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EXPEDITION IN 1946.

In 1945 and 1946 and in 1943 and 1944 cases of an unknown disease were recorded in Sargatsk, Soldatsk, and Bolsherechensk districts of Omsk Oblast. The greatest number of cases occurred in spring (May) 1946. Information was received that similar cases of disease occurred in Bolsherechensk district neighboring Ust-Tarsk district of Novosibirsk Oblast.

It was impossible to determine the nature of this illness by the usual method of epidemiological survey.

In May 1946, in view of this fact, on the initiative of A. P. Polyakova of the Anti-Epidemiological Administration of Omsk Public Health Department, a group of specialists headed by V. P. Konstantinov of the Department of Infective Diseases of M. I. Kalinin Omsk Medical Institute, and A. A. Gavrilova of the Regional Anti-Tularemia Station, with assistants of the Infection Clinic Yu. V. Veselova, G. A. Sizemova, and Z. V. Fenelonova, were sent to Sargatsk and Soldatsk districts. After examination of several patients in the district, these doctors could not solve the nature of this disease. However, resemblance of clinical picture of the new disease to Crimean hemorrhagic fever earlier described in special literature and unusual abundance of pasture ticks in the foci, suggested the infective and transmissible nature of the disease.

On the basis of the conclusion of these specialists, an expedition was organized by the Public Health Department and Omsk Medical Institute.

G. I. Netsky, Dr. Sci. (Biology) of Omsk Institute of Epidemiology and Microbiology was placed at the head of the expedition, and P. M. Akhrem-Akhremovich (Dir. of Therapy Department of Omsk Medical Institute) directed the scientific research team.

* This translation was made for members of the U. S. Hemorrhagic Fever Delegation to the USSR and for other interested persons.

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Other persons who also participated in this expedition were Professor A. V. Fedyushin (Zoological Department of Omsk S. M. Kirov Agricultural Institute), Professor I. S. Novitsky (Department of Pathologic Anatomy of the M. I. Kalinin Omsk Medical Institute), and E. D. Kushnir (Dr. Med. Sci.) (Microbiology Department of Omsk Institute of Epidemiology and Microbiology).

At the suggestion of Professor A. V. Fedyushin, a detailed chart of examination of patients suspected to be ill with the new disease was drawn up (V. P. Konstantinov, Yu. V. Veselov, G. A. Sizemova, Z. V. Fenelonova, A. V. Fedyushin, and G. I. Netsky). In the second half of June 1946, the expedition with Professor A. V. Fedyushin, Yu. V. Veselov, G. I. Netsky, and medical students Bel'kevich, Mysina, Utkina, and Sokol'sky, left for Sergatsk District, where after examination of many patients ill with the new disease, they carried out statistical research on the history of this disease for the years 1945 and 1946 in the Bazhenovsk Hospital, and formed a primary conclusion.

The data of preliminary examination revealed the following epidemiological characteristics of the new disease: focality, seasonality (peaks in May and August, and cessation of the disease in mid summer and during the autumn-winter months), non-contagiousness of workers and visitors in fields and forests, and attachment of pasture ticks (to persons).

The remarkable coincidence of the seasonal activity-curve of ticks (based on data of infestation of cattle) and the curve of the illness indicated the rather probable relation of the latter to the pasture ticks.

According to the data of Professor A. V. Fedyushin, areas where this new disease was recorded proved to be absolutely predominated by Dermacentor pictus ticks. The activity of adult stages of Dermacentor pictus resumed with the thawing of the snow cover, reached a maximum in the first half of May, terminated in the middle of summer, and increased again in August, whereupon overwintering of ticks began, apparently mostly on the surface of the soil.

In June and July, ticks feed on small mammals, in July and August nymphs appear and feed in a similar manner and molt into adults of the autumn generation.

The peak curve of new incidence followed 7 to 12 days after the seasonal peak of abundance of adult ticks, which usually attach to large mammals.

On this basis, Dermacentor pictus was acknowledged as the most probable vector and reservoir of the agent of new disease, which was characterized by the very important epidemiological criterion of transitive disease with

In fact, the curve of incidence in 1946 fully confirmed the 1945 curve. After the first peak in May, the second peak occurred in the middle of August.

The role of other bloodsucking arthropods (mosquitoes, gadflies, midges, wood-lice, and ectoparasites of small and large mammals) was acknowledged as probable, but in the present conditions epidemiologically ineffective.

In June 1946 in Bolsherechensk district, I. S. Novitsky made the first pathologic-anatomic discovery.

