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R.Z. Alekseev, N. A. Struchkov, K. R. Nifontov, A. S. Andreyev CHANGE OF THE GENERAL CLINICAL PARAMETERS AND INDICATORS OF CARDIOVASCULAR SYSTEM AT A HYPOTHERMIA OF DOGS

ABSTRACT

The article describes some clinical data on influence of low temperatures on organism of dogs in an experiment.

Keywords: temperature, dogs, hypothermia.

Relevance. The phenomenon of an anabiosis it is widespread in wildlife. Usually it is taken for such condition of an organism at which vital processes are so slowed down that there are no implications of life as an anabiosis. When favorable conditions occur normal intensity of vital processes is restored. The big contribution to development of ideas of an anabiosis was made by the Russian physicist and the biologist experimenter Porfiry Ivanovich Bakhmetyev. At the beginning of the 20th century, investigating the hibernation phenomenon at animals under natural conditions, he found out that in an organism these animals have a sharp depression of vital activity of all organs. They as if plunge into a condition of the «slowed-down» life - an anabiosis. P. I. Bakhmetyev reduced the body temperature of bats to - 9 degrees, and then resuscitated them.

The foundation for studying of a deep hypothermia at mammals was started by the researches conducted mainly on small animals (groundhogs, gophers, hamsters, rats). The obtained data allowed to be find an opportunity to artificially reduce the body temperature of these animals to 0 — 5 ° and even lower, and then in 1 — 2 hours to try to obtain restoration of all vital signs of an

organism by only one heating .

Studying of a deep hypothermia at mammals in the Republic of Sakha (Yakutia) were carried out by Akhremenko A. K., Anufriyev A. I. who carried out mainly on fine animals (groundhogs, gophers) [2, 3].

The hypothermia has strongly entered medicine. For the last 15 — 20 years in many countries researches conduct experiments on a large scale and the works confirming thoughts of a possibility of use of cooling in the medical purposes are published. The prominent surgeons of many countries use this method as an agent, warning operational shock or as strong anesthetic. With use of a hypothermia it has become possible to perform difficult endocardial operations when the condition of the patient doesn't allow to apply a usual narcosis or when operation is so long and difficult that, despite a narcosis, in connection with strong exaltation of a nervous system at the patient shock can occur. In these conditions an important role is played by inherent hypothermia factors, namely: dropping of metabolic processes, retardation of respiration and cordial activity, dropping of sensitivity of an organism [1, 4, 5, 6, 7].

It is known that strong cooling is a trauma for an organism. In the conditions

of low temperatures in Yakutia the question of the general hypothermia remains urgent as the lethality remains high.

In medicine the hypothermia and a problem of resuscitation of an organism remains open. For the last 15 — 20 years in many countries researchers conducted on a large scale and the works confirm thoughts of a possibility of resuscitation of an organism [1] were published.

In modern conditions of development of the Arctic the problem of a frigorism and hypothermia of an organism gains applied character.

Purposes and tasks: Studying of the general clinical parameters and indicators of cardiovascular system at a cold trauma of dogs in the conditions of low temperatures of Yakutia.

At the same time the following tasks are set:

1. To tap pattern of fall of temperature of a body, rectal and muscular temperatures.

2. To establish changes of indicators of an ECG at an artificial hypothermia of dogs.

3. To acquire methods of resuscitation of an organism at a hypothermia.

Original materials of a research.

Work was performed from 2015 to 2017 on the basis of faculty of veterinary

medicine of Yakut State Agricultural Academy in cooperation with Yakut Scientific Centre.

Experiment was carried on clinically healthy dogs that were picked up for the principle of analogs. Before experimental work of dogs were dewormed with Ivermekt in a dose of 0,2 ml on 10 kg of weight of an animal and given vaccines against plague carnivorous and a rabies. Animals were kept in the open-air cage, the ration of animals consisted of the admixed forage, feeding happened 2 times a day (in the morning and in the evening), walking was carried out 2 times a day.

The experiment was made under a neuroleptanalgeziya (a neuroleptic – Rometar of 0,2% and an analgetic – Zoletil 100). Animals were placed on the street at ambient temperature – 40 °C. Permission of the bioethical commission is available.

All-clinical parameters were investigated by the standard methods. Separately investigated rectal and muscular temperature by Alekseev R. Z. technique. An ECG carried out by means of the device Poly-range. For prevention of a blood coagulation entered anticoagulant a heparin.

To show dynamics of fading of vital signs of an animal, we will provide the short description of experience of February 10, 2016. Before experiences the sensor was orally entered, the dog weighing 11,6 kilograms before experience had a pulse of 68 beats per minute, respiration — 36 in a minute, temperature in a rectum — 33 degrees, muscular temperature of a femur – 30,7 degrees, external dermal temperature – 15 degrees..

13 hours of the 00th minute. Under a neuroleptanalgezia (a neuroleptic – Rometar of 0,2% