

Investigation of the relationship between allergic rhinitis and personality traits using semeiometry

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Abstract

Mind-body interactions have been well recognized and are extendedly studied in the medical literature. There is evidence that the mind and body communicate with each other in a multidirectional flow of information by means of hormones, neurotransmitters/neuropeptides, cytokines, and semaphorines. There are consistent and convincing reports of links between stress and disease onset and progression, e.g. asthma. Growing evidence in the field of psychoneuroimmunology contributes to the understanding of the mechanisms by which stressful events affect physical health. The psychoneuroendocrine system can influence the immune response and thereby the capacity of the organism to cope with illness, and the immune system can have an impact on neuroendocrine function. Such cross-talk among systems is dependent upon feedback loops working to maintain homeostatic equilibrium. The immune system is capable of producing factors, which serve to integrate immune-neuroendocrine circuits with immunoregulatory and metabolic consequences for the organism. The interaction of the immune, nervous and endocrine system may drive an individual to a well recognized biological hypersensitivity and the creation of allergic symptoms (allergic rhinitis, asthma, atopic dermatitis, etc), followed by distinct behavioural patterns characterized as affective hypersensitivity. Semeiometry is a proper tool for large scale investigation of the psychological profile of patients with allergic rhinitis. Statistical analysis of semeiometry questionnaires processed by Greek adult patients in Crete island during 2005, showed that there is relation between occupation and allergy. Housewives, public services employees and private employees appear to be allergic in significantly higher percentage than others. With semeiometry we can find evidence of the bi-directional immunoendocrine - nervous system interactions in patients with allergic rhinitis. *Hippokratia* 2007; 11 (3): 138-141

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Increasing evidence indicates the presence of functional interconnections between immune and nervous system, although data available on the mechanisms of this bi-directional cross-talking are frequently incomplete and not always focussed on their relevance for neuroimmune modulation¹. Mast cell and nerve may be considered as a functional homeostatic regulatory unit². Suzuki et al (2001)³ who studied the communication from mast cells to neurites, observed that binding of anti-IgE receptor antibodies to mast cells increases calcium ion concentration in cultured murine superior cervical ganglia neurites. This indicates that mast cell-nerve communication is bi-directional.

The nervous and immune systems may communicate through the action of neurotransmitters on mast cells⁴. The immune system can clearly communicate with the nervous system but the nervous system can also communicate with the immune system. Experiments in which nerve stimulation and electrical stimulation have been employed indicate that this can occur

at least in the periphery and that minor changes in mast cells occur ultra-structurally at certain levels of current intensity. Nevertheless major changes can occur with appropriate electrical stimulation. If an antigen is added to the nervous ganglion of a sensitised animal, it can easily be shown that the allergen will cause the neurons to change the action potentials that they generate in the cell body. In other words antigen is "talking" to the mast cells, and the mast cells are "talking" to the nervous system. The nervous system through its neurotransmitters can modify the threshold for subsequent activation of the mast cell⁵. The mind and body communicate with each other in a multidirectional flow of information by means of hormones, neurotransmitters/neuropeptides, cytokines⁶, and semaphorines⁷. It has also been investigated the influence of psychic factors on the triggering, establishment, and modulation of the diseases of the upper respiratory system, such as allergic rhinitis, using several psychological methods, e.g. semeiometry⁸⁻¹⁰.

The influence of physical and mental stress to the atopic patient

Psychological stress may disrupt biological systems related to inflammation through mechanisms potentially overlapping with those altered by physical pollutants and toxicants. There is provocative evidence that psychological stress constitutes an increased risk for atopy¹¹. Current views on the relation between stress and allergy vary from the denial of any relationship that could fundamentally help in allergy treatment to the widespread opinion that psychological stress can exacerbate some skin and nasal symptoms, and precipitate asthma. The role of stress in the genesis, incidence and symptomatology of allergy still remains a controversial issue since the mechanisms of that relationship are not well understood¹². Independently of that, exposure to acute restraint stress inhibits antigen-specific antibody production, but not local or systemic eosinophilia. This result suggests that acute stress has the potential to modulate the initiation of allergic rhinitis¹³.

