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RHEOENCEPHALOGRAPHY IN MENIERE'S DISEASE

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| 16. Abstract REG was used on 35 patients with Meniere's disease to determine tonus and perfusion of cerebral vessels. The analysis took account of age, duration of the disease and presence of absence of cervical osteochondrosis. Hypertensive symptoms in the vertebro-basilar system predominated in the under 45 group, while for the over 45 patients and those suffering for more than 5 years hypertensive symptoms were likewise noted in the internal carotid arterial system. Signs of angiospasm were revealed both for patients with cervical osteochondrosis (12) and without it (9). Thus, hypertensive signs were noted in 88.5% of patients with Meniere's disease and, as a rule they were noted in the entire vertebro-basilar system without respect to the presence or absence of concurrent cervical osteochondrosis and uni- or bilateral affection of the labyrinth; in patients over 45 who had suffered more than 5 years this also applied to the internal carotid arterial system. REG makes possible not only identification of the condition of cerebral circulation but also the planning of more effective therapy that influences vascular tone. |  |  |   |   |     |
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## RHEOENCEPHALOGRAPHY IN MENIERE'S DISEASE

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There is an opinion current [13, 12, 8, 7, 5, et al.] that Meniere's disease is based upon a dysfunction of autonomic innervation of the vessels of the inner ear, this dysfunctioning appearing as a spasm or dilatation of the labyrinthine arterioles. For the purpose of defining the nature of these disturbances it was suggested that use be made of a subcutaneous histamine test [1], plethysmography or capillaroscopy [2, 11], inhalation of carbogen or oxygen [8].

After the appearance of the rheoencephalographic method (REG) making it possible to objectify the mechanism of vascular regulation while determining the localization side of the process, some authors [6, 9, 10] used this method in cases of Meniere's disease and expressed themselves satisfied with its reliability for the discovery of vagospastic or vasoparalytic forms of the disease and the assignment of appropriate therapy.

We have used the REG to determine the tonus and perfusion of vessels of the brain in 35 cases of Meniere's disease.

As we know, the principle of the REG is the recording of changes in electrical resistance of tissues for a determined segment of HF current based on differences in vascular perfusion that are caused by the cyclic action of the heart which evokes synchronous fluctuations in the brain's electric conductivity. For the REG we used the East German type 6 NEK-3 polygraph with a 4 channel Soviet rheographic attachment type 4 RG-1A. We calibrated the rheograph with a standard resistance of 0.1 ohms, the patient being hooked up in parallel. The calibrating signal was adjusted to 10 mm.

Record was made with symmetrical frontomastoidal (FM) leads showing the type of

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\* Numbers in the margin indicate pagination in the foreign text.

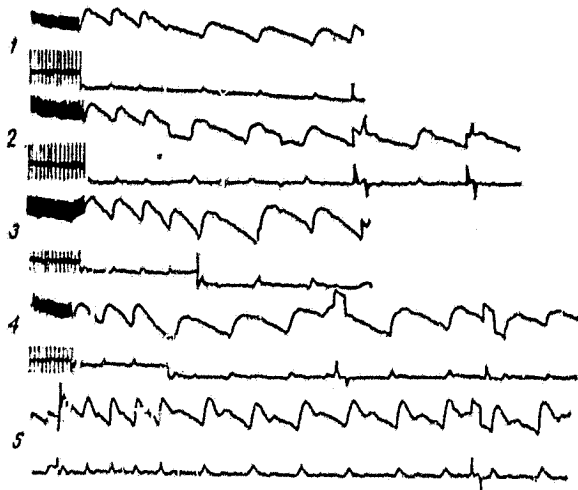


Fig. 1. REG of patient M. with high vascular tonus. 1 - FM right, 2 - FM left, 3 - OM right, 4 - OM left, 5 - after nitroglycerin test. Under each REG curve - differential curve.

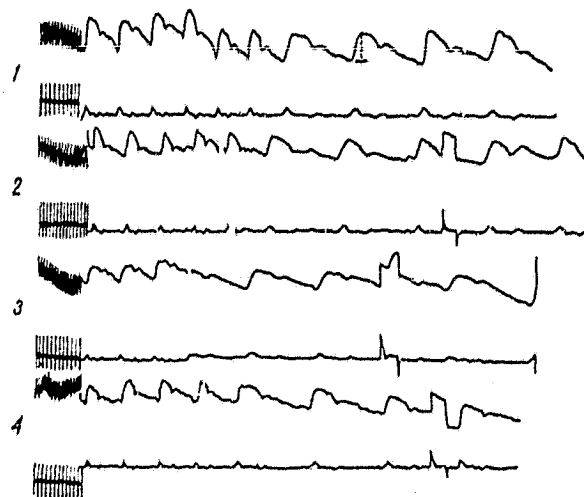


Fig. 2. REG of patient S. with low vascular tonus left side. Rest as above.

blood circulation in the system of internal carotid arteries and with the occipito-mastoidal (OM) leads showing blood circulation in the system of the vertebrobasilar arteries.

