Nystagmus Reactions Among Patients with Asymptomatic Cerebrovascular Diseases: Results and Analysis of Investigation of 228 Persons

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Abstract: The aim of this investigation was to view characteristics of vestibular nystagmus (spontaneous, latent, and positional) through Frenzel's spectacles in patients with asymptomatic cerebrovascular disease (ACVD), with the intent of providing an early diagnosis and appropriate prophylaxis. We examined a total of 228 men (mean age, 48.04 ± 7.8 years), a mean group of 150 men with proven asymptomatic cerebrovascular disease, and 78 clinically healthy men. Vestibular nystagmus was investigated through Frenzel's spectacles. The following characteristics (qualitative and quantitative) were studied: degree and direction form, association, continuity, frequency, and amplitude. It was found that in patients with proven ACVD, latent nystagmus is prevalent. The symptom of positional nystagmus is much more frequent than that of spontaneous nystagmus and is often the first objective symptom of initial disturbances of the cerebral blood flow in the region of the vertebrobasilar system. The vestibular system is mainly labyrinthine in origin, becoming later of central origin.

Key Words: asymptomatic cerebrovascular disease; nystagmus (spontaneous, latent, positional); vasculovestibular dysfunction; vertebrobasilar insufficiency

The high rate of morbidity, mortality, and disability due to cerebrovascular disease (CVD) ranks it as one of the most important medical and social problems of health services. Based on World Health Organization data [1], mortality due to CVD constitutes 15.4% of total mortality. In Bulgaria, this relative proportion was higher during recent years (18–20%). Since 1978, CVD has been in first place among the causes of death among the Bulgarian population [2].

Determining early stages of asymptomatic CVD (ACVD) and transient insufficiency of cerebral circulation and providing purposeful and controlled prophylaxis and treatment are of great importance for guarding against cerebral apoplexy [3,4].

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ACVD—also called *early manifest insufficiency of cerebral circulation* and *latent insufficiency of cerebral circulation*—is the earliest stage of CVD [5–7]. According to a classification of cerebral diseases worked out by a committee led by Y. Whisnan [8], patients in whom no cerebral or retinal symptoms of vascular disease are present are considered to have ACVD.

Audiovestibular symptoms are the first (and often the only) clinical sign of ACVD. Sensory structures, being highly differential, are known to be more vulnerable to ischemia than are other nerve structures [9,10]. The nystagmus (a vestibuloocular reflex), with its qualitative and quantitative characteristics, is the reliable and constant objective symptom of vestibular dysfunction.

The aim of this investigation was to study the characteristics of vestibular nystagmus (spontaneous, latent, and positional) through Frenzel's spectacles in patients with ACVD. Our intent was to provide early diagnosis of and appropriate prophylaxis for this disorder.

SUBJECTS AND METHODS

Subjects

At the Department of Neurology and Neurootology of the National Transport Hospital Tzar Boris III (Sofia), we examined a total of 228 men for a period of 2 years. The main group of men (n = 150) with proven ACVD had a mean age of 48.04 ± 7.8 years. Our control group (n = 78) was composed of clinically healthy men. All examined subjects were divided into three groups according to their ages: 30–39, 40–49, and 50–59 years.

Methods

We used several methods to obtain our results. First, we determined otological and neurological status. We then investigated vestibular nystagmus through Frenzel's spectacles and obtained the following qualitative and quantitative characteristics: degree and direction; form (horizontal, horizontal-rotatory, rotatory, vertical, and multiple); association (i.e., including both eyes' rhythmical and symmetrical movement); duration; frequency (fast, moderate, slow); and amplitude (fine, moderate, coarse). Additionally, we investigated spontaneous nystagmus and observed that a horizontal and a vertical plane occur during immobility of the head. Our investigation of latent nystagmus was performed with patients in the supine position with the head shaking. The nystagmus reactions was registered immediately after discontinuation of the shaking.

In our study of positional nystagmus, we looked for the following positions: nystagmus related to certain head posture (Langenystagmus); nystagmus with determined kinetic moment; and nystagmus depending on movement while holding a position (Langerung nystagmus). We examined our patients in several positions: sitting and lying in the supine position with left ear up and with right ear up.

We investigated cervical nystagmus in our patients with the head turning to the left and to the right while the body remained immovable. We used the Nylen classification for interpreting positional nystagmus.

