Electro-acupuncture drug testing. Overview

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Electropunctural medicamental testing. Review

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SUMMARY

Electropunctural drug testing is one of the fundamental components of electropunctural diagnostics. The purpose of the review is an objective analysis, based on currently available publications, of the advantages and disadvantages of the drug testing method, its objectivity and reproducibility. The prospects and breadth of the use of drug testing in various fields of practical medicine for non-invasive selection of drugs are shown.

Key words: drug testing, electroacupuncture

RESUME

Electropunctural medicamental testing is one of the principal elements of electropunctural diagnostics. The aim of the review is to provide objective analysis of its advantages and disadvantages, objectivity and reproducibility basing on literature data. Medicamental testing has successful application in different areas of practical medicine and is perspective for noninvasive selection of remedies.

Keywords: medicamental testing, electroacupuncture.

In one of the previous publications, drug testing was considered as a phenomenon that gave rise to a wide range of diagnostic and treatment methods, united by the terms "informational" or "energy-informational" methods [1]. This article provides an overview of the use of electropuncture drug testing of diagnostic and therapeutic drugs, including homeopathic ones, as well as the reproducibility and effectiveness of this method.

Preservation and restoration of human health is closely related to accurate diagnosis and optimal selection of methods and means of treating the disease. In this regard, methods that allow such procedures to be carried out are of particular importance, since the individual sensitivity of a particular person is the most important factor that should be taken into account in the treatment of any disease. The recent allergization of a modern person makes it necessary to use invasive allergic diagnostic testing with great caution, since there is a high probability of developing an immediate type of hypersensitivity with various

clinical manifestations up to anaphylactic shock [2]. Thus, the advantage of using non-invasive methods for the selection of drugs or other biologically active substances, such as drug testing, is beyond doubt. At the same time, the problem of drug testing has been and continues to be the subject of a lively scientific discussion, in which various opinions, both pro and contra, are expressed.

In this regard, the purpose of this review is an objective analysis based on currently available publications of the advantages and disadvantages of the drug testing method, its objectivity and reproducibility.

Materials and methods

Overview existing published research, concerning electropuncture drug testing was carried out according to the results of a systematic search of publications carried out during the period from 1980 to 2015. on electronic databases eLIBRARY, SCISEARCH, MEDLINE, EMBASE and PubMed by keywords: electropuncture testing, drug testing, drug test, electrodermal testing, electroacupuncture, ElektroHauttestes, Elektroakupunktur Medikamenttestung, EAVMediktestAnten.

The origins of the emergence of non-invasive selection of therapeutic agents

In practical medicine, non-invasive selection (in modern terminology - testing) of a therapeutic agent was first used in ancient China, when a sample was placed on the corresponding acupuncture meridian or organ, and the response was assessed using pulse diagnostics [3]. In 1966, R. Nogier discovered the effect of changing the pulse of the radial artery in humans when exposed to acupuncture points of the auricle. P. Nogier first called this effect the auriculocardial reflex, and later
- vascular autonomous signal [4, 5]. It was found that changes in the pulse occurred not only when the points of the skin on the auricle of a person were stimulated, but also when homeopathic preparations, as well as nosodes and organopreparations were brought to certain points, which, in fact, reaffirmed the possibilities of non-contact approbation of certain therapeutic drugs in vivo.

However, only thanks to the research of R. Voll, who developed the method of electroacupuncture diagnostics, it became possible, using instrumental methods, based on the electrical resistance of certain points of the skin, to objectively and non-invasively determine the correspondence of a particular therapeutic agent to a particular patient. This method, which was later called "drug test" or "drug testing", and in the English-language literature - electrodermal testing, is the phenomenon discovered in 1954 by R. Voll together with M. GlaserTürk [6-8]. The drug testing phenomenon was

opened quite by accident. R. Voll noticed changes in the electrical conductivity of some points on the skin when the patient had a medicine bottle or medicine in his pocket. In order to identify this phenomenon, drugs were placed on a metal plate in contact with an electrical measuring circuit. In the course of experimentation, it turned out that this phenomenon is reproduced even when the medication itself is not in direct contact with a metal plate, but is, for example, in a glass container. Thus, the measuring circuit was born, which is used in modern practice of drug testing. In 1975, the doctor F. Morell, who is better known as the founder of bioresonance therapy, together with the engineer E.