REG makes it possible to discover the special features of cerebral blood flow and to assess the tonus of cerebral vessels.

For the evaluation of blood perfusion in the cerebral hemispheres and the tonus of the cerebral vessels we took into account:

- 1) the shape of the rheographic curve as an index of the tonus of the vascular wall;
- 2) the rheographic index value (RI) showing the intensity of arterial perfusion in the brain area under study;
- 3) length of the anacrotic phase of the REG curve in seconds reflecting the elastic capability of the vascular wall;
- 4) the presence of asymmetrical intensity of blood perfusion in the system of internal carotid and vertebrobasilar arteries.

In the control group the average value for the RI of the hemisphere REG was  $1.2 \pm 0.1$ , for the occipital tracings  $0.9 \pm 0.1$  and length of the anacrotic phase was  $0.10 \pm 0.01$  and  $0.10 \pm 0.01$  sec respectively.

There were the following signs of angiospasm: slower rise of the anacrotic peak, rounded off peaks, at times a plateau or arclike peak, indistinct incisure, a weak dicrotic notch. The principal finding from the quantitative indices was a reliable drop in the RI. The nitroglycerin test was followed by an increase in the amplitude of the curve, normalization of the shape of REG attendant upon the decline

of vascular tonus. Fig. 1 shows the REG of patients with Meniere's disease and symptoms of angiospasm.

The patients studied (24 women and 11 men) ranged in age from 32 to 60. All of them in the clinicoaudiological and vestibulometric examination presented a triad of symptoms (vertigo, diminished auditory acuity and noise in the ears, equilibrium disturbance) typical of Meniere's disease. 25 patients presented unilateral impairment of the peripheral cochleovestibular apparatus. 12 under X-ray showed signs of cervical osteochondrosis.

17 patients presented signs of angiospasm both in the system of internal carotid arteries and in the vertebrobasilar system, in 2 of these cases on the same side as the impairment; in 12 patients these symptoms were revealed only in the vertebrobasilar system bilaterally, in 2 cases only on the impairment side, in 3 cases there were no signs of hypertonus and 1 female patient presented reduced vascular tonus (Fig. 2).

In analyzing the REG we took into account the patient's age, length of illness and the presence or absence of cervical osteochondrosis.

The patients up to age 45 presented a REG with predominant symptoms of hypertonus in the vertebrobasilar system, whereas older patients showed signs of hypertonus not only in the vertebrobasilar system but also in the system of internal carotid arteries and this is apparently explained by the incipient formation of a hypertonic syndrome or by sclerotic changes in the vessels.

Patients who had been ill more than 5 years also showed a REG with a predominance of hypertonic symptoms in both systems (12 patients).

Symptoms of angiospasm were presented both by patients with cervical osteochondrosis (12 patients) and by 19 patients without such symptoms.

An analysis of the literature data bears witness to the fact that the REG of patients with Meniere's disease are interpreted variously despite the fact that the method is acknowledged to be valuable and reliable in the assessment of the condition of cerebral circulation. Thus, V. V. Mitrofanov, in 45 out of 50 patients with

Meniere's disease, found a difference in the intensity of blood perfusion and a difference in the anacrotic phase in the vertebrobasilar system on the impairment side without substantial changes of perfusion in the system of the internal carotid arteries. A. N. Pomukhina and N. N. Filimonov in noting similar changes explain them as due to irritation of the periarterial sympathetic plexus of the spinal artery in the osteochondritic process. In contradistinction to this V. N. Prokhorov found in most patients (9 out of 12) a healthy symmetrical blood flow in the vertebrobasilar system.

WE know that the REG shows the quality not only of pulse fluctuation but also of changes in elasticity and tonus of the cerebral vessels [14], so that in our o- /15 pinion it is important to take into account the patient's age, length of illness, frequency and intensity of vertigo attacks, presence or absence of concomitant cervical osteochondrosis and its clinical severity.

We have had under observation patients with frequent vertigo attacks repeated monthly or even oftener; the attendant cervical osteochondrosis did not appear with clinical symptoms that were typical and caused by osseous growths in the bodies or processes of cervical vertebrae. We discovered signs of hypertonus in 88.5% of patients with Meniere's disease, as a rule, in the entire vertebrobasilar system without reference to the presence or absence of accompanying cervical osteochondrosis and likewise in the system of internal carotid arteries in patients older than 45 who had suffered from the disease more than 5 years.

More intensive changes in cerebral blood circulation, it would appear, are due to the spread of dysfunction in the autonomic nervous system, which is the root of Meniere's disease [13, 12, 8, 3, 4 et al.] with vasomotor impairment not only in the vertebrobasilar system but also in the system of internal carotid arteries and likewise with sclerotic vascular changes or incipient manifestations of a hypertensive syndrome.

Thus the REG makes it possible not only to discover the condition of cerebral circulation but also to determine the extent to which it has changed and to indicate a more effective use of conservative therapy affecting vascular tonus.

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