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THE STATE OF THE ANALYZER FUNCTIONS DURING CHRONIC OCCUPATIONAL
INTOXICATION WITH CERTAIN SUBSTANCES HAVING A NARCOTIC EFFECT

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Translation of: "Sostoyaniye Analizatornykh Funktsiy Pri Khronicheskoy
Professional'noy Intoksikatsii Nekotorymi Veshchestvami," Gig.Truda, 9,
pp. 19-22, 1972.

Soviet literature contains a significant number of publications devoted to the study of analyzer functions during various forms of occupational pathology (E. A. Drogichina et al.; L. G. Okhyanskaya; V. G. Osipova and L. G. Okhnyanskaya; Z. F. Nestrugina; B. A. Atchabarov et al., and others). In a number of studies the high sensitivity of certain analyzers to the effect of toxic agents is pointed out.

Thus, according to the data of V. Ye. Ostapovich et al., the vestibular apparatus has an elevated sensitivity to substances which exert a narcotic effect (benzine, vulcanizing gases). A complex investigation of the analyzer functions having the goal of revealing the degree of involvement of each of the analyzers, as well as a study of the mechanisms of formation of their disorders during exposure to various harmful factors are of interest.

We studied the state of the basic analyzer functions (taste, olfactory, vestibular, auditory, visual) in 60 patients with a pronounced form (second and third stage) of occupational intoxication caused by inhalation exposure to narcotics. In half the patients (in 30) intoxication with unsaturated and chlorinated hydrocarbons (ethylene, propylene, vinylchloride, trichlorethylene, and others) was noted, while the remainder suffered from methylmethacrylate intoxication. The intoxication appeared as a syndrome of the so-called vegetative-sensory polyneuritis against a background of significant asthenization with the presence of more or less pronounced brain stem symptoms. The latter, in pronounced cases, were represented by profound oculomotor disorders (strabismus of the -[illegible]- Maghandi variety, nystagmus, tremor of the eyeballs with the -[illegible]- phenomenon of them, and also by disorders of swallowing, with hypotrophy of the tongue, and hypothalamic paroxysms. In mildly pronounced cases one detected only mild oculomotor and trigeminal [Translator's note: the word is blurred, but it appears to be deficiency].

During the study of the analyzer functions the data of clinical examinations were used. Moreover, for investigating each of the analyzers individually, a combination of special methods were employed which made it possible to study excitation, lability, and their adaptational capacity. As a control, six practically healthy people of an analogous age composition were examined; these people had not been in contact with toxic substances (they were clinical associates of ours). The obtained numerical figures were statistically processed.

The most pronounced, clinically clear deviations were found with respect to the vestibular analyzer. In patients with gross brain stem symptoms, these deviations organically entered the clinical picture of intoxication and were evidenced by complaints of dizziness, indeterminate sensation of unsteady gait, sensation of the ground moving beneath the feet, and unsteadiness of surrounding objects.

Objectively during this process, close misses during the finger-nose test we revealed as well as unsteadiness in the Romberg position. Similar clinical signs of vestibular inadequacy were detected less seldom among a group of persons with microorganic brain stem symptoms and were also less pronounced. They were not found at all in the control.

The use of load tests made it possible to establish disorder of vestibular function among all patients, frequently identically pronounced on both sides. The caloric test proved most adequate. An investigation of caloric nystagmus (washing the outside auditory passage with 60 ml water at 19° for 10 seconds) in more than one-half of the patients revealed complete absence of vestibulo-motor reaction. In the remaining cases, a decrease in excitability of the vestibular apparatus was noted; this was manifested in lengthening of the latent period and shortening of the duration of nystagmus to 10-15 seconds (in the norm 60-80 seconds). In addition to this, in one-third of the patients (more frequently in patients with pronounced brain stem symptoms), the caloric test revealed an enormous vegetative reaction with whitening of the face, cold sweat, bouts of vomiting with subsequent deterioration of overall condition for several hours or even days. The rotation test was particularly poorly tolerated by these patients. We refrained from carrying out this test further after two patients experienced short term respiratory failure during the test. An investigation of the optokinetic nystagmus in a significant portion of the patients revealed its rapid exhaustion with the appearance of "lapses" in tracking movements of the eyes. Active fixation of attention and glance (calculation of the hearing range) made possible an increase in the amplitude and uniformity of nystagmus in a number of cases.

The subjectively estimated disorders of visual function are intimately linked with the pathology of the vestibular analyzer. Most of these disorders were caused by the inadequacy of the oculomotor apparatus. An attempt actively to fix a glance on an object frequently caused dizziness, and a sense of nausea with reddening or paling of the face. In pronounced cases the patients were forced to refrain from reading and watching television transmissions. An investigation of the analyzer function in the indicated categories of patients was extremely difficult, while in certain of them (three) it proved to be impossible. In the absence of oculomotor disorders, most of the patients did not complain of disorders of vision. Nevertheless, an examination of the state of the visual analyzer -- adequate optic chronaxia, adaptation to darkness, and the critical frequency of blending flashes caused a change in all indices in most patients. The curve of adequate optic chronaxia was sharply altered. As a rule, it was of a fluctuating character, frequently with an increase toward the end of the investigation. The level of the curve reflecting the adaptation capacity of the visual analyzer principally decreased toward the end of the investigation. In an overwhelming majority of the patients, the critical frequency of merge blinks also proved to be diminished. With respect to the remaining analyzer functions investigated by us (auditory, taste, olfactory), none of the patients revealed any active complaints with respect to disorders affecting them. However in a special questionnaire, success was achieved in establishing inadequacy of certain of these in part of the subjects. This primarily pertains to the auditory analyzer. Thus, disorders in the sphere of the auditory analyzer appeared in the form of more difficult perception of the spoken voice with good hearability of sounds. In a number of cases poor tolerance to extreme noises was noted.

