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TICK ENCEPHALITIS IN MOLOTOV OBLAST IN 1948

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Clinical study of tick encephalitis in Molotov Oblast has established a unique and clearly defined quality by comparison with the clinical picture of tick encephalitis as described in the Far East (Miyai', Shapoval, Panov, and others) and Kazakhstan (Atabekov and Kazaryko).

A comparative clinical description of cases at various seasons of the year has shown the presence of seasonal, apart from local, peculiarities. In N.V. Samovich's "The State of the Spinal Fluid in Spring-Summer Encephalitis," in the work State of the Spinal Fluid in Tick Encephalitis, published in Trudy Molotovskogo stomatologicheskogo instituta, Vol VI, 1943, which was based on material from the years 1939 to 1941, we were able to note the presence of local and seasonal differences in changes in the fluid, with a repetition of the basic type characteristics.

The peculiarities of tick encephalitis in Molotov Oblast are clearly revealed by observations as to the course of tick encephalitis in 1948 in the data of the nerve diseases clinic of the Molotov Medical Institute. During the summer months, 47 patients with acute forms of tick encephalitis were admitted to the clinic from various rayons of the oblast. All patients had, before developing the disease, been in the woods, but only 42 percent had picked ticks from themselves. The first case of the disease dated from 13 May and the last from 1 August. In May, nine persons became ill; in June, 25; in July, 12; and in August, one.

- 1 -

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As in past seasons, meningeal forms predominated, without pronounced focal symptoms. The meningoenephalitic form was detected in 24 persons, the poliomyelitic in 3, the poliomyelitic myelitic in 4, the poliomyelitic neuritic in 4, and the encephalitic in one. Forms which were not clearly defined were detected in four persons.

A special group was formed by seven patients with the presence of sympathalgia and neurovascular dermal reactions which had not been described earlier in the works of local neuropathologists. It was possible to detect forms which were not clearly defined in only the Mulyansk center, where all cases of illness were submitted to scrutiny.

Without touching on the characteristics of sufficiently well-known type manifestations of tick encephalitis, it is still necessary that individual aspects of the cases of disease occurring during the season under consideration should be given attention.

In 11 of the cases, a two-phase course of the high-temperature period was observed, then, following a 2-day rise in temperature, the temperature fell to normal for 1-2 days, with an improvement in the patient's condition, and then again underwent a strong rise. In such cases, the neurological symptoms had already reached the second phase when the patient was placed under the observation of a neuropathologist, while the primary period was revealed on the basis of anamnestic information and was more often than not diagnosed originally as influenza. Examination of patients did not reveal the presence of typical influenza manifestations during the primary period. It had also been possible to observe such a two-phase temperature trend in earlier seasons; in 1939, it was noted in almost one half of all cases.

Paralytic symptoms in the form of pronounced atrophic paresis of the upper extremities were observed in eight persons (17%), two of them exhibiting this in conjunction with paresis of the neck muscles. In six patients, there occurred also a mild swelling of the muscles of the humeral belt. Atrophic paresis of the lower extremities did not set in. Cerebral hemiparesis was noted in one case. Disturbance of the cranial innervation was exhibited by eight patients.

During the whole period of observation, the motor disturbances which had set in did not change. An exception was one female patient, who underwent a considerable improvement of the motor functions. Upon discharge, she was able to hold her head in a vertical position, while during the acute period, the head had fallen down on the chest. In this patient, the functional disturbances of the cranial nerve also disappeared.

Sensory disorder appeared in the form of paresthesia (the outer edge of the hand, the second finger of the hand, the back of the neck, and others) and disorder in sensitivity (hyperaesthesia, hyperaesthesia) of the segmental type. The latter were noted, as well as their localization in the segments of the lower neck, no less often in the 1st thoracic section (D₁ - D₇).

A peculiarity of the disease was the presence of seven cases with a unique course, of which the following is typical. Following a 4- to 16-day incubation period after the tick bite, there appeared on the site of invasion itching and hyperemia of the skin of a circumscribed nature. The hyperemia of the skin spread diffusely in the first week of sickness, occupying an area of a radius from 10 to 15 cm. In the second week of sickness, in the central portions of this area, the skin began to become and only the annular hyperemic peripheral zone continued to spread further. Gradually losing color, it was lost to view on the third week of sickness, at a distance of 20-30 cm from the site of invasion. Simultaneously with the hyperemia of the skin there developed a

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general malaise, high temperature, headache (sometimes with nausea), mild meningeal symptoms, and sharp pains of a burning, unpleasant nature, situated in the extremity nearest the site of the bite. The muscles and the neurovascular band of this extremity were painful to the touch.

In one female patient, who had not been receiving serum treatment, there appeared, as the local dermal reaction subsided, individual, pink annular-rash elements over the entire body. In the cases cited above, the general symptoms of neuroinfection (general malaise, headache, high temperature, acceleration of ROE [reaction of erythrocyte sedimentation], pleocytosis) were accompanied by symptoms indicating that the regional sympathetic elements were affected (local pain syndrome of sympathalgic character, change in sensitivity, and disturbance of neurovascular skin reactions).