As the result of these preliminary investigations, a plan for future work in the 1946 and 1947 expeditions was elaborated, and groups were formed as follows: 1) Epidemiologico-Bacteriological: A. A. Gavrilovskaya and A. P. Polyakova (Public Health Department; directed by M. V. Los (Director of Epidemiological Department of the Institute of Epidemiology and Microbiology); 2) Parasitology: Professor A. V. Fedyushin (supervisor) and G. I. Netsky; 3) Clinical: V. P. Konstantinov, G. A. Sizemova, and Yu. V. Veselov (Department of Infective Diseases) and I. S. Novitsky.

Thus, as the result of data of previous study of the problem, a definite seasonality of incidence was established, and therefore an increase in incidence was expected in August. Certain prophylactic measures were carried out (lectures to medical students, publishing of methodical leaflets, etc.).

In 1946, the number of cases increased, and the expedition left for the foci.

The main force of the expedition concentrated in Bazhenovsk Hospital of Sargatsk district, where the clinical group began to work (V. P. Konstantinov and Yu. V. Veselov), and a bacteriological laboratory was organized under the direction of M. P. Vishnevskaya (Omsk Institute of Epidemiology and Microbiology).

Observations and investigations by the parasitological group were carried out in the vicinity of Despodzinovka settlement, 8 kilometers from Bazhenovsk Hospital.

At the same time, Yu. V. Veselov with a medical student and a laboratory worker left for Soldatsk district in order to carry out clinical examination of patients, and to determine foci and incidence curves, and A. A. Gavrilovskaya to collect ticks and blood sera of patients.

As the result of work carried out by the 1946 expedition, the general features of the clinical picture of morbidity were elucidated, and it was established that the new disease, according to all data collected, was an independent nosological entity, a disease originally apparently associated with Dermacentor pictus ticks and with definite areas of the northern forest-steppe belt in western Siberia. It became evident that this disease may spread to other areas of western Siberia with identical landscapes.

At a meeting devoted to results obtained by the 1946 expedition, it was decided to work out a plan of future control measures for the year 1947, and to enlist specialists-virologists in the person of Professor M. P. Chumakov and others in order to determine the etiology of the new disease.

EXPEDITION IN 1947.

The staff of 1947 expedition was considerably enlarged.

Study of the new disease was to be carried out by the virological group of Professor M. P. Chumakov (Institute of Neurology of Academy of Medical Science of USSR), who personally directed the general scientific research work of the expedition.

The virological group consisted of scientific workers A. V. Gagarina, and I. A. Gavrilovskaya (Omsk Institute of Epidemiology and Microbiology), and N. S. Slavina, laboratory workers O. A. Arapova, and K. K. Vinogradova (Institute of Neurology of the Academy of Medical Science) and other workers.

The epidemiological group under the direction of M. V. Los enlisted more than ten physician-epidemiologists from the Regional Public Health Department, Institute of Epidemiology and Microbiology, and Anti-Tularemia Station, in order to carry out an epidemiological survey.

The parasitological group, under supervision of Professor A. V. Fedyushin, was reinforced by zoologists O. V. Ravdonikas (Regional Anti-Tularemia Station), and K. M. Rastegayeva (Omsk Agricultural Institute). Students of the Omsk Agricultural Institute M. T. Davidchenko and N. M. Kostina also participated in the parasitological group.

The clinical group work under supervision of Professor A. F. Bilibin (Academy of Medical Science of USSR) and Professor R. M. Akhrem-Akhremovich, was reinforced by neuropathologists - lecturer V. A. Zudov (Omsk Medical Institute), N. V. Sorokina, Yu. S. Klein (Academy of Medical Science of USSR) P. P. Timokhina (Omsk Medical Institute), and many others.

G. I. Netsky headed the expedition until 15-VII-1947, and afterwards F. A. Maslov (Director of Omsk Institute of Epidemiology and Microbiology).

The research bases of the expedition were founded by the Omsk Institute of Epidemiology and Microbiology, the virological laboratory was supervised by A. V. Gagarina, and the parasitological laboratory in Bashenovsk Hospital of Sargatsk district (clinical observations, storage of blood sera of patients for virological investigation, zoological observations and collections), and in Tyukalinsk Hospital (clinical observations, storage of blood sera of patients for virological investigation) were supervised by G. I. Netsky.

