

## RHEOENCEPHALOGRAPHIC CHANGES OF CEREBRAL ATHEROSCLEROSIS

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Polzer K. and Schuhfried F. (1950), examining patients with cerebral atherosclerosis, establish an increase of the time-period of the ascendent part of the rheoencephalographic (REG) curve up to 0.25 sec. Kunert (1959), Auinger et al. (1961), Czernic A. and Serzisko (1963) etc. report similar results. Jarulin H. H. (1967) accepts that the ratio of this time-period to that of the whole pulse wave is 29.1%. The authors find a decrease of the REG-curve amplitude, rounding of its peak and flattening of the polydi-crotic wave, together with the aforementioned changes.

The object of the present work is to study the changes of the cerebral haemodynamics in the course of various stages of cerebral atherosclerosis by using REG. The study covers 60 patients, aged 36—85 years. The following 3 groups, concerning the clinical and laboratory data, are formed: I<sup>st</sup> group — 20 patients with cerebral atherosclerosis in an initial stage. By using REG-investigation, it is established that all cases show bilateral rounding of the pulse-curve peak and moderate flattening of the polydi-crotic waves. The pulse-track amplitude is equal averagely to 0.11  $\Omega$ . The time-period of the ascendent part of REG is 0.1 sec. and the ratio of this period to that of the whole cardio-cycle is 13.5% (table 1). We illustrate the REG of one of the patients — I. T. R., 70 years, c. r. 1041/1969: Hemi-spheric asymmetry at the global FM-recording is not registered. The pulse-curve amplitude is 20,20  $\Omega$  and the time-period of the ascendent part is 0,13 sec. The ratio of this time-period to that of the whole cardio-cycle is 19%. The occipital REG-amplitude is equal to 0.9  $\Omega$ , while the time-period of its ascendent part is 0.1 sec. The pulse-track peaks are bilaterally rounded and the polydi-crotic waves are flattened (fig. 1).

The bilateral morphological REG-track changes, slight elongation of the time-period of the ascendent part of the pulse curve at hemispheric recording, as well as the more expressed relation of the time-period of the ascendent part of REG to that of the whole pulse wave, support the diagnosis "initial atherosclerosis of the cerebral vessels". The incipient atherosclerosis of the retina-vessels confirms this idea.

The REG-analysis shows that slightly expressed cerebral atherosclerosis can be established at senile age. Minz A. J. (1965) and Ronkin N. M. (1967) report similar data. Jarulin H. H. (1967) determines the degree of the cerebral atherosclerosis by using the dynamic REG-changes under the influence of vasoactive medicines.

**II<sup>nd</sup> group** — 20 cases. Slightly expressed atherosclerosis of the cerebral vessels. The REG of the patients of this group is characterized by a round and flat (plateau-like) peak, with flattened polydi-crotic waves and decreased amplitude. The time-period of its ascendent part is averagely equal to 0.15

sec. and the ratio of this period to that of the whole cardio-cycle is 17.2%. We illustrate the REG of one of the patients — I. N. D., age 70, c. r. 8434/1963: The pulse-curve amplitude of the global recording is  $0.1 \Omega$  to the right and  $0.11 \Omega$  to the left. The time-period of the ascendent part is 0.166 sec. The ratio of this period to that of the whole cardio-cycle is 20.5%.



Fig. 1: REG of a patient with initial atherosclerosis (A) of the brain vessels (BV)