The vicious circle of allergy

Allergic symptoms influence the quality of life which is further worsened if the patients are suffering simultaneously from asthma or any other debilitating atopy. Rhinitis and asthma are common comorbidities suggesting the concept of "one airway, one disease"¹⁴. Use of second generation antihistamines, intranasal corticosteroids, antileukotrienes, anti-PAF and intranasal ipratropium bromide have been shown to improve the health-related quality of life of sufferers of allergic rhinitis¹⁵.

Allergic symptoms can be triggered, worsened or improved by several psychological factors or stress. Extremely introverted patients experience a poorer course and outcome of allergies as well as greater degrees of distressed affect such as depression and anxiety than do extraverts. Patients with affective disorders have a higher prevalence of atopic allergy than the general population¹⁶. The individuals prone to clinical depression have more allergies than nondepressives¹⁷.

On the other hand, it is well known that allergic diseases influence the psychological status of persons who may demonstrate psychological imbalance or affective or other psychological disturbances. Hernandez Robles M et al¹⁸ demonstrated that 100% of the evaluated asthmatic children and adolescents, showed data related to depression presence. Gauci et al¹⁹ studied the relationships among perennial allergic rhinitis and personality traits in a nonpsychiatric female population of proven allergic status. Analyses of Minnesota Multiphasic Personality Inventory profiles (MMPI) showed that allergic subjects scored significantly higher on the Hypochondriasis and Social Introversion scales and significantly lower on the Correction and Ego Strength scales. The results suggested that women with perennial allergic rhinitis show poorer psychological functioning than nonallergic women. Muluk NB, et al²⁰ using also MMPI investigated

the relationship between allergic rhinitis and personality traits in a nonpsychiatric population of proven allergic status. Analysis of MMPI profiles showed that male subjects with allergic rhinitis had significantly higher scores on depression, paranoia, and social introversion. Depression, hypochondriasis, and hysteria scores were significantly higher in female subjects. They concluded that patients with allergic rhinitis have poorer psychological function compared with the nonallergic subjects. Patients with allergic rhinitis, allergic asthma and atopic dermatitis are demonstrating a specific psychology⁹.

The involvement of the psychological process in the etiology of perennial allergic rhinitis has been studied by Mac Fadden et al²¹ in thirty selected patients with perennial allergic rhinitis, submitted to a Program of Hyposensibilization. All patients were studied through psychological interviews and Pfister Colored Pyramid Test. The study revealed that the patients with perennial allergic rhinitis present intrinsic psychological difficulties characteristic of failures in the affective-emotional development and points out to a neurotic line of personality structuration. Patients with allergic rhinitis - regardless of type of rhinitis - may develop a group of psychological complaints related to symptom severity²².

All these complex interrelationships could lead to a vicious circle: allergic symptoms may trigger emotional stress and finally create a special psychological profile of the patient, while emotional stress and the special psychological profile of each patient influence the triggering or expression of allergic symptoms.

Semeiometric investigations

Semeiometry was designed to overcome the problem encountered by the physicians who would like to understand who their patients are, without directly asking them. With semeiometry is measured the emotional reaction elicited by words. The concept is based on submitting very ordinary words to subjects and asking them whether they like the word or not. An analysis of their responses allows a very deep understanding of their psychological profile. Briefly, the allergic patient-physician relationship can be excellent but in many cases is quite difficult, complicated or incomplete⁸.

A very successful semeiometric study took place at the early 1993 among French citizens. Marion Merel Dow commissioned the Gallup society SOFRES to undertake the study with citizens aged 15 years or more. They sent 20.000 letters and they received answers from 17.084 individuals, of whom 1833 were allergic. The statistical analysis showed a divergence of the psychological persona. Asthmatic patients were regressive, had real need of protection and were afraid of adult life. Patients with allergic rhinitis had adult outlook on life, were sensual and harmonious and aspiring to independence of mind and spirit. Patients with eczema or urticaria exhibited feminine and maternal traits, they were narcissistic and feared power⁹.

