Modern medical science has made significant advances in the study and treatment of the symptoms of various diseases. It is also called symptomatic treatment [1]. It is gradually replaced by medicine, which studies the pathogenesis of the very nature of the onset of diseases, integrative medicine [2]. This branch of medicine brings the disparate facts of various analyzes and studies into a single information database, processes it and determines the root cause of the patient health issues. The overriding task of integrative medicine is to postpone the onset of these symptoms (manifestations of diseases) as long as possible. There is a boundless need for a special device designed to accurately obtain instrumental and laboratory information, convert it into digital form, store it, and transfer it to the specialists for the analysis resulting in taking appropriate therapeutic and prophylactic measures (including a remote consultation option).

Keywords: symptomatic treatment, integrative medicine, telemedicine, computer appliance.

Introduction

For a long time, the main sources of information about the patient condition and his or her diagnosis were his/her complaints, anamnesis, and a doctor's examination (which introduces a subjective factor and largely depends on the adequacy of the patient per se and the qualifications of the physician). Later, instrumental and laboratory examinations were added, which greatly facilitated the doctor's task.

At present, the tasks of more accurate acquisition of instrumental and laboratory information, its transfer into the digital form, its preservation and transmission to the specialists for the subsequent analysis, followed by the adoption of appropriate therapeutic and preventive measures (including the remote consultation option) have come to the fore.

All information is stored in digital form and on various media. It became possible to more accurately compare subsequent repeated instrumental and laboratory examinations and track the results of therapeutic and preventive measures in dynamics (including *via* the use of mathematical programs), along with making appropriate adjustments in terms of the time, and creating an electronic passport of the patient and his/her mathematical model.

Materials and Methods

To achieve these goals, we propose to use the following provisions:

1. The human body is a single entity, in which all its parts are in steady interrelationships.

2. At present, for a number of reasons (there are many of those), the approach to studying the health condition of a person (diseases, symptoms) is, so to speak, 'disjoined', i.e., human body is studied separately by its systems and individual organs.

3. The novelty of our proposed methodology is in an integrative approach to studying the human body.

4. The condition of the cardiovascular system (CVS) is taken as an indicator, as the most reflecting the complex state of the entire body (at least, at the moment, there is not more adequate information about the relatively quick reaction of the organism in response to any changes in homeostasis).

5. Any changes (diseases, the presence of symptoms and syndromes) in homeostasis are interpreted as a manifestation of the defense mechanisms (or their breakdown) in the human body in response to the effects of the external environment and internal processes in the body itself.

6. The sooner objective information about prepathological and pathological changes in homeostasis becomes available, the faster it is possible to take preventive and therapeutic measures, as well as to control their impact and, if necessary, correct them, without waiting for the development of catastrophic changes in the human body.

There are many methods for determining the general health of a person. We used the *OMEGA-M* computer appliance (hardware and software complex).

OMEGA-M was designed to analyze the biological rhythms of the human body, isolated from the electrocardiography signal in a wide frequency band [3]. The method is based on a novel information technology for the analysis of processes related to the biorhythms, *fractal neurodynamics*. When creating the system, the latest achievements of biology, physiology, genetics and clinical medicine were used, on the basis of which new highly informative indicators were developed for assessing the functional state of the human body.

The *Omega-M* computer appliance allows:

- in the screening mode: to determine the level and reserves of the cardiovascular system, autonomic and central regulation, as well as to assess the deviations of these indicators from the norm;

- to evaluate the level of compensation and energy resources of the body at various levels of regulation;

- in the biofeedback mode: to identify the possibilities of self-regulation; to assess and predict the psychophysical condition of a person;

- in the dynamic observation mode: to monitor the functional state of the patient and evaluate the effectiveness of various methods of therapy in the course of carrying out therapeutic and prophylactic measures;

- based on the results of computer analysis, to form a comprehensive medical opinion and issue necessary recommendations.

Omega-M enables the practitioner of any specialization field to monitor the indicators of a patient's functional condition, predict their changes, assess the body reserves and determine the effectiveness of treatment.