Further development of the R. Voll method was made by the doctor H. Schimmel in 1978. The test developed by him was based on R. Voll diagnostics, including drug testing. The test developed by him H. Schimmel called "autonomous reflex test" or "vegetative reflex test". Subsequently, in the literature, it began to be referred to as "VEGAtest" since the company "VEGA Grieshaber KG" (Germany) was the first to manufacture equipment for the implementation of this diagnostic method [10].

Hardware complexes for drug testing have been widely used for more than thirty-five years in different countries of the world - Germany, Japan, China, France, Denmark, Russia, CIS countries, and somewhat later began to be used in the United States [11–13]. The possibilities of these methods have also expanded. So, for example, in the article by A. Weber, published in 1997, dedicated to the 40th anniversary of the R. Voll method, new possibilities of using non-invasive testing were presented, in particular, testing for allergies, individual selection of homeopathic and allopathic drugs and their doses in the treatment of diabetes, determination of food intolerance, the presence of ecotoxins, use in orthopedic dentistry to determine the compatibility of materials used for prosthetics, etc. [14]. However, despite such a wide distribution, the physical mechanism, underlying electropuncture testing is not yet fully explained. Attention is drawn to the fact that there are very few publications in which the possible mechanisms of this phenomenon were studied or even considered.

Assumptions about the electrical (electromagnetic) nature of the phenomenon of drug testing were expressed even at the time when this effect was only discovered [6–8, 15]. There is an opinion about the participation of biophotons in this process [16]. It is quite possible that it is for this reason that in some devices, for example, by the company "Pitterling Electronic, GmbH" (Germany), the ampoules of the tested preparations are illuminated with red light. Recently, the scales have been leaning towards the electrical (electromagnetic) hypothesis, and it is believed that drug testing is based on the phenomenon of interference of antiphase oscillations of a drug with pathological oscillations of an organ, system and the whole organism [17]. This assumption can be a logical "bridge" between the phenomenon of drug testing and

bioresonance therapy.

A detailed study of drug testing showed that charged drugs at the moment they are connected to the measuring circuit create an exponential electrical impulse in it, which, in accordance with the Fourier transform, briefly excites the frequency spectrum in the range from 5 Hz to 200 kHz, which causes a response of the body, which is fixed [18].

Electro-acupuncture testing methods according to R. Voll and H. Schimmel received their further evolutionary development as they were used in practical medicine: individual selection of allopathic and homeopathic medicines, testing of allergies, including food allergies, of various toxicants, as well as determining the biocompatibility of materials in dentistry, etc.

Electro-acupuncture testing in the individual selection of allopathic and homeopathic medicines

Allopathic medicines

R. Voll testing was used for individual selection of the optimal dose of oral hypoglycemic agents such as Chlorpropamide, Glyburide and injectable Insulin (NPH Iletin U100) from 10 to 60 units [19]. The examination was carried out in 55 patients (33 men and 22 women over the age of 30 years) with an established clinical diagnosis of diabetes. The median values for the optimal defined doses were 8.196 mg for Glyburide, 436.63 mg for Chlorpropamide and 24.582 mg for Insulin NPH. The dose of Glyburide, according to drug testing, was slightly higher for men than for women. The results showed the effectiveness of drug testing as a complementary method for the physician in determining the appropriate dosage of drugs for the patient.

