Original Article

Unproven techniques in allergy diagnosis

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Summary. Mainstream allergy diagnosis and treatment is based on classical allergy testing which involves well-validated diagnostic methods and proven methods of treatment. By contrast, a number of unproven tests have been proposed for evaluating allergic patients including cytotoxic food testing, ALCAT test, bioresonance, electrodermal testing (electroacupuncture), reflexology, applied kinesiology a.o. There is little or no scientific rationale for these methods.

Results are not reproducible when subject to rigorous testing and do not correlate with clinical evidence of allergy. Although some papers suggest a possible pathogenetic role of IgG, IgG4 antibody, no correlation was found between the outcome of DBPCFC and the levels of either food-specific IgG or IgG4, nor was any difference seen between patients and controls. The levels of these and other food-specific immunoglobulins of non-IgE isotype reflect the intake of food in the individual and may thus be a normal and harmless finding. The so-called "Food Allergy Profile" with simultaneous IgE and IgG determination against more than 100 foodstuffs is neither economical nor useful for diagnosis. DBPCFC must be the reference standard for food hypersensitivity and any new test must be validated by it. As a result, all these unproven techniques may lead to misleading advice or treatments, and their use is not advised.

Key words: allergy diagnosis, unproven methods, applied kinesiology, electroacupunture, bioresonance, cytotoxic testing, ALCAT test, food allergy profile, food-specific IgG.

Introduction

Unconventional methods are increasingly being used for allergic diseases and the list of commonly used unproven techniques for diagnostic and therapeutic purposes is long. *Unproven methods* are procedures used in diagnosis and treatment that lack scientific credibility and have not been shown to have clinical efficacy. Various factors influence physicians and patients in their choice of treatment and therapist, respectively. The allergy patient is increasingly caught in the tug-of-war between allopathic and "alternative" medicine, pharmacists, so-called "natural healers", patient and consumer organisations and the mass media. Some people are disappointed from classical medicine and are looking for better medical care. Expectations of successful results from "natural", "soft" methods without "chemistry", "Chinese" or "Tibetan" Medicine are high, along with the corresponding marked placebo effects and scepticism about "technical" school medicine [1]. These procedures are promoted by a small group of physicians, usually because they base their practice on controversial and unproven theories, and by the manufacturers of these unorthodox devices due to obvious commercial interests.

In an attempt to rationalize or explain symptoms or general feelings of poor health, patients tend to look to external influences, often blaming their diet, or more particularly the "chemicals" in their diet, for their illnesses. These patients find "open doors" with many dubious practitioners who claim that food allergies may be responsible for virtually any symptom a person can have. In support of this claim - which is false - they administer various tests purported to identify offending foods and food additives. Claims of this type may seem credible because about 25% of people think they are allergic to foods. A modification of the diet, based on these diagnostic procedures which lack scientific evidence, even if irrational from the allergological point of view - e.g. a rotation diet with the introduction of the offending food after a period of ten days to six months abstinence, according to the strength of the "allergy"

rate -, can alleviate the actual condition due to the great expectations of the patient [2]. However, this placebo effect is generally short-lived, and the search for other culprit foodstuffs, or "environmental" harmful substances, e.g. "amalgam", or alternatively, the consultation of another doctor, is usually the consequence. Frequent "alternative" allergy diagnoses are "cow's milk", "wheat", "yeast", "food additives" and "sugar" allergy. The irrational result from the diet advices: instead of cow's milk or cheese, goat's milk or cheese, instead of wheat spelt is recommended. But the main allergens in cow's milk are caseins – and there are large cross reactivities among caseins of the different mammalian species; spelt is an old wheat species with the same allergenicity of wheat!

The physician who treats patients with allergy should be sufficient knowledgeable about both the accepted and the unproven techniques and theories to provide the patient with the best currently available care and to counsel the patient who may be tempted to use unproven methods of treatment. Position papers and critical statements about unconventional theories and unproven methods in allergy have been issued by many Medical Associations and in textbooks or review articles [3-14]. Also in many web sites there are excellent reviews in this field. In the Internet under "Allergy – unproven methods" one can find data from many health authorities, non-profit organizations, as the "Food Allergy Initiative" (FAI) [15], "Quackwatch" - operated by Stephen Barrett, M.D., a retired psychiatrist, resident in Allentown, Pennsylvania, USA, who has achieved national renown as an author, editor, and consumer advocate [16] -, or the "Allergy Capital", Australian Allergy, Asthma and Immunology Information for consumers & health professionals [17], among others.