Over the years of using this appliance, we have accumulated vast experience, the conclusions from which we offer in this article.

With the help of the *OMEGA-M* software and hardware complex, over the course of 10 years, we have carried out over a thousand medical examinations. *OMEGA-M* allows determining many parameters of the functional condition of the body, but in this short publication, we will focus only on some of those.

We considered the vegetative balance index of the human body indicative of the degree of intoxication. Similarly, we treated the energy curve as an indicator of the functional state of the body systems in charge of utilization of carbohydrates, proteins and lipids (in other words, the level of metabolism).

Our numerous medical evaluations suggested the following: the better the system that determines the degree of utilization of carbohydrates, proteins and lipids in the body, the lower the level of intoxication.

To elucidate the data collected by *OMEGA-M*, an ultrasound examination of the kidneys, liver, gall bladder and pancreas, along with biochemical blood tests, were carried out simultaneously in the same patients. The results confirmed the initial assumptions. If the ultrasound examination showed damage to the pancreas, then the levels of sugar and uric acid in the blood were elevated. High levels of uric acid provoked damage to joints and coronary arteries, causing arthrosis, myocardial infarctions and strokes.

Microliths (sand) in the kidneys indicated a malfunction in the entire gastrointestinal tract. As a rule, this pathology was accompanied by an increase in blood pressure. An increase in the size (edema) of the pancreas was suggesting a difficulty in the release of insulin into the blood (pinched capillaries of the gland) and an increase in blood sugar content. Excess glucose could not be deposited in the form of glycogen in the liver and muscles, a part of it was bound to hemoglobin, causing the onset of the oxygen starvation of the body – i.e., instead of aerobic metabolism, the anaerobic variant with a high content of endotoxins was taking place. In addition, the outflow of pancreatic secretions was also hampered. And this, in turn, caused enzyme deficiency and, as a result, obesity and food poisoning, general intoxication of the body, as well as exacerbation of gout, cholelithiasis and urolithiasis. In case of malfunctioning or removal of the gallbladder, as a rule, pancreatitis was developing, followed by diabetes, arthrosis, and cardiac pathology.

The presence of a parasitic or other infection was aggravating the situation, causing hepatitis, cholecystitis and pancreatitis, accompanied by severe allergies and autoimmune diseases. Knowing this, it was possible, to assess the functional condition of the human body *via* determining the level of intoxication and the energy curve. During mass examinations, as a rule, the *traffic light principle* was quite sufficient: green light meaning no health problems, yellow light implying the necessity to exclude detrimental factors (for example, smoking), and red light denoting the required in-depth medical examination and urgent action.

Results

Here are the results of some case studies.

Study subject K

At 65 years old, he complained of severe weakness, inability to perform any physical work. Examination using the computer appliance (hardware and software complex) '*Omega-M*' showed the presence of severe intoxication of the body. At the same time, parallel ultrasound examination did not reveal any damage to any internal organs. From the anamnesis, it became known that the patient was practicing self-healing: used decoctions of various herbs of his own formulation and manufacture. From the textbook on pharmacology, we know all too well that herbs tend to accumulate in the body and cause poisoning. The patient was asked to stop using such decoctions, and the intake of enzymes and choleretic medications was recommended for cleansing the body. The patient followed our recommendations, and after a short time his health was fully restored.

Study subject M

At 70 years old, she complained at high blood pressure (up to 200), joint pain severely impeding her movements, and high blood sugar content. After examination using the *Omega-M* appliance, the patient was suspected of having and exacerbating chronic pancreatitis and chronic cholecystitis, and all complaints and symptoms were consequences (or complications) of these ailments. This was confirmed by the results of an ultrasound examination and laboratory diagnostics. After the treatment of these diseases, the patient condition improved significantly: her blood pressure decreased, freedom of movements in the joints improved substantially, there was no pain, and blood sugar returned to normal. This is an example of a holistic approach to treatment.

The conventional way of treating her would involve several specialists simultaneously. Blood sugar would be treated by an endocrinologist with the help of stimulants of the islets of Langerhans, and we know that if there is edema of the pancreas and pinched capillaries, then the release of insulin into the blood is problematic, and the stimulation of the islets is harmful; as a result, they would degrade, and it would be necessary to use external insulin intake.