Evaluation of the effectiveness of treatment of candidiasis of the digestive system using individually selected daily doses of the antifungal drug Nystatin was carried out using the method of R. Voll [20]. Clinical microbiological examination was carried out in 45 patients aged 18 to 45 years diagnosed with various forms of candidiasis of the digestive system - oropharyngeal, candidal eosophagitis, stomach and intestinal candidiasis. The main group of 27 patients (10 men, 17 women) received Nystatin therapy in the tested daily doses, the control group, which consisted of 18 patients (6 men and 12 women), was treated with Nystatin in the generally recommended doses and according to the usual scheme. Electro-acupuncture testing showed that the daily dose of Nystatin ranged from 4,500,000 U to 13,500,000 U of the drug, depending on the form of candidiasis, and in these dosages the patients of the main group were treated. Patients in the control group were prescribed Nystatin at a dose of 6,000,000 U of the drug. According to the data of the mycological examination carried out after the course of treatment, the positive effect of the therapy was noted when using individually selected

daily doses of Nystatin. Thus, in the group of patients with oropharyngeal candidiasis, a positive effect of therapy was observed in 4 (80%) patients in the main group and in 1 (25%) patient in the control group. Among patients with candidal esophagitis, complete sanitation of the esophageal mucosa from Candida fungi was achieved. In the group of patients with gastric candidiasis, a positive effect was observed in all patients of the main group and in 1 (25%) patient in the control group. Positive clinical signs were observed in 14 (93.3%) patients with intestinal candidiasis in the study group and in 3 (30%) patients in the control group. The results of the treatment were recorded against the background of the absence of side effects and complications from the use of Nystatin in the tested doses. Analysis of the data obtained made it possible to assert that

Studies of the effect of Prednisolone doses determined with the help of drug testing on the parameters of cellular immunity were carried out in patients with chronic viral hepatitis B with moderately active process [21]. All patients participating in the studies with an established diagnosis of chronic viral hepatitis B were divided into two groups: 21 people in the main group and 20 in the control group. Testing showed that the dose of Prednisolone, which was prescribed as a course dose for 12-16 days, was 30-50 mg, and there was no dependence of the tested dose of the drug on the patient's age, gender and body weight. In the course of the therapy, the state of immunity was studied, which showed a decrease in the expression of CD16 receptors, an increase in CD3 and CD4 receptors of lymphocytes, decrease in the number of CD8 receptors and stimulation of phagocytic activity of neutrophils. At the same time, no changes were found in the content of cortisol in the blood serum in patients who took Prednisolone in the tested doses. The research results have shown the promise of using drug testing in the treatment of patients with chronic viral hepatitis B with Prednisolone, which helps to increase the immune defense and normalize the parameters of cellular immunity.

The study of the possibilities of the method of drug testing according to R. Voll was undertaken with the aim of individual selection of daily doses of pharmacological drugs that are used for various infectious diseases [22]. The study involved 80 patients aged 11 to 52 years with various pathologies - candidiasis of the digestive system, various viral infections and chronic bacterial infections. In the first group of patients (47 people) with various clinical forms of gastrointestinal candidiasis, testing was carried out with the selection of doses of Nystatin. It was found that the recommended doses of this drug for the treatment of candidiasis of the digestive system differ from the doses obtained during drug testing. So, the recommended daily dose of Nystatin is up to 6,000,000 IU, while testing has shown