Diagnostic tests *in vivo*

Applied Kinesiology: Muscle-Testing for "Allergies"

"*Applied kinesiology*" (AK) is the term most commonly used to identify a pseudoscientific system of muscle testing and therapy [18]. Its basic notion is that every organ dysfunction is accompanied by a specific muscle weakness, which enables diseases to be diagnosed through muscle-testing procedures. The concepts of applied kinesiology do not conform to scientific facts about the causes or treatment of disease. Controlled studies have found no difference between the results with test substances and with placebos [19]. Differences from one test to another may be due to suggestibility, distraction, variations in the amount of force or leverage involved, and/or muscle fatigue.

In Italy a test called DRIA has been developed by the Associazione di Ricerca Intolleranze Alimentari [ARIA]. This sublingual test is based on administration of the allergenic extract and on measurement of muscle strength with an ergometer. The test is considered positive when there is a decrease in muscle strength within 4 s after sublingual contact with the extract. No investigation supported the rational and diagnostic claims of the DRIA test [2].

Electrodermal skin testing, bioresonance and dubious devices

Some physicians, dentists, naturopaths, and chiropractors use "electrodiagnostic" devices to help select the treatment they prescribe, which usually include homeopathic products. The diagnostic procedure is most commonly referred to as Electroacupuncture according to Voll (EAV) [20] or electrodermal screening (EDS), but some practitioners call it bioelectric functions diagnosis (BFD) or bio-energy regulatory technique (BER). The devices (e.g. VEGA I-III) are simply resistance-measuring instruments [21]. Recently, in a double blind, randomised block design study the electrodermal testing showed not to be effective for diagnosing allergies [22].

Bioresonance is based on the belief that human beings as well as any substances in the environment, such as allergens, emit electromagnetic waves, which may be either "good" or "bad". These waves can only be measured by special bioresonance devices (e.g. Bicom). It could be shown that the device is not capable of measuring the electromagnetic wave presumed to be involved [23]. Bioresonance therapy uses the apparatus, which is supposed to be capable of filtering the waves and sending the "rehabilitated" waves to the patient. It is claimed that the pathologic waves can be removed by that process, and the allergic disease should thereby be treated. Two controlled studies failed to show any diagnostic and therapeutic value of bioresonance in adult patients suffering from hay fever and in children with atopic dermatitis [24, 25].

In conclusion, "the devices described above are used to diagnose nonexistent health problems, select inappropriate treatment, and defraud insurance companies. The practitioners who use them are either delusional, dishonest, or both. These devices should be confiscated and the practitioners who use them should be prosecuted" [16].

Diagnostic tests *in vitro*

Cytotoxic Testing; ALCAT

The ALCAT Test (*TEST FOR CELLULAR RESPONSES TO FOREIGN SUBSTANCES)* has been launched in several countries for diagnosing so-called

"non-IgE-mediated hypersensitivities". The promotion is mainly "for detecting adverse reactions to foods by an advanced technology". The ALCAT Test is a more sophisticated version of the previous "*Leukocytotoxic testing"*, which was stopped in the USA by Government Actions after the negative statement of the American Academy of Allergy, Asthma and Immunology (AAAAI) [3, 4]. A review has concluded that cytotoxic testing is ineffective for diagnosing food or inhalant allergies [26].

The basic principle of the ALCAT test is measurement changes in white-cell diameter after challenge with foods, molds, food additives, environmental chemicals, dyes, pharmacoactive agents in foods, antibiotics, NSAID's *in vitro*. The blood cells are passed after an incubation period through a narrow channel and are measured by an electronic instrument, ADS1200, permitting to count instantaneously the number of cells in a parallel series of size, ranging from the smallest to the largest. The sizes are displayed as either cell diameters or as cell volumes. Using an electronic principle histograms of the different samples were produced. The information brochure stated that the system has proved to be extremely reproducible and sensitive. In the company homepage some references are listed, mainly abstracts from papers presented at congresses or articles in non-peer reviewed journals. In the database (PubMed) only few papers are listed. Three studies come from Poland [27-29], but a Polish review on Diagnosis of allergic diseases states that "as a matter of fact many patients in Poland are tested with unverified (ALCAT) or negatively verified methods (allergen specific IgG4) as well as by means of alternative medicine (acupuncture, BICOM)" [30]. A paper describing technical validation reports a poor reproducibility and discourages the use of the test [31]. Unfortunately, in the abstract of a study from Italy comparing prick tests, specific serum IgE and ALCAT in fourteen children affected with allergic diseases the results of the analysis are not reported [32]. More investigations, which fulfil scientific criteria, need to be published [33].