Joints and pain would be treated by a neuropathologist with nonsteroidal anti-inflammatory drugs NSAIDs (diclofenac, Nise®, Movalis®, etc.). This would ensure a temporary analgesic effect, but since these drugs have strong toxicity, the situation would quickly worsen.

High blood pressure would be treated by a cardiologist. According to the standard of treatment, the specialist physician would prescribe antihypertensive drugs, diuretics, statins and acetylsalicylic acid. Altogether, these medications would give a temporary effect, and then the situation would deteriorate due to the toxicity of the listed drugs. Everyone knows the postulate that it is necessary for food to be medicine rather than for medicine to be food. However, it is important to know, what kind of food and in which quantities. During the heat processing of the food, proteins are denatured and fats are emulsified. This is clearly seen in the example of a chicken egg. Before cooking, the protein (egg white) is transparent, but not after it. Sunflower oil changes color and thickens. In other words, the biochemical properties of the products change. Still, the set of enzymes remains the same. It is like changing the security cylinder mechanism in a cylinder lock – and then trying to open it with an old key. With this in mind, we conducted an experiment using various foods and studied their effect on the human body. Three people were selected: 28, 67 and 75 years old. The algorithm of the experiment was as follows: we studied blood sugar, cholesterol, uric acid, biological age, energy curve, and level of intoxication on an empty stomach, immediately after breakfast, one hour later and after two hours; then immediately after lunch and an hour or two after it.

Study subject J (75 years of age)

Blood sugar: 6.9 on an empty stomach, 9.1 after the breakfast, 7.4 an hour later, 7.0 after two hours, 8.0 after the lunch, 8.8 an hour after lunch, 7.9 two hours after it.

Cholesterol in the blood: 5.1 on an empty stomach; after the breakfast, an hour later, immediately after the lunch, and an hour after lunch, the cholesterol levels virtually did not change.

Uric acid in the blood: 151 on an empty stomach -, 312 after the breakfast, 275 an hour later, 180 two hours later, 417 after the lunch, 334 an hour later.

Energy curve: 80 on an empty stomach, 92 after the breakfast, 80 an hour and several hours later, 88 immediately after the lunch and an hour later.

Intoxication level: 160 on an empty stomach, 310 immediately after the breakfast, 210 an hour later, 180 two hours later, 360 after the lunch, 300 an hour later.

Study subject C

At 67 years of age, the development was essentially the same as that of subject J (75 years old), but with a slightly higher rate of change.

Study subject Y

At 28 years of age, although similar dynamics was present, the changes were much smaller, and occurred with the highest speed.

Discussion

Evaluating the results of the experiment, it can be argued that the intake of food is somewhat of a stress for the body, and this pattern directly depends on the amount, type and quality of consumed food and the patient's age. Figuratively speaking, the functional state of the body depends on how and how the systems of the body (gastrointestinal tract, for example) function. Conventionally, for every 100 grams of food, 100 units of various enzymes are needed, and if there are less of them for any reason (pancreatitis, for example), then chronic intoxication (poisoning) of the whole organism occurs. This is accompanied by an increase in blood sugar and uric acid (uric acid salts are deposited in the kidneys and joints in the form of urates, and these, in turn, take calcium from bone tissue, provoking osteoporosis), and obesity is also possible. Experimental studies showed that different types of food affected the body in different ways and caused different levels of intoxication.

The time required for cleansing the body from intoxication is suggestive of the functioning of all organs, and, accordingly, of its functional state. Studying the problem of intoxication results in a possibility to control the effect of some particular food and drink (alcohol, for example), or the effect of medications prescribed by a doctor, on the patient's body.

Conclusion

On the basis of the computer appliance (hardware and software complex) '*Omega-M*' (or its analogs), a complex analyzer of medical information about a patient can be created based on the *traffic light principle*. This device will facilitate the development of a patient condition personalization scheme containing many parameters. In addition, due to such model, it is possible to track the effects of various medical procedures and medications on the body.

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