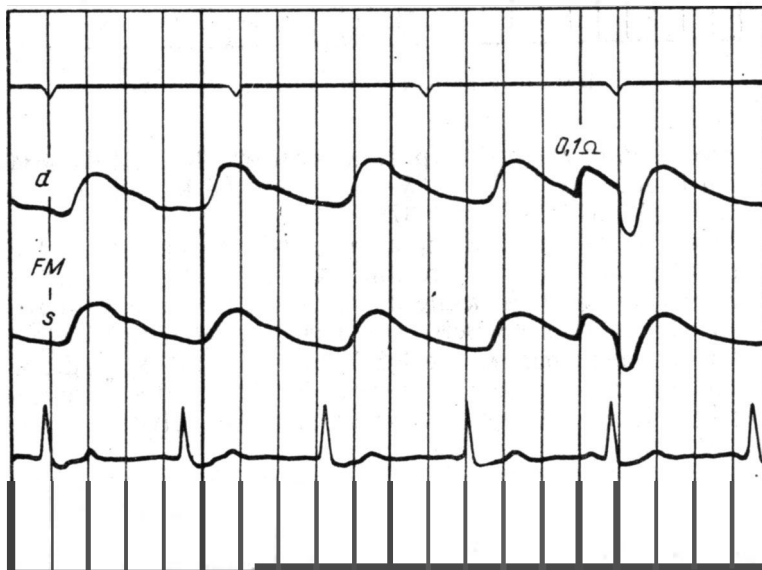


Fig. 2: REG of a patient with moderate A of the BV

The REG-track peaks are rounded, at some segments — plateau-like. The polydicrotic waves are rounded (fig. 2). The REG-findings suggest moderate atherosclerosis of the cerebral vessels.

**III<sup>rd</sup> group** — 20 cases. Well-expressed atherosclerosis of the cerebral vessels. Bilateral plateau and archwise-changed REG-peaks, also totally flattened polydicrotic waves, are established. The time-period of the ascendent part of the pulse-curve is averagely equal to 0.13 sec. and the ratio of



Fig. 3: REG of a patient with expressed A of the BV

this period to that of the whole pulse-wave is 23,3%. REG-amplitude at FM-recording is equal to 0.074  $\Omega$ . We illustrate the REG of one of our patients — D. K. G., age 72, c. r. 9378/1968:

An increase of the angle of the ascendent-part slope of the REG-curve is registered at global FM- and regional OM-recordings. Its amplitude at hemisphere-recording is 0.09, while at occipital it is 0.05 to the right and 0.04  $\Omega$  to the left. The asymmetry coefficient is equal to 25%. The time-period of the ascendent part of the REG-curve is 0.23 sec. and the ratio of this period to that of the whole pulse-wave is 22.9%. The pulse-track peaks are bilaterally plateau-like or archwise and the polydicrotic waves are flattened (fig. 3).

The REG-findings contribute to a heavily developed atherosclerosis of the cerebral vessels and disorder of the cerebral haemodynamics in the pool of the left vertebro-basilaric system.

The analysis of the received data shows that the various forms of cerebral atherosclerosis are manifested with certain REG-changes. The configurative and architectonic changes of the pulse-curve (peak rounding, polydicrotic-wave-flattening, elongation of the time-period of REG-ascendent part and the percent-ratio of this period to that of the whole pulse-wave) are considered to be most characteristic. These data support the idea of an increased vessel-tone. The blood-current in the cerebral vessels tends to a de-

crease in the course of the atherosclerotic development. The lower amplitude of REG-track in the third stage of the disease confirms it. The cerebrohaemodynamic disorders in our cases are due to the atherosclerotic lesion of the cerebral vessels as well as the regional metabolic disorder ((Andrew S. V., J. S. Tchetchulin — 1965), also the changed neuroreflective mechanisms (Mironov P. — 1960. Trachov R. A. — 1960; Jarulin H. H., Z. J. Soloveva — 1962; Hajutin V. M. — 1964, etc).

The bilateral changes of REG of patients with cerebral atherosclerosis support the opinion of Lang G. F. (1953); Monkovski V. N., V. M. Slominskaya, Z. N. Dracheva (1960); Maksudov G. A. (1962), etc. concerning the diffusive character of this disease.

In conclusion it must be pointed, that by using REG, the state of the cerebral haemodynamics at different stage of cerebral atherosclerosis can be considerably determined.

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#### РЕОЭНЦЕФАЛОГРАФИЧЕСКИЕ ИЗМЕНЕНИЯ ПРИ АТЕРОСКЛЕРОЗЕ МОЗГА

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#### РЕЗЮМЕ

С помощью реоэнцефалографии авторы прослеживают изменения гемодинамики мозга у 60 больных с атеросклерозом мозга. Полученные результаты показывают, что различные стадии заболевания характеризуются определенными изменениями параметров реоэнцефалографной кривой.