The principal objects of the 1947 expedition were as follows:

(1) To determine the nature of the agent, (2) to verify the role played by Dermacentor pictus in transmission of disease, (3) to extend observations on the ecology and distribution of small mammal hosts of larval and nymphal stages of ticks, (4) to conduct a wide epidemiological survey of areas with incidence of spring-autumn fever, (5) to extend, widen, and thoroughly study pathogenesis, clinical features, differential diagnosis, and therapeutics of the new disease. Naturally, solution of the first two problems was of decisive significance.

In a very short time (about 3 months), the principal problems set for the 1947 expedition were solved.

The efforts of a large team (about 50 persons) of research and technical workers under the energetic direction of M. P. Chumakov, and participation of local medical workers (physicians N. P. Al'binskaya, N. F. Borisova) and many others, assured success of the 1947 expedition.

The work to be carried out by the 1947 expedition was planned by order of Ministry of Public Health of USSR No. 660 as from 13-XI-1947. Obtained results are as follows: (a) a filterable infective agent was obtained; (b) presence of this agent in nature, and in Dermacentor pictus ticks, which transmit infection to man, was revealed; (c) immunological differences between the Omsk disease and Crimean hemorrhagic fever, which is similar to it, were revealed; (d) clinical and laboratory characteristics of this disease were given; (e) diagnostics, preventive measures, and methods of treatment of disease were adopted.

Six of the participants of the expedition, A. V. Gagarina, N. V. Sorokina, N. S. Slovina, Yu. S. Klein, O. A. Arapova, and E. Mushkanskaya, were awarded the badge for "Outstanding Public Health Services," and thirty-four of the participants of the expedition were officially thanked.

The preliminary conclusions on the nosologic entity of the new disease, of its infective (viral) etiology, and its probable transmission by Dermacentor pictus ticks, were confirmed and scientifically substantiated.

The new disease obtained, as a nosological entity, the name of "Omsk hemorrhagic fever" and thus found a place in a group of viral hemorrhagic fevers described in recent years by Soviet scientists.

EXPEDITION IN 1948.

Into the plan of work to be carried out by the 1948 expedition, along with scientific research work, prophylactic measures on a broad scale - mass vaccination against Omsk hemorrhagic fever of the population in affected areas - was to be included.

M. P. Chumakov prepared a vaccine in the form of an emulsion of formalin-killed virus of Omsk hemorrhagic fever from the brains of artificially infected white mice.

The plan of work for the 1948 expedition was drawn up in March by Professor M. P. Chumakov with cooperation of A. A. Avakyan, and A. D. Lebedev (Institute of Neurology of Academy of Medical Science), and G. I. Netsky and O. V. Ravdonikas (Omsk Regional Anti-Tularemia Station).

In May, further details were added with the assistance of N. A. Zeitlenok (Institute of Neurology of Academy of Medical Science) and M. V. Los.

The plan of clinical investigations was compiled and realized under the supervision of Professor R. M. Akhrem-Akhremovich, and K. M. Vinogradova (Omsk Institute of Epidemiology and Microbiology) was appointed as head of the expedition.

The principal tasks of the 1948 expedition were as follows: (1) prophylactic vaccination of population in foci of infection, and collection of data in order to determine effectiveness of this prophylactic measure; (2) collection of materials in order to study reservoirs of virus in ticks, and representatives of the local mammal fauna associated with them, and also to investigate susceptibility of some animals and bloodsucking mosquitoes for the virus of Omsk hemorrhagic fever; (3) to study population dynamics and activity of tick-vectors, and also fauna and phenology of bloodsucking mosquitoes and horseflies within foci of infection; (4) to study clinical features, pathogenesis, and treatment of this illness in adults and children.

In 1947, experimental investigations and principal clinical observations were conducted in Omsk, and not in the foci of infection, while in 1948, the experimental base was entirely transferred to the Bashenovsk Hospital in Sargatsk district.

In the middle of May 1948, owing to the energetic leadership of A. A. Avakyan, the following laboratories were set up in Bashenovsk Hospital: (a) Virological with two sections (A. V. Gagarina, O. A. Arapova, A. V. Lekusha, and I. V. Makarova); (b) Microbiological (A. A. Avakyan, M. N. Lituncvskaya, and A. A. Gavrilovskaya); (c) Parasitological (A. D. Lebedev); (d) Zoological (O. V. Ravdonikas); (e) G. I. Netsky, and A. P. Zalivina).

A vivarium was set up for wild and laboratory animals.

The Director of Bashenovsk Hospital, N. F. Borisov, actively participated in organization of the experimental base.