The second group of patients with viral infections consisted of 25 people aged 15 to 52 years with chronic viral hepatitis C in 10 patients and chronic cytomegalovirus infection in 8 patients. In groups of patients, drugs were tested traditionally used to treat these diseases: with chronic viral hepatitis C - Ribaverin and chronic cytomegalovirus infection - Ganciclovir. Testing has shown that the maximum daily dose of Ribaverin in various patients with viral hepatitis C ranges from 800 to 2000 mg of the drug, while the recommended daily dose of Ribaverin is from 600 to 1400 mg of the drug and depends on the patient's body weight. The results of testing the maximum doses of Ganciclovir in patients with chronic cytomegalovirus infection showed their values in the range from 500 to 1500 mg at the traditionally recommended dose of up to 1000 mg of the drug. The third group consisted of 25 patients aged 11 to 30 years with a chronic bacterial infection and an established diagnosis of chronic tonsillitis (14 patients) and chronic pyelonephritis (11 patients). Individual testing was performed for the drugs Abaktal and Siflox, which are used in the treatment of patients with chronic bacterial infection. Testing of Abaktal in this group of patients showed that the maximum doses determined by this method are in the range from 400 mg to 1000 mg of the drug, while the recommended dose for the treatment of adult patients and children over 15 years old is 800 mg of the drug. Testing Siflox in patients of this group revealed the maximum doses of the drug from 500 mg to 1250 mg with the recommended value of 1000 mg in the treatment of this pathology. During the research, it was found that the doses of the tested antifungal, antiviral and antibacterial drugs in patients differ, which is probably associated with different fungal, viral and microbial loads in patients with different infectious pathology, as well as the individual characteristics of the immune response of the body of a particular patient.

Homeopathic remedies

Possibilities of electropuncture drug testing according to R. Voll in order to determine the mutual compatibility of homeopathic drugs when used together were studied during outpatient admission [23]. The final decision on the mutual compatibility of one or another homeopathic preparation out of 44 used was made based on the results of testing carried out in at least 10 patients. The test results, as shown by the studies, coincided with the clinical data of the treatment performed. So, for example, according to the data of joint testing of Anacardium, Collocynthis, Hamomelis and Hydrastis preparations, their compatibility was about 90%, and their joint full therapeutic effect was observed in 87% of patients with duodenal ulcer. It is noted that the recommendations of the founder of homeopathy S. Hahnemann on the use of only one remedy, apparently, and were due to the mutual incompatibility of homeopathic remedies. Clarification of the mutual compatibility or incompatibility of homeopathic medicines using medication

testing allows in specific cases to facilitate the selection of homeopathic treatment and increase its effectiveness [24].

In further studies, drug testing, which was based on the R. Voll method in the author's modification, was used for the individual selection of complex homeopathic drugs in combination with allopathic drugs for the therapy of patients with bronchial asthma (Lobelia EDAS 933, Broncholate EDAS 918, Broncholate EDAS 104) [24], asthenoneurotic syndrome (Passiflora EDAS911) [25], neurocircular dystonia (Afosar EDAS916) [26], joint diseases (Artromil Edas119, Artromil Edas919) [27, 28].

Testing homeopathic remedies "LobeliaEDAS 933 ", "BroncholatEDAS 918" and "BroncholatEDAS 104" for the treatment of bronchial asthma together with Solbutamol showed that the most optimal in this case is the drug "BroncholatEDAS 918" [24]. The results of the selection of drugs using drug testing were evaluated in the course of treatment of 60 patients of both sexes aged 21–56 years, who were divided into two equal groups - the main group and the control group. In the control group, patients received Solbutamol, and in the experimental group - in addition to Solbutamol, the drug "Broncholat EDAS 918". In the course of treatment, for 35 days, a complete examination of the patients was carried out and a statistically significant reduction in the timing of relief of clinical manifestations of the disease in the main group compared to the control group was noted in all objective and subjective indicators. The improvement in the condition of patients in the main group was 93.3%, while in the control group it was 86.7%, i.e. the results of treatment in the main group exceed those in the control group by 6.6%, which is a consequence of the individual selection of doses.

Productive enough testing for it turned out application medicinal individual selection doses multicomponent homeopathic preparation "Passiflora EDAS911" in the treatment of patients with asthenoneurotic syndrome [25]. Evaluation of the effectiveness of the selected doses of the drug was carried out on the basis of a significant decrease in the severity of the manifestation of the main symptoms or their complete disappearance in the course of treatment. Thus, a reduction in the duration of a pronounced clinical manifestation for all the studied symptoms of subjective and objective assessment in the main group (30 people) who took the drug "Passiflora EDAS911" was observed in 93.3% of patients, while in the control group (30 people) - in 83 , 3%. The effectiveness of the selection of doses of the drug contributed to the fact that the positive result of treatment was 10% higher than when the drug was prescribed only on the basis of clinical indications.

