Evoked Skin Sympathetic Potential in Bronchial Asthma Patients with the Hyperventilation Syndrome

N. S. Tataurshchikova, T. A. Chervinskaya, and A. B. Gekht

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Patients with bronchial asthma hyperventilation syndrome are found to manifest an increase of the latent period of the evoked skin sympathetic potential as compared to patients without the hyperventilation syndrome. This attests to an autonomic neuropathy in the hyperventilation syndrome.

Key Words: *bronchial asthma; hyperventilation syndrome; evoked skin sympathetic potential*

Neurogenic factors significantly affect the course of bronchial asthma (BA). Affections of the autonomic nervous system (ANS) are reportedly extremely common in BA [2,5,7]. The addition of hyperventilation disorders (HD), probably caused by pathological changes in different components of the nervous system including those at the level of central ANS structures, to the changes of external respiration existing in BA results in aggravation of the course of BA, reducing the efficacy of symptomatic and pathogenic therapy. It is reported [9] that BA may be combined with the hyperventilation syndrome (HVS). Such a combination with autonomic pathology motivated the use of the method of the evoked skin sympathetic potential (ESSP) in responce to graduated stimulation of peripheral nerves in these patients, because the ESSP permits quantitation of the state of the postganglionic nonmyelinized sympathetic nerve fibers.

The aim of the present investigation was to analyze the state of the sympathetic component of the ANS in BA patients with HVS.

MATERIALS AND METHODS

Forty patients with BA of the infectious-allergic and noninfectious-allergic types in the stage of relative remission were examined in a hospital department. The group comprised 26 women and 14 men aged from 18 to 61 years with a duration of the disease from 1 to 25 years.

Two groups of patients were studied: BA patients with HVS (16 women and 4 men) and BA patients without HVS (10 women and 10 men). General clinical, allergological, and neurophysiological (ESSP) examinations were performed.

The function of external respiration was studied on an ST-460 spiroanalyzer (Fucuda, Japan). The presence of HVS was determined according to the increase of the minute volume of respiration to 300% of the proper values on no less than 3 spirograms.

HVS was diagnosed on the basis of commonly accepted criteria [1,3,8]. The ESSP was studied using a universal neurophysiological analyzer (OTE Biomedica, Italy). It was induced by electrical stimuli using standard methods [4]. The results were processed using standard statistics software.

RESULTS

The comparison of the clinical picture in the two groups of patients showed that the course of the main disease in BA patients with HVS was accompanied by numerous autonomic disturbances, including autonomic paroxysms which had to be differentiated from BA attacks. These disturbances accounted for the severity of the disease course.

Institute of Immunology, Russian Ministry of Health, Department of Neurology and Neurosurgery, Russian State Medical University, Moscow. (Presented by A. D. Ado, Member of the Russian Academy of Medical Sciences)

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TABLE 1. Indexes of the Amplitude (μV) and Latency of the ESSP in 40 Bronchial Asthma Patients ($M \pm m$)

Group of examinees (n=20)	Latency, msec	Amplitude, mV
Healthy subjects	1.47±0.17	473±26
BA with HVS	1.804±0.063*	446±33
BA without HVS	1.532±0.046	435±30

Note. An asterisk denotes the significance ($p<0.01$) of differences from healthy subjects.

The BA patients with HVS noted, among other things, a tendency toward numbness, chill, change of skin color on the hands and feet, paresthesia, and pain in the distal parts of the extremities. They experienced a lowered pain and temperature sensitivity in the parts mentioned. These manifestations are correspondent with the clinical features of the autonomic neuropathies described by Popelyanskii [6].

The results of the ESSP examination in the groups of patients studied are listed in Table 1. It was found that in BA patients with HVS the index of latency was reliably ($p<0.01$) greater as compared to the healthy group and significantly ($p<0.001$) greater than in BA patients without HVS, being 1.804±0.063 msec. The indexes of amplitude in the BA groups with and without HVS did not differ significantly either from the healthy group or from each other.

Since the ESSP makes it possible to assess quantitatively the state of the postganglionic nonmyelinized sympathetic nerve fibers, it may be assumed that there are features of neurogenic neuropathy in BA patients with HVS.

Thus, the diagnosis of autonomic neuropathy in BA patients with HVS is instrumentally confirmed.

The diagnosis of autonomic neuropathy in this group of patients dictates the need for sympathotropic drugs, which in this case will be agents for pathogenic treatment.

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