The epidemiological group of the expedition under the leadership of M. V. Los, with colleagues Z. I. Goncharova, A. N. Ravdonikas, V. Ya. Shwabauer and others, carried out mass vaccination of the population, studied the incidence rate, and made an epidemiological survey in Sargatsk, Tyukalinsk, and Soldats districts.

Research work of the expedition was carried out under the direct leadership of Professor M. P. Chumakov.

Clinical observations were carried out in the Tyukalinsk and Bezhenovsk hospitals, as well as in the clinics of Omsk Medical Institute by E. I. Masurgan, N. M. Tatarintsev, V. A. Zudov, G. A. Sizemova, and others. The experimental base in Bezhenovsk Hospital functioned from the middle of May until end of August.

Reports of the work carried out by the 1948 expedition, submitted by Professor M. P. Chumakov at the final meeting at the Bezhenovsk Hospital on 15 August 1948, showed that the principal work set for 1948 expedition was successfully carried out.

The results of three years study of Omsk hemorrhagic fever, which began on the initiative of local workers, showed how in Soviet conditions advanced science is inseparably linked with the need of practical care of public health. It is only under Soviet conditions that it became possible to advance such a complicated problem so far in such a short time.

The Soviet and Party Organizations of the Ministry of Public Health of the Union of SSR and Federation, as well as the local public services, and also the population in districts where cases of Omsk hemorrhagic fever were recorded, greatly assisted in carrying out all the control measures adopted by the expedition.

Hereunder, we shall present the basic research results obtained during three years of study of Omsk hemorrhagic fever.

ETIOLOGY

- 1) It was demonstrated that the agent of Omsk hemorrhagic fever is a filterable virus.
- 2) The virus was regularly revealed in persons who became infected spontaneously, and also in those who became infected accidentally while working with the virus in laboratories.
- 3) The virus of Omsk hemorrhagic fever in convalescent blood causes appearance of specific antibodies, which are revealed by reactions of complement fixation and neutralization tests.

4) Clinical and experimental investigations (morphological, bacteriological, virological, and immunological) allow the differentiation of the virus of Omsk hemorrhagic fever from the agents of commonplace rickettsiae (tick-borne typhus), filterable rickettsiae (atypic viral pneumonia or Q fever), and also from the virus which is of Crimean hemorrhagic fever very similar to Omsk hemorrhagic fever (cross immunization tests in monkeys, mice, and other animals).

5) The virus (from blood of infected ticks, and also passaged) easily passes through Seitz filters, Berkefeld filters V and N, Chamberland Ls, and therefore is an ultravirus.

6) As in many ultraviruses, the virus of Omsk hemorrhagic fever may be preserved for a long period in glycerol on ice, or in dried form (powder) in a vacuum.

7) The virus of Omsk hemorrhagic fever multiplies well in live (7 day old) chick-embryo, accumulating in great quantities in the brain and in the embryonic membrane.

8) The virus of Omsk hemorrhagic fever (from the blood of patients before the 6th day) adapts well to guineapigs (5 to 7 passages through blood or brain tissue of artificially infected guineapigs) and to white mice (1 to 2 blind passages). Adaptation tests on white rats and rabbits gave negative or inconclusive results.

9) White mice are the best subjects for experiments in these (with a sufficient number of cerebral passages) acute intensification of pathogenicity of the virus occurs, producing almost 100% morbidity of mice by all methods of infection.

10) Infection of mice inoculated by adapted virus strains generally affects the nervous system (progressive weakness, convulsions, meningeal symptoms, sometimes paresis and flaccid paralysis of extremities, followed by prostration and death); the illness lasts for about 24 hours. Hemorrhagic syndrome was not observed in white mice.

EPIDEMIOLOGY.

1) From the very outset in 1943, Omsk hemorrhagic fever was diagnosed as tularemia, and many cases were recorded in populated areas of Soldatsk, Sargatsk, and Tyukalinsk districts of Omsk Oblast. In 1946, study of this illness was planned on a large scale (during this year the greatest number of patients was recorded).

2) This illness was generally observed among local rural inhabitants engaged in agricultural work, and in single cases among other persons who lived in the steppe or forests prior to onset of illness. Persons of all age are affected, but generally the young (10 to 20 years of age) were mostly affected. The illness is more frequently recorded among women, and

this may be explained by the fact that women take greater part in agricultural work.

3) The seasonal incidence and also endemicity is observed in (spring-summer-autumn) with two peaks: in spring (May) the highest and in autumn (August) the lowest.

4) Dispersed focal character of incidence, when considerable number of persons are simultaneously affected, leaves no doubt as to the infectious origin of this illness. The illness is not contagious (absence of infection in families and among hospital staff).