The selection of doses of the multicomponent homeopathic drug "Afosar EDAS916" for the treatment of patients with neurocircular dystonia was carried out by electropuncture drug testing and was carried out according to the same scheme as in previous studies [26]. The results of treatment of patients with hypertensive type of neurocircular disorders of the main group (30 patients) who took the drug "Afosar EDAS916" in doses

determined as a result of preliminary testing, and a control group (30 patients). In the main group, as shown by the results of the treatment, clinical improvement occurred in 86.7% of patients, versus 76.75% in the control group. Individual selection of the dose of the drug "Afosar EDAS916" made it possible to increase the positive result of treatment by 10%, compared with the use of the drug only for clinical indications.

The effectiveness of using homeopathic medicines "Artromil EDAS119" (drops) or "Artromil EDAS919" (granules) and in the treatment of pathology of the musculoskeletal system in combination with the allopathic drug Ibuprofen was studied from the standpoint of their compatibility and individual selection of the dose of "Artromil EDAS" during drug testing [27, 28]. Patients of the main group (31 people) took the drug "Artromil EDAS" in two forms, and the control group (27 people) - only Ibuprofen. Evaluation of the clinical efficacy of treatment of patients with joint pathology with the homeopathic preparation "Artromil EDAS" in combination with Ibuprofen showed that in the main group, clinical improvement occurred in 91.2% of patients, while in the control group - in 84.4%. In this way,

Electropuncture testing of allergens

Recently, the problem of allergy has begun to become a global medical and social problem, which is facilitated by many factors, such as environmental pollution as a result of intensification of industrial production, increased use of pesticides and herbicides in agriculture, uncontrolled intake of pharmaceuticals, the introduction of qualitatively new and genetically modified products into the food ration. and much more [29]. It is quite natural that the problems associated with the diagnosis, and, consequently, the prevention and treatment of allergies and allergic diseases are currently more than relevant, and especially non-invasive methods [2]. It should be emphasized here once again that not only intradermal tests, but even dermal applications can pose a serious danger to patients,

Probably, for the first time, the possibilities of electropuncture testing for assessing allergy to inhaled substances of biological origin were investigated by JJ Tsuei et al., The results of which were published in 1984, and then again in 1999 [30, 31]. A comparative study of the effectiveness of assessing allergies by the method of electropuncture testing according to R. Voll in comparison with classical methods was carried out with the participation of 30 volunteers (16 men and 14 women) aged 16 to 69 years. The following allergens were tested: house dust mites, Redtop grass pollen and Hormodendrum mushrooms (modern Cladosporium), and distilled water served as a control. Determination of IgE content in blood was used as classical methods.

test subjects and antigens by radioallergosorbent test (RAST), as well as skin tests. Based on the results of the studies performed, it was suggested that there is no reliable clinical test for diagnosing allergies, however, electropuncture testing according to R. Voll demonstrates the highest sensitivity of all the methods used. Comparison of the results of blood levels of IgE and antigens according to the RAST test showed that they coincide with the results of electropuncture testing in 80% of cases.

In a series of studies, J. Krop et al. the reliability of allergic testing of a number of chemicals using the VEGA Test II was assessed in comparison with classical methods (sublingual and intradermal allergy tests), as well as the comparative difference in the results of testing with allergic and non-allergenic substances [32–34].