In summary, the ALCAT test system represents a new edition of some old claims of "cytotoxic testing", claims which up to now have not proven to be scientifically established. The ALCAT test system is for the time being relying on unproven statements that lack scientific and clinical proofs of efficacy [2]. It should in no case be recognized by social security and medical reimbursement instances.

Determination of food specific IgG and IgG4

Specific IgG antibodies and their subclasses, mainly IgG4, can be found in both children and adults in many different physiological and pathological conditions [2, 4]. The incidence falls after a period with withdrawal of the specific food antigens. Determination of food-specific IgG or IgG4 antibodies with different appropriate serological methods (immune precipitation, passive hemagglutination, IgG RAST/CAP, ELISA and chemiluminescence) alone do not prove the existence of a food allergic reaction, mainly of an immune complex-mediated type III reaction. Besides clinical aspects that indicate a type III reaction against foodstuffs – there exist only few anecdotal reports in the medical literature [34] -, one needs serological parameters, like the measurement of complement activation or antigen antibody immune complexes, after controlled oral provocation with the culprit food. The American Academy of Allergy and Immunology Position Statement concluded that the value of the measurement of food-immune complexes regarding the diagnosis of food allergy remains unproven and per se does not have a place in current clinical practice [4]. A follow-up study on children, aged 2 – 5 years with food allergy demonstrated that the occurrence of serum IgE and IgG antibodies to milk, egg and fish paralleled in most cases. However, an early high IgG/IgE food antibody ratio seemed to be a good prognostic sign, indicating a possible blocking capacity of IgG antibodies [35]. In another study allergen-specific IgG and IgE antibodies against 35 allergens in sera of 400 atopic patients and 48 healthy subjects were determined, using a commercial chemiluminescent assay [36]. The levels of specific IgG in atopic patients and healthy subjects were similar, but patients with high IgE levels showed also significantly increased levels of allergen-specific IgG. The determination of food-specific IgG failed to distinguish between DBPCFC-positive and -negative patients [37, 38]. Success rates after elimination of IgG-positive foods in the called "delayed hypersensitivity reactions" (asthma, headache, fatigue, serous otitis, etc) correspond to the high placebo effect of each manipulation in the diet [39].

"Food Allergy Profile"

Some alternative doctors use now a so-called *Food Allergy Profile IgE & IgG (Combined Foods)* against more than 100 foods (Dairy, Fruits, Fish/Shellfish, Poultry/Meat, Vegetables, Nuts and Grain and Miscellaneous, namely Yeast, Sugar, Chocolate, Coffee and Honey!) The results are given in colour with a scale of reactivity (0+ to 3+). The patient receives then informations about the results and therapy in form of a *True Relief Guide* with instructions based on a first phase of *Elimination diet* of the IgG positive foods and on a second phase with *Rotation Diet Schedule*. In this phase, foods that are not eliminated are allowed. After having eliminated the foods the patients were advised to avoid for a period of time determined by the computer program on the basis of the results (1+, 2+ or 3+) (e.g. 3, 6 or 9 months), and having rotated other foods to prevent the development of new allergies (!), the foods may be re-introduced into the diet (third phase). That procedure is

not economical, lacks all scientific evidence and can be particularly dangerous if a true IgE-immediate allergy is still present after the avoidance phase. Obviously, such a sophisticated guide is impressive for patients without true food allergies and together with the charisma of their health care providers using these mystic elimination, rotation and reintroduction diet can experience – at last for a time period – some benefits.

Conclusions

In conclusion, all the above described *in vivo* and *in vitro* unproven techniques may lead to misleading advice or treatments; their use is not advised [40]. The allergist should be aware of these alternative procedures and protect patients from such not serious methods [41]. He should frankly criticise these unproven and often dishonest theories and technologies with his patients, but only after he has gained their confidence and having shown his competence and good will to help them.

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