5) It was demonstrated that the vector of this infection is Dermacentor pictus Herm., which is encountered in abundance in affected areas. The role of these ticks in the capacity of vectors (and also as reservoirs) of this virus was established on the basis of conformity of both maximums of incidence with seasonal dynamics of abundance, and activity of indicated ticks (maximum infestation by adults precedes the period of spring summer peaks by approximately 7 to 10 days, this is satisfactorily explained by duration of incubation period in humans); also on the basis of almost 100% findings of ticks on the body and clothes of patients, and also as the result of revealing spontaneous infection by virus of Omsk hemorrhagic fever in indicated ticks (isolation of the agent by virological method from emulsion of ground steppe-ticks).

6) Comparison of circulation curve of incidence by Omsk hemorrhagic fever with the flight curve of all bloodsucking insects (mosquitoes, gnats, midges, etc.) known in the given territory revealed complete lack of coincidence of these curves, and therefore, it is very unlikely that such insects play a role as vectors of Omsk hemorrhagic fever. Nevertheless, the role of some species of mosquitoes (Mansania Arichardi) (SIC) is doubtful and is subject to further study.

7) The role of the so-called domestic insects (bedbugs, lice, fleas, and flies), owing to marked seasonality of Omsk hemorrhagic fever and to absence of domestic focality and other reasons, is rejected.

8) Wide distribution of Dermacentor pictus ticks, and no incidence of Omsk hemorrhagic fever foci outside its range, suggests that in the formation of natural focality of this disease ticks as well as certain local animal hosts of ticks play a part. According to the data of Professor A. V. Fedyushin, the host range of this tick includes 37 different mammal species, among them, man.

CLINICAL FEATURES OF OMSK HEMORRHAGIC FEVER.

Omsk hemorrhagic fever is an infectious - toxic disease, which is based upon general affliction of parietic character of the arterioles and capillaries, accompanied by increased permeability of the latter. Apparently the affliction depends on involvement of indicated branches of the network of rete vasculosum, as well as through the involuntary centers, and also through peripheral nerve apparatus.

During Omsk hemorrhagic fever the central and involuntary nerve system, mucous membran internal organs, and hemopoietic system is afflicted.

The incubation period is from 4 to 7 days, sometimes with prodromal manifestations (general malaise; and generalized aches and pains). The onset is sudden (chills, high temperature, headache, backache, pain in legs, and absence of appetite). The fever is constant or remittent in character (30 - 40 C), frequently with a second wave of increased temperature. Duration of illness from 4 to 15 days.

THE BLOOD. At the beginning of illness high HB figures (80 - 98%); erythrocyte sedimentation reaction is retarded or normal during the first days of illness but accelerated later. Leukopenia lasts from 20 to 30 days, nuclear displacement of neutrophils to the left, which rapidly disappears after drop of temperature; monocytosis and thrombopenia.

BIOCHEMISTRY. At the climax of the illness hypoproteinemia and moderate azotemia are revealed. In the blood sera bilirubin, cholesterol, and calcium are unchanged. Decrease of the complement titre.

CARDIOVASCULAR SYSTEM. All branches of cardiovascular system are afflicted. Electrocardiographically - dystrophic degenerative changes of myocardium of diffuse or focal character owing to intoxication and disturbance of coronary blood circulation. Dilatation of the heart margin mainly in the left ventricle. Deaf tones. From the first day of onset until termination of illness, there is a marked arterial hypotonia (maximal blood pressure 80 - 90, minimal 30 - 50). Disorder of capillary blood circulation (acute turbidity of capillarscopic field, light pink, sometimes red background etc.). In addition the following manifestations are characteristic: hyperemia of the face and upper half of trunk, injection of sclerae, exanthema, scant petechial rash, and nasal, pulmonary, gastric, intestinal, uterine and other hemorrhages.

LUNGS. Affliction of the lungs occurs in one-third of cases in the form of diffused bronchitis and pneumonia. Frequently the later course is atypical: percutaneous and auscultatory manifestations weak, absence of cough, small amount of sputum, absence of pain in the thorax region, and absence of inflammatory signs of the pleura. The etiology of pneumonia in most cases is apparently of viral origin (atypical course), but in some cases it has bacterial nature (usual clinico-roentgenologic exposures).

KIDNEYS. Moderate albuminuria, cylindruria, hematuria of inconstant character, arising on the 5th or 8th day after onset of illness and disappearing 20 - 30 days after the beginning of onset of illness. The affliction is of infectious toxic character and is not accompanied by marked disorder of functional capacity.