In the very first study, testing was carried out in 43 patients (29 men and 14 women) aged 10 to 60 years with multiple allergies due to the adverse environment [32]. Various chemicals were tested: synthetic ethyl alcohol, formaldehyde, chlorine, natural gas, tobacco smoke, perfume, glycerin, environmental terpenes, progesterone, as well as inhaled aeroallergens: house dust, household insect allergens, Candida fungi, mold mixtures, total emissions organics of cats, dogs, horses, mixtures of herbs and woods, ragweed, terpenes of herbs and trees. Testing of each patient was performed separately for each antigen using intradermal and sublingual tests and VEGA test II, which were performed independently by two specialists. A total of 227 tests were performed, of which 183 were sublingual and 44 were intradermal. Of all the tests carried out, the classic allergy tests and the VEGA test showed an agreement in 68% of cases for chemicals and in 71% of cases for inhalation, which averaged 66%. At the same time, the differences in test results for chemical and inhaled substances were 32% of cases for the VEGA test and 29% for the classical methods. In conclusion, it is summarized that the research results demonstrate that the VEGA test is an effective, reliable and comparable method to classical testing. At the same time, as an undoubtedly positive fact, it is indicated that during VEGA testing, patients are not directly exposed to allergens, and therefore there is no risk of adverse allergic reactions.

Simultaneously with these studies, M. Ali double-blind showed the coincidence in 73% of cases of the results of testing patients for IgE antibodies to pollen of white oak, June grass, ragweed, fungi Alternaria and Candida albicans using the enzyme-linked immunosorbent assay (ELISA test system) and electropuncture method [35] ...

However, later there were separate publications in which the results of the VEGA electropuncture method were questioned. The objectives of one of these studies were to determine the possibility of electropunctural VEGA test to distinguish between subjects with a previously established allergy to house dust mites or cat dandruff from persons with negative reactions to these

allergens [36]. The study involved 30 volunteers, 15 of whom tested positive (intradermal prick test) for house dust mites or cat dandruff, and the other 15 were negative. In addition to house dust mites and cat dandruff, the test samples included distilled water as a control. The results showed that the VEGA test was unable to distinguish between allergic subjects and non-allergic subjects for each of the allergens. Thus, according to the VEGA test, 24% of people with allergies and 22% of those without allergies were sensitive to cat dandruff, 28% and 29%, respectively, to house dust mites and 26% and 23%, respectively, to distilled water. The aim of other studies was to verify the correctness of the diagnosis of allergic respiratory diseases in allergic patients and healthy volunteers using electropuncture testing, which was carried out using the DBE204 apparatus (TEKAV SRL, Rovigo, Italy) [37]. The study involved 100 patients, 72 of whom (39 women and 33 men with an average age of 31.2 years) were diagnosed with allergic rhinitis and / or asthma. All of these patients had been ill for at least 2 years and all had positive skin and PAST tests for one or more allergens: pollen from parietaria, grasses, cat dandruff, birch, and house dust mites. The remaining 28 patients (20 women, 8 men, mean age 42.1 years) were healthy and had negative skin and RAST tests. The study was conducted in a double-blind manner. Pollen of parietaria, grass, birch, house dust mite (Dermatophagoides pteronyssinus), cat dander, IgA, IgG, IgM, IgE, histamine, interleukin4 (IL4) and saline were tested. The results showed no correlations between the data of electropuncture testing, the allergic status of patients, the tested allergen and control samples, as well as in the control group of subjects. Thus, according to the results of this study, the diagnosis of allergic respiratory diseases using electropuncture testing is not possible. However, it is pointed out that the results of this study can in no way be generalized to the entire field of electropuncture testing, which remains open to further research and development. However, it is recommended that

It should be noted that it is to these two articles that criticism of the use of electropuncture testing is appealed to in many publications and reviews, and exclusively on allergies.

In the next double-blind, randomized controlled study of the reliability of the VEGAtest II method, 41 patients with multiple allergies, aged from 6 to 70 years, took part [33]. The study was carried out in two independent series, in which the results of electropuncture testing of four different substances were recorded and then compared: allergens (house dust mites and histamine) and not

allergic (saline and distilled water). Testing was carried out in two series - in the first group, which included 17 patients, the significance of the difference (Fisher's exact method) between allergens and non-allergens was 82% (p = 0.007). In the second study, which included 24 patients, the significance of the difference according to Fisher's exact method was even higher (p = 0.000002) and amounted to 96%. The study concluded that the VEGA test statistically reliably reveals the differences between the two electropuncture-tested allergenic and non-allergenic substances, with gender, age and known preliminary diagnosis not affecting the objectivity of the test results.