RESULTS AND DISCUSSION

Nystagmus is infrequently seen in people with asymptomatic ischemic disturbances of cerebral circulation; this finding conforms to the definition of the disorder's latent form, which is not often observed, having been seen in only 12 persons from the main group. It tends to increase with age (from 4.2% for ages 30–39 years up to 11.6% for ages 50–59). In younger subjects, only nystagmus with fine amplitude was found; after age 40 years, moderate-amplitude nystagmus occurred; and among patients aged 50–59 years, nystagmus with coarse amplitude was found.

In contrast to spontaneous nystagmus, the latent form essentially occurs more often among persons with ACVD—69.3% for the latent form as compared with 33.3% for the spontaneous type ($p < .001$)—as the proportion of people with latent nystagmus increases along with age.

As a whole, latent nystagmus was predominant among persons from the main group, but we did note the presence of spontaneous nystagmus (as opposed to its absence in members of the control group). In younger persons, nystagmus with the following characteristics was dominant: fine amplitude, horizontal-rotatory or horizontal, fast, associated, and mainly second- or first-degree (Fig. 1).

The described characteristics of nystagmus show that in early forms of insufficiency of cerebral circulation and in younger patients, disturbances in the peripheral part of the vestibular analyzer prevail. Owing to the slow passing process, these disturbances are compensated (i.e., appear with no symptoms) and manifest only during physical or neurosensory hypertensions.

Among persons with ACVD, positional nystagmus is determined to be statistically important more often than is the spontaneous form: 60.7% for positional nys-

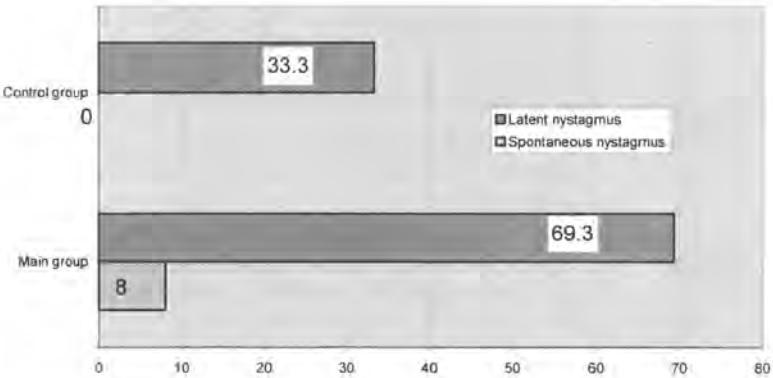

Figure 1. Subdivision of persons with spontaneous and latent nystagmus (expressed as percentages).

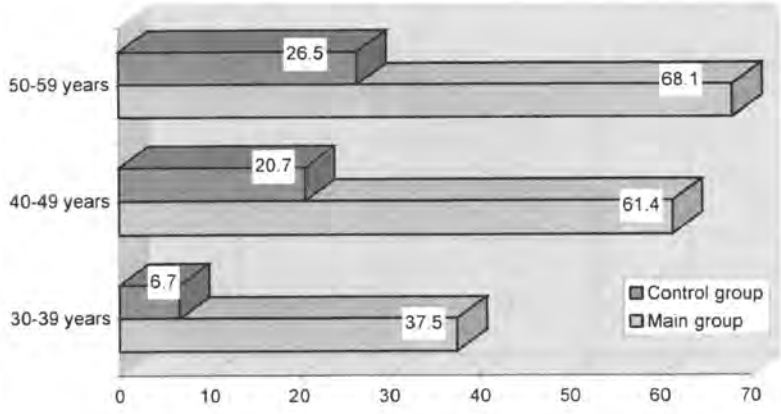

Figure 2. Subdivision of persons with positional nystagmus according to age (expressed as percentages).

tagmus as compared to 8% for spontaneous nystagmus ($p < .001$). The proportion of people with positional nystagmus in both examined groups increased with the subjects' ages (i.e., 37.5% in 30- to 39-year-old members of the main group), whereas for men older than 50, it reached 68.1%. In our control group, the proportion was 6.7% for the youngest group (according to their ages) and 26.5% for the oldest. According to the Nylen classification, more than one-half (54.9%) of the members of the main group represented type II and 25.3% type I. In our control group, 93.8% comprised type II and 6.3% type I. Type III occurred in every fifth member of our main group (19.8%) but was absent from all the control group members. The difference between types for both groups was considerable ($p < .001$; Figs. 2, 3).