NERVOUS SYSTEM. During Omsk hemorrhagic fever, the somatic and involuntary nervous system is afflicted during the acute period and also after disappearance of febrile manifestations.

Among neurological symptoms, the first place is occupied by algosic syndrome: headache, muscle pains, pains along all the nervous system, and in the stomach.

Objectively, Kernig's sign (23%), rigidity of occiput (40%), and Lasagne's sign (20%) were revealed.

Lack of taste (sensation of bitterness in the mouth, inversion of taste), decrease of hearing, and acute adynamia in all cases.

Manifestation in the involuntary nervous system - regional hyperemia and hemorrhages, xerostomia, absence of sudation, decrease of blood pressure, constipation, etc. was observed.

PATHOLOGICO-ANATOMIC CHANGES.

During Omsk hemorrhagic fever all the organs and systems are afflicted with predominant symptoms of degenerative-necrobiotic character, and vascular disorders.

Toxic afflictions of the involuntary nervous system and vascular system cause the most important clinical manifestations (algosic syndrome, hemorrhagic diathesis), and also pathologic-anatomic findings.

In the brain and in various sections of the involuntary nervous system, swelling of the brain cells, perivascular edema, stasis, diapedesis, and destruction of capillaries was observed. Degenerative transformation of nerve elements was observed in many cases.

In the internal organs and in the hemopoietic apparatus are clearly marked: stagnant plethora, dilatation of capillaries, diapedetic hemorrhages, toxic edema, and degeneration of parenchymatous elements (liver, heart, and kidneys).

Inflammatory reaction during Omsk hemorrhagic fever was characterized by predominance of changed component; exudation was revealed in the form of infiltration of tissues by albuminous fluid, and erythrocytes. Emigration of leucocytes was not marked.

DIFFERENTIAL DIAGNOSIS.

Omsk hemorrhagic fever is an independent nosological entity. Its characteristic clinical features, when epidemiological situation is taken into consideration, allows diagnosis of this illness without any difficulty. By means of complement fixation reaction and by reaction of virus neutralization by specific sera, the possibility in some cases of practical serodiagnosis of Omsk hemorrhagic fever was established. By means of clinico-microscopic, bacteriologic, resp. virologic, serologic, and allergic reactions it is possible to differentiate Omsk hemorrhagic fever from several similar infectious diseases: tularemia, brucellosis, leptospirosis, rickettsiosis, etc.

The criteria described above, and also epidemiological, clinical, and pathomorphological data allow to establish principal features distinguishing Omsk hemorrhagic fever from diseases with which it has the greatest similarity: hemorrhagic fevers, Central Asiatic capillary toxicosis, Far Eastern nephrosonephritis, and particularly, Crimean hemorrhagic fever.

PROGNOSIS. During Omsk hemorrhagic fever prognosis is favourable, however, it is characterized by protracted convalescence followed by prolonged decrease of working capacity.

TREATMENT. The treatment of Omsk hemorrhagic fever is symptomatic and is directed to weakening toxicosis and hemorrhagic phenomena. Basic control measures: early hospitalization, careful nursing, and abundant intake of liquid. Medical remedies are chloride potassium, vitamins (C and K), and glucose. In case of decrease of heart capacity (use) heart remedies. During complications (pneumonia etc.) treat accordingly. Of major importance is study of application of specific serotherapy.

SPECIFIC PROPHYLAXIS. Immunization with formalized (5 percent) emulsion from the brains of white mice, which were artificially infected with Omsk hemorrhagic fever, showed high effectiveness in experiments, and also in humans.

Of major importance may be anti-tick measures: burning of old grass in the immediate vicinity of human habitations (rest camps, and field camps), and individual protective measures.

FUTURE TASKS IN STUDY OF OMSK HEMORRHAGIC FEVER.

The work, which began in 1946 by Omsk epidemiologists, parasitologists, clinical staff, and microbiologists, extended in 1947 and 1948 with the participation of the expedition of Institute of Neurology of the Academy of Medical Science under the direction of Professor M. P. Chumakov, has solved the principal questions connected with the problem of study of Omsk hemorrhagic fever.

It is natural that study of this problem cannot and must not stop at this stage.

The success obtained through application of mass vaccination against Omsk hemorrhagic fever, is only the beginning of many subsequent investigations and study of artificial and natural immunity during Omsk hemorrhagic fever.

It is essential to study in future dislocation, dynamics, and origin of Omsk hemorrhagic fever foci.