Final studies compared the reliability of allergological testing of serial dilutions (1: 5) of house dust mite extract (Dermatophagoides farinae and Dermatophagoides pteronyssinus) using an intradermal allergy test (prick test) and electropuncture method (VEGAtest II) [34]. All 57 patients (39 men and 18 women) who took part in the studies, aged 6 to 70 years, were divided into three independent groups, in each of which the dust mite allergen was tested by two methods. The results showed the coincidence of the intradermal test and VEGA testing in all three groups of subjects in 93% of cases, which, according to Fisher's exact method, turned out to be statistically significant to a high degree (p = 0.00001). The conclusion indicates

It is quite natural that the problem of assessing the allergic status is still far from complete solution, both in theoretical and practical aspects. Nevertheless, denial or doubt about the informativeness of electropunctural testing is based on the results of far from exhaustive studies, which are sinful both in an insufficiently representative sample and in the limitedness of comparative evidence-based routine methods. It would probably be counterproductive to deny the need to further improve electropuncture testing and conduct more in-depth studies, which should increase the sensitivity and specificity of this promising non-invasive method.

Electro-puncture testing of food allergy

An allergic reaction that develops to a certain food or any food ingredients, which can occur in both children and adults, is a food allergy or food intolerance [38]. Along with laboratory immunological (radioallergosorbent and enzyme-linked immunosorbent) methods, as well as the passive hemagglutination reaction [39], electropuncture methods of food allergy testing, which are favorably distinguished by non-invasiveness and efficiency, occupy a certain place.

The above studies by JJ Tsuei et al. concerned not only the possibility of electropuncture testing to identify allergic

reactions to some biological aeroallergens, but also allergies to certain foods, which were also performed for the first time [30, 31]. The R. Voll method tested milk, eggs, rice and food extracts with preservatives phenol and glycerin on 30 subjects (16 men and 14 women aged 16 to 69 years), and distilled water was used as a control. Comparison of the results of electropuncture testing showed a high degree of correlation in comparison with the RAST test in 68.8% and 65.2% of cases, and with skin tests - in 71.6% and 74.3% of cases, respectively.

In the earlier studies by J. Krop et al. Allergy testing was also carried out using the VEGA test for foods such as apples, milk, cane sugar, oranges, potatoes, beef, tomatoes, cheese, corn, pork, eggs, peanuts, brewer's yeast and coffee [32]. Food testing was carried out on fewer patients (16 people) than chemicals and inhaled aeroallergens, and, therefore, the coincidence of the VEGA test results with classic allergic tests (sublingual and skin) was observed only in 30%, while in 70% there were no coincidences.

In studies by E. Giannazzo et al. electropuncture testing according to R. Voll was used to determine the intolerance of preservatives and biologically active additives added to food products [40]. The tests were carried out on 20 volunteers of both sexes, aged 18–60 years, who were practically healthy during the examination and did not take any medications. Tested ethylenediaminetetraacetic acid (EDTA), lysozyme, nisin and lactoferrin, which are used in the food industry or are used as dietary supplements. Thus, EDTA (E386) is used in the food industry as an antioxidant, the enzyme lysozyme (E1105) and the food additive nisin (E234) as a preservative, and whey protein lactoferrin as a biologically active additive. As a result, it turned out that intolerance to EDTA was noted in 47% of the tested individuals, and in 41% - to lysozyme, lactoferrin and nisin. The conclusion points out that determining the threshold, or minimum concentration of intolerance, of additives in food products can facilitate the combination and use of different preservatives at lower concentrations and reduce the number of additives in potentially hazardous concentrations.