According to the commonly accepted opinion that Nylen type II nystagmus is labyrinthiform and that type I to the down-lying ear is mainly labyrinthiform, we can conclude that in our examined group, the positional manifestations are mainly of the peripheral kind. Among persons with ACVD, horizontal-rotatory and horizontal nystagmus occur almost equally (44% and 41.8%, respectively), and the rotatory form accounts for only 14.3%. The number of people with horizontal-rotatory nystagmus decreases along with age, and the number of people with the rotatory form increases with age. In the control group, rotatory positional nystagmus did not register, horizontal-rotatory nystagmus occurred in 62.5%, and the horizontal form appeared in 37.5%. The difference between both groups is important only in regard to rotatory positional nystagmus ($p < .001$).

Although nystagmus with fine amplitude registered among most of the members of the control group (81.3%) and in one-half of the people from the main group (52.7%), nystagmus with moderate amplitude occurred nearly twice as often in the main group (33% and 18.8%, respectively). Positional nystagmus with coarse amplitude was observed in 14.3% of members of the main group but in no member of the control group.

In those in the main group, nystagmus after changing body position was observed nearly twice as often as in the control group: 56.3% as compared with 26.4%, respectively ($p < .01$). The latent period was determined among all persons with positional nystagmus in the control group, whereas in those in the main group, it occurred in only 72.5% of persons. As age increased, the proportion of people with ACVD increased three or

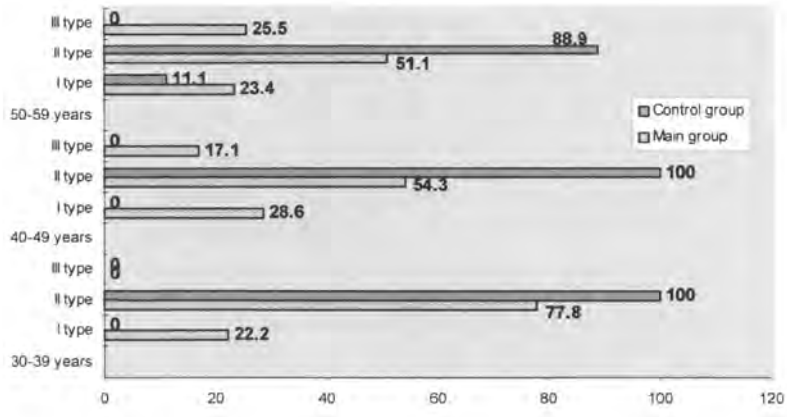

Figure 3. Subdivision of persons according to type of positional nystagmus (Nylen's classification; expressed as percentages).

more times and, because of this age-proportional dependence, the positional nystagmus does not have a latent period: 11.1% in 30- to 39-year-olds as compared to 36.2% in the 50- to 59-year-olds.

In general, positional nystagmus symptoms are observed much more often than are spontaneous nystagmus symptoms, and they are very often the first objective symptom of early disturbances of cerebral circulation, especially in the vertebrobasilar system. The presence of cervical positional nystagmus was registered in two-thirds of the persons with ACVD (64.7%) and in only one-third of members of the control group (32.1%; $p < .001$). In both examined groups, the number of people with cervical positional nystagmus increased as their age increased. The data about cervical osteochondritis correlate to the higher values of positional nystagmus in the 50- to 59-year age group among both the main and control subjects.

CONCLUSIONS

The results we obtained show that determining characteristics of vestibular spontaneous, latent, and positional nystagmus via Frenzel's spectacles plays an important role in the early diagnosis of ACVD. Among those with ACVD, latent nystagmus is predominant, but the presence of spontaneous nystagmus is seen. As in younger patients, nystagmus with the following characteristics dominates: fine amplitude, horizontal-rotatory or horizontal, fast, associated, and mainly second- or first-degree. Positional nystagmus symptoms are observed more often than are spontaneous nystagmus symptoms, and they are very often the first objective symptom of early disturbances of cerebral circulation in the vertebrobasilar system [11,12]. This finding determines the necessity of treating the disorder in every patient by all possible methods. In early stages of circulatory dysfunction in the vertebrobasilar system, the vestibular symptoms have mostly a labyrinthine origin; later, they arise from central origins. We may conclude that our results from the investigation of nystagmus reactions through Frenzel's spectacles are of great importance for the early diagnosis of vestibular dysfunction in ACVD.

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