The reason for epidemiological outbreaks in definite areas in the northern forest-steppe belt of western Siberia still remains unclear. The distribution range of the vector-tick, Dermacentor pictus, is considerably wider than that of the presently known distribution of foci of Omsk hemorrhagic fever.

In this respect, of great interest would have been comparative extended investigation of ecology of Dermacentor pictus combined with investigation for its spontaneous infection by the virus of Omsk hemorrhagic fever and susceptibility to the latter in localities where Omsk hemorrhagic fever was recorded, and in localities where Omsk hemorrhagic fever has never been observed, for example, in the central zone of the European part of the Union.

It is also obscure why Omsk hemorrhagic fever has not been recorded in extreme southern localities of Omsk Oblast, where Dermacentor pictus is more or less gradually replaced by an ecologically close species Dermacentor marginatus.

The susceptibility to the virus of Omsk hemorrhagic fever of some of the bloodsucking arthropods, particularly certain mosquito species, which was established in 1948, makes it important to elucidate their role in the circulation of the virus in nature.

It is also essential to investigate duration of preservation of the virus of Omsk hemorrhagic fever during the process of transovarial transmission in tick-vectors Dermacentor pictus, and also in other ixodid ticks which are distributed in Omsk Oblast, and to subject them to experimental infection.

Without an answer to these questions prognosis of possible epidemiological outbreaks of Omsk hemorrhagic fever remains, while planning of effective prophylactic control measures against the vector and reservoirs of the virus are extremely difficult.

Further study must be made of pathogenesis and clinical features of Omsk hemorrhagic fever.

It is essential to find effective methods for treatment of Omsk hemorrhagic fever, in particular serotherapy must be tested on a wide scale.

Constant epidemiological inspection of localities where Omsk hemorrhagic fever has been recorded, and surrounding neighboring districts where this disease has not been observed.

The immediate objective of our scientists is to apply acquired experience in order to achieve complete elimination of Omsk hemorrhagic fever in future, and also to plan and widen the scope of study of regional epidemiology of Omsk Oblast.

BIBLIOGRAPHY ON OMSK HEMORRHAGIC FEVER.

SCIENTIFIC WORKS.

- Akhrem-Akhremovich, R. M. (1949). The spring-autumn fever in Omsk Oblast. Trud. Omsk. Med. Inst., No. 13.
- Akhrem-Akhremovich, R. M. (1947). Clinical features, pathogenesis, and treatment of Omsk hemorrhagic fever. (Manuscript).
- Veselov, Yu. V. (1947). Variation of the complement titre during Omsk hemorrhagic fever. (Manuscript).
- Gavrilovskaya, A. A. (1949). Data on epidemiology, etiology, and prophylactic measures against spring-autumn fever in some localities of Omsk Oblast. Trud. Omsk. Med. Inst., No. 13.
- Gagarina, A. V. (1948). The possible role played by birds in the circulation of the virus of Omsk hemorrhagic fever. (Manuscript).
- Zudov, V. A. (1947). Changes in the nervous system during Omsk hemorrhagic fever. (Manuscript).
- Konstantinov, V. P., Sizemova, G. A., and Veselov, Yu. V. (1949). Spring-autumn fever in Omsk Oblast. Trud. Med. Inst., No. 13.
- Kurmayeva, M. E. and Sizemova, G. A. (1948). The state of cardio-vascular system in patients ill with Omsk hemorrhagic fever. (Manuscript).
- Los, N. V. (1948). Omsk hemorrhagic fever. (Manuscript).
- Novitsky, I. S. (1949). Pathologic anatomy of Omsk spring-autumn fever. Trud. Omsk. Med. Inst., No. 13.
- Netsky, G. I. and Gagarina, A. V. (1950). Tests for susceptibility of bloodsucking mosquitoes to the virus of Omsk hemorrhagic fever. Med. Parasit., (6).

Tatarintsev, N. M. (1947). Transformation of respiratory organs during Omsk hemorrhagic fever. (Manuscript).

Chumakov, M. P. (1948). Results of the study of Omsk hemorrhagic fever made by an expedition of the Institute of Neurology. Vestn. Akad. Med. Nauk USSR, No. 12

Fedyushin, A. V. and Netsky, G. I. (1949). Results of the study of spring-autumn fever in Omsk Oblast by parasitological group of the expedition of Omsk Public Health Department and Omsk Medical Institute. Trud Omsk. Med Inst., No. 13.

Fedyushin, A. V. (1947). The vector of Omsk hemorrhagic fever Dermacentor pictus, its distribution range, ecology, and control measures. (Manuscript).