Electropuncture testing of toxicants

Synthetic preservatives and antiseptics, which are widely used in the cosmetic and pharmaceutical industries in creams, ointments, cosmetics, etc. were tested using the electropuncture method according to R. Voll in order to predict the possibility of contact dermatitis [41]. The studies were conducted on 46 healthy subjects (33 women and 23 men) aged 18 to 60 years. Preservatives used in cosmetic products have been tested: methylparaben (Methylparaben), propylparaben (Propylparaben), imidazolidinyl urea (Imidazolidinyl Urea), methylchloroisothiazolinone

(Methylchloroisothiazolinone) / Methylisothiazolinone

(Methylisothiazolinone) and benzalkonium chloride antiseptic (Benzalkonium Chloride).

The results of electropunctural testing were compared with patch tests of the test substances, which were applied at 6 sites on the ventral surface of the forearm of each volunteer. Comparison between the results obtained using patch tests and electropuncture testing showed general agreement in 70% of cases. For some of the tested substances, this agreement was even higher - 74% for methylparaben and 85% for benzalkonium chloride. Thus, the results show that R. Voll electropuncture testing can be a valuable and sensitive method for assessing potential contact dermatitis that occurs with the use of cosmetics containing preservatives.

In the treatment and prevention of endotoxinemia, an important place belongs to methods of detecting endotoxin and its content, since the effects of endotoxin action primarily depend on its concentration [42]. A method for the detection (detection) of endotoxins of gram-negative bacteria by the method of electro-acupuncture vegetative resonance test in a test sample (a drop of blood) has been developed and protected by a patent [43, 44]. The method has a high sensitivity and is based on the frequency spectrum of its own electromagnetic radiation, characteristic of the glycolipid Rechemotype, which is part of the lipopolysaccharide of most gram-negative bacteria. In order to assess the specificity of the method for detecting endotoxins in the analysis of preparations, an enzyme-linked immunosorbent assay with antibodies to the glycolipid of the Re chemotype was used. The studies involved 11 healthy volunteers at the age of 25–30 years and 7 people at the age of 45–70 years, as well as 34 patients over 60 years old with various diseases, including intestinal dysbiosis. The research results showed that the electropuncture autonomic resonance test detects endotoxin at a concentration of 0.1 pkg / ml. Lower concentrations of the toxin have not been investigated. An enzyme-linked immunosorbent assay with antibodies to Reglycolipid reveals an endotoxin content of at least 10 ng in 1 ml, which characterizes the electropuncture vegetative resonance test as more sensitive. In addition, the method in this case has a high specificity, since it is not able to detect gram-positive bacteria (Staphylococcus aureus, bifidobacteria, lactobacilli) and Candida albicans fungi. Electro-acupuncture testing of blood samples revealed endotoxin in 2 out of 11 examined healthy volunteers aged 25 to 30 years and in 5 out of 7 aged 45 to 70 years, while in patients over 60 years of age, endotoxin in the blood was detected in 32 of 34 surveyed. All test results were confirmed by enzyme immunoassay of blood samples taken from a vein or finger.

The method of electropuncture testing according to R. Voll was adapted to assess the influence of the elements of the ecosphere, both whole biomass (plants, soil, water), and its constituent organic and inorganic substances on the state of the main organs and systems of a particular person [45]. The adapted method allows it to be used for environmental monitoring of both individual components of the environment and ecosystems in general, and for studying the natural conditions of the area, analyzing biocenoses (water, soil, air), without expensive and not always

objective selection of components.

conclusions

The analysis of the origins and further evolution of electropuncture testing methods, which were originally developed by R. Voll and H. Schimmel, carried out in the review, showed the prospects and breadth of their use in various fields of practical medicine. Today it is already difficult to cover the entire range of areas where the use of electropuncture testing methods has received its sustainable application: individual selection of allopathic and homeopathic medicines, testing for allergies, food intolerances, exo and endotoxicants, and much more.

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