During an objective examination, in two-thirds of the patients a slight and most frequently identical bilateral decrease in hearing was revealed; this took the form of different types of audiometric curves. Somewhat more frequently, an ascending type of audiogram was found with a decrease in hearing with respect to low frequency tones down to 35-40 db. However, there were also curves with two slopes which were characterized by increased thresholds of both low and high frequency tones (up to 40-45 db) with preservation of normal hearing in the speech zone (1,000-2,000 Hz). In a number of cases a slight decrease in hearing throughout the entire frequency range was noted. In the control group the thresholds of tonal audiometry in both air and bone transmission were 0-10 db, which is in agreement with the data of the literature. With respect to the degree of functional mobility of the auditory analyzer, judgment was made by the maximum duplication of rhythmic stimuli and according to the critical interval of differentiating between two sounds. An increase in the interval of discretion was revealed as well as a decrease in the critical frequency of merging of sound bursts.

During the special examination of the taste analyzer by the drop stimulus method, taking into account the taste zones of the tongue, a statistically reliable increase in the threshold of noting bitterness was revealed (0.005 ± 0.00023) and with respect to sweet stimuli (3.4 ± 0.31) ($P < 0.01$). The sensitivity to acid and salt was within the limits of the norm in most patients. In a number of cases, in addition to an increase in the threshold of sensitivity, there was an inversion of the taste sensations: acid was perceived as salt while salt was perceived as acid or as a bitter taste. A residual effect was also frequently noted (up to 1-2 hours) after placing a bitter substance on the tongue.

Similar data were also obtained during a study of the olfactory analyzer. The investigation of olfactory function carried out by the Elsberg-Levi method revealed in most patients an increase in the threshold of olfactory sensitivity to thymol and camphor to 16-18 mm, while at the same time the threshold with respect to coal tar and Rosemary remained within the limits of the norm. In addition to dissociated hyposmia, in most patients an increase in the time of adaptation was noted as well as a slow down in the restoration of the original threshold after load.

Hence, as the result of a special investigation, inadequacy of all the analyzer functions investigated by us was found. The most profound in clinically well-defined changes were detected in the sphere of the vestibular analyzer. Disorders of the remaining analyzer functions most frequently were of a subclinical character. An analysis of the revealed vestibular disorders makes it possible to theorize a significant deficiency of its central regions. This indicates a character of disorders of optokinetic nystagmus as well as the presence of dissociation between the degree of pronouncement of the vestibulomotor and vestibulovegetative reactions with predominance of the latter. There is every basis to hypothesize a significant involvement of the vestibular nuclei of the brain stem, which is indicated by the pronounced clinical picture of vestibular insufficiency, as well as by the presence of other symptoms of brain stem pathology.

Disorders in the sphere of the other analyzers are primarily linked with inadequacy of their cortical terminus, which provides for finely specialized functions. These types of disorders are particularly clearly revealed during the examination of the auditory, taste and olfactory analyzers. For the very visual analyzer, pronounced deficiency of the central neural mechanisms is characteristic, as is their significant degree of exhaustion, which is possibly worsened to a certain extent by the oculomotor disorders.

The functional dynamic character of the revealed disorders in the sphere of the visual, auditory, taste, and olfactory analyzers in the presence of local brain stem pathology provides a basis to evaluate them as a manifestation of dysfunction of the brain stem's reticular formation. It is in fact this formation which is primarily damaged during long term exposure to narcotics, which are the cause of intoxication in the patients examined by us.

REFERENCES

- Атчабаров Б. А., Мошкенич В. С., Пятаев Г. Д. Ж. ушн. нос. и горл. бол., 1967, № 4, с. 42. — Дрогичина Э. А., Охнянская Л. Г. и др. Труды АМН СССР, 1954, т. 31, с. 9. — Нестругина З. Ф. Слуховая и вестибулярная функции при профитоксикациях тяжелыми металлами. Автореф. дисс. канд. Харьков, 1958. — Осипова В. Г. Гиг. труда, 1957, № 3, с. 44. — Остапкович Е. В., Милков Л. Е., Макаренко Ю. И. В кн: Материалы I-й Всесоюз. конференции по ранней диагностике, экспертизе трудоспособности и профилактике профессиональных заболеваний химической этиологии. М., 1971, с. 101. — Охнянская Л. Г. Труды АМН СССР, 1954, т. 31, с. 28.