Fedyushin, A. V. (1949). Zoological factors in epidemiology of spring-autumn fever in Omsk Oblast (data of the expedition of Omsk Public Health Department and Omsk Medical Institute). Trud Omsk. Med. Inst., No. 13.

CONCISE REPORTS.

(Sborn. Autoref. Mezhevuzov. Nauch.-Konf. 27 may 1948).

Akhrem-Akhremovich, R. M. Clinical features, pathogenesis, and treatment of Omsk hemorrhagic fever.

Veselov, Yu. V. Variation of the blood complement titre during Omsk hemorrhagic fever.

Gavrilovskaya, A. A. Data of etiology and epidemiology of Omsk hemorrhagic fever.

Zudov, V. A. Changes in the nervous system during Omsk hemorrhagic fever.

Konstantinov, V. P. Treatment of Omsk hemorrhagic fever.

Kurmayeva, M. E. and Sizemova, G. A. The state of the cardio-vascular system during Omsk hemorrhagic fever.

Los, M. V. Epidemiological survey of Omsk hemorrhagic fever.

Novitsky, I. S. Pathologic anatomy of Omsk hemorrhagic fever.

Tatarintsev, N. M. To the question of affliction of respiratory organs during Omsk hemorrhagic fever.

Fenelonova, Z. V. To the question of clinical picture of Omsk hemorrhagic fever in Sargatsk district.

(Reports of the Session of the Moscow Therapeutic Society, from 26 Jan. 1948)

(Reports by M. P. Chumakov, A. F. Bilibin, and Akhrem-Akhremovich). Terap. Arkh. 20(2).

REPORTS ON OMSK HEMORRHAGIC FEVER AT CONVENTIONS.

Akhrem-Akhremovich R. M. Clinical picture, pathogenesis, and treatment of Omsk hemorrhagic fever. 3. S'yezd Sel'sk. Vrach. Omsk. Oblast, 28 June 1948.

REPORTS ON OMSK HEMORRHAGIC FEVER AT CONFERENCES.

Akhrem-Akhremovich, R. M. Clinical features, pathogenesis, and treatment of Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

Veselov, Yu. V. Variation of the blood complement titre during Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

Gavrilovskaya, A. A. Data of etiology and epidemiology of Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

Zudov, V. A. Changes in the nervous system during Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

Konstantinov, V. P. Treatment of Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf. 27 May 1948, Omsk.

Kurmayeva, M. E. and Sizemova, G. A. The state of cardio-vascular system during Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

Los, M. V. Entomological survey of Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

Los, M. V. Omsk hemorrhagic fever. (Report at the Inter-Institute Conference of Institute of Epidemiology and Microbiology 13 July 1948, Irkutsk.

Novitsky, I. S. Pathologic anatomy of Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

Tatarintsev, N. M. To the question of affliction of respiratory organs during Omsk hemorrhagic fever. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

Fenelonova, Z. V. To the question of clinical picture of Omsk hemorrhagic fever in Sargatsk district. Mezhevuzov. Nauch.-Konf., 27 May 1948, Omsk.

REPORTS ON OMSK HEMORRHAGIC FEVER AT ASSEMBLIES OF SCIENTIFIC SOCIETIES

Akhrem-Akhremovich, R. M. Clinical features and treatment of hemorrhagic fevers. Moscow Therapeutic Society, 28 January 1948.

Bilibin, A. F. Clinical features of acute period of hemorrhagic fevers. Moscow Therapeutic Society, 28 January 1948.

Gavrilovskaya, A. A. Data of epidemiology and etiology of spring-autumn fever in Omsk Oblast. Omsk Medical Society, 17 January 1947.

Konstantinov, V. P., Sizemova, G. A., and Veselov, Yu. V. Clinic-Epidemiological characteristics of spring-autumn fever. Omsk Medical Society, 17 January 1947.

Los, M. V. Epidemiology of Omsk hemorrhagic fever. Joint Sitting of Scientific Workers and Physicians of Novosibirsk Medical Institute and Novosibirsk Regional Municipal Public Health. Novosibirsk, 26 July 1948.

Chumakov, M. P. Etiology of hemorrhagic fevers. (At the same Sitting).

Chumakov, M. P. Etiology and epidemiology of hemorrhagic fevers. Moscow Therapeutic Society, 28 January 1948.

Fedyushin, A. V. and Netsky, G. I. Zoological factors in the epidemiology of spring-autumn fever. Omsk Medical Society, 17 January 1947.