Greek semeiometric investigation - our material and method

During 2005 a semeiometry study took place in the Otorhinolaryngology Department of Heraklion Medical School, in Crete island, Greece¹⁰. In our investigation it was studied whether the adults sufferers of allergic rhinitis demonstrate a special psychological profile or psychological characteristics. One hundred thirteen male and female adult persons were assigned to the allergic (61%) or non-allergic (39%) group on the basis of skin prick test and self reported symptoms of allergic rhinitis.

It was asked from the participants to complete a questionnaire which contained 177 Greek words, nouns, adjectives and verbs. Those words are classified according to their statistical interrelations in categories according to the factorial plan of analogous questionnaire used in 1993 by SOFRES company of France. The emotional reaction which was created by the words had to be defined or fixed using a seven grade scale [-3, -2, -1: I do not agree at all, 0: it is indifferent to me, +3, +2, +1: I totally agree (harmony-dysharmony, dependence-independence, order-freedom)]. The questionnaire was submitted for processing and response to the patients by their otorhinolaryngologist after the performance and study of the skin prick tests results.

Results

The analysis of the answers showed that there is relation ($\alpha=5\% >0,047$) between occupation and allergy. Housewives, public services employees and private employees appear to be allergic in significantly higher percentage than others. The allergic patients appear to positively and emotionally react to words: nurture, frankness, honest, politeness, justice, family, faith, open, emotion, sensuous, delicate, present, sweet, adore, wish, god, religious, cry and betray. On the other hand they react negatively to the words: lie, war, rifle, detachment, metallic, soldier. The Greek patients with allergic rhinitis except of their biological hypersensitivity display an affective hypersensitivity which drives to a special psychological profile. This event probably is the result of their allergic status. On the other hand the bi-directional reaction of immune, nervous and endocrine system may permit to this clear psychological profile to influence the severity of the symptoms of allergic rhinitis¹⁰.

These results raise questions and new topics for research. Evidence linking psychological stress to the expression of allergic rhinitis, asthma and atopy continues to grow. Examining the underlying molecular mechanisms linking stress to allergic rhinitis, asthma and other allergic phenomena is an active area of research. Currently, an optimal test of the stress-response system is lacking. The present challenge is to develop a means of accurately, safely, and reliably activating the stress response in order to predict disease susceptibility within both individuals and larger population groups¹². It is imperative to develop ways of consistently recording the consequences of exposure to both

acute and chronic stress. Much progress is being made in understanding the mechanisms by which activation and dysregulation of stress-response systems leads to overt psychological and physical disease, particularly in the field of molecular biology. Evidence is reviewed for the influence of stress on neuroimmunoregulation and oxidative stress pathways, which, in turn, may affect biological hypersensitivity to environmental stimuli characteristic of atopic disorders. Critical periods of development, including *in utero* environment, are underscored. Based on evolving knowledge of candidate genes that may be relevant to both the stress response in general and pathways linked specifically to atopy the role of genetics and gene - environment interactions will be better understood¹².

Conclusions

Statistical analysis of semeiometry questionnaires processed by Greek adult patients showed that there is relation between occupation and allergy. Housewives, public services employees and private employees appear to be allergic in significantly higher percentage than others. The allergic patients tend to be attached to family values (words: nurture, frankness, honest, politeness) and to strong society values (words: justice, family, faith) that will keep them in a harmonious relation to other people. It appears to invest that they invest to sensual values (words: open, emotion, sensuous, delicate, present, sweet) that shows their willing of freedom. They reject conflict values (words: betray, lie, war, rifle, detachment, metallic, soldier) and they prefer to invest to values that provoke to them exaggerating emotions (words: adore, wish, god, religious, cry) which they find positive.

Semeiometry is a proper tool for large scale investigation of the psychological profile of patients with allergic rhinitis. It is of importance that each patient tested with *in vivo* and *in vitro* methods, completes at the same time the questionnaire of semeiometry. Certainly the questionnaire has to be adapted in the native language of the examined patients. With semeiometry we can find evidence of the bi-directional immunoendocrine - nervous system interactions in patients with allergic rhinitis.

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