Recognizing the great importance of spinal-fluid diagnosis of tick encephalitis, we sought to do everything in our power to study the spinal fluid. Measurement of the pressure of the spinal fluid by carrying out medical-diagnostic lumbar taps revealed interesting data. The taps were performed with the patient placed in a reclining position. An initial pressure of the water column of from 40 to 50 mm was established ten times; from 50 to 100 mm, 34 times; from 100 to 150 mm, 13 times; and higher than 150 mm (180 mm), once. A reduced pressure of the fluid was repeatedly observed in patients in the period of the clearly pronounced meningeal symptom complex. With repeated tapplings in such cases, simultaneously with amelioration of the patient's condition, a normalization of the pressure of the fluid was noted.

In investigating the fluid, lymphocytal pleocytosis was established in the majority of cases, ranging from tens to the first few hundreds of formed elements [blood corpuscles?] in one cubic millimeter. The amount of protein did not exceed 0.45% in positive protein reactions. In investigation of the blood, leucocytosis ranging from 9,000 to 12,000 was encountered in 22% of those examined. ROE, as a rule, was accelerated and was normal only in individual cases. In the second month of sickness, a moderate eosinophilia was not infrequently noted.

The carbohydrate-salt metabolism was investigated in 45 cases and the potassium-calcium metabolism in 12.

Carbohydrate Metabolism

A normal amount of sugar in the blood was observed in 79% of those examined. In 11.7% of those examined, the absolute sugar content of the blood was reduced 52 to 79 mg %.

The coefficient of penetration for sugar was increased in 62.5% of those examined. A pronounced hyperglycorrhachia was noted in 35% of the cases. The increase in penetration of the hematoencephalic barrier for sugar was unevenly pronounced at various stages of sickness: in the first 2 weeks, in three fourths of those examined; in the third and fourth weeks, in one half; and more than one month after the beginning of sickness, in only one third.

Salt Metabolism

The absolute sodium-chloride content of the blood increased in 30.3% of the patients. The coefficient of penetration of the hematoencephalic barrier for sodium chloride was reduced in 65% of the cases, due mainly to pronounced hyperglycorrhachia (85.7%). The coefficient of penetration of sodium chloride in the first 2 weeks of sickness was reduced in more than three fourths of those examined; in the third week, in one half; and after more than a month, in one third.

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Comparison of the carbohydrate and salt metabolisms for the period of sickness revealed an inverse relationship between them. In the early phases of sickness, when the greatest number of cases with increased coefficient of sugar penetration was observed, the penetration of sodium chloride proved to be lowered in the same proportion. The inverse relationship between them remained also in later phases.

Potassium-Calcium Metabolism

The coefficient of penetration of the hematoencephalic carrier was within normal limits in 60% of the cases.

In 40 cases, the Lange reaction with colloidal gold was performed, with a normal type of curve being obtained in 21 cases and a change in color toward violet being observed in 19 cases in the third, fourth, and fifth test tubes. Of them, these changes set in eight times with meningeal forms in the second week of sickness and 11 times with forms exhibiting local symptoms at various stages of sickness. The type of curve obtained shows coincidence with the syphilitic bend in the corresponding curve and with the curve for poliomyelitis. A meningitic curve was not observed. The data obtained in performing the Lange reaction agree with the fluid-pressure indications, i.e., with the absence of a meningitic curve and of increased pressure.

Completely different data were obtained by A. B. Mandel'boym in investigating the spinal fluid and blood of patients sick with tick encephalitis in Kazakhstan. These data are fundamentally different from ours in the following respect: predominance of high fluid-pressure values, different morphological composition of the cellular elements, presence of a usually meningitic curve in the Lange reaction, absence of changes in the salt metabolism, and lowering of the coefficient of penetration for sugar. The data cited clearly indicate decided differences in the laboratory characteristics of tick encephalitis in Molotov Oblast and Kazakhstan.

Our laboratory data differ in smaller degree, and in individual instances approximate the investigations by V. V. Kartasheva of patients in the subacute stage of the western variant of tick encephalitis. The author notes the presence, in the [spinal] fluid and in the blood, of pathological shifts in the biochemical equilibrium of both the carbohydrate and salt metabolism (in the majority of patients, there was an increase in the coefficient of penetration for sugar and pronounced hypochlorrachia).

Basically, in the treatment of our patients, together with supplementary methods, the antiencephalitis serum of hyperimmune goats was used. The serum was prepared by the Molotov Virusological Laboratory on the basis of Prof A. V. Pshenichnov's method. Following medical-diagnostic lumbar tapping, which confirmed the diagnosis, the patients were injected intramuscularly, after Bezredko, with 30 cc of serum which had been slightly heated. With the ordinary method of injecting the serum, an unusually high percentage (up to 58) of serum sickness was observed in 1948 in the form of skin eruptions of the urticaria type, with painful skin itching and sometimes with edema of the eyelids, gums, and even of the larynx. The presence of aphonia, together with edema of the larynx, could simulate the appearance of bulbar disorders.

The general seral symptoms, which usually set in on the sixth to eighth day following injection, were usually preceded (for 2-3 days) by a local reaction in the vicinity of the site of injection (in the buttock).

A lethal outcome developed in only one case of the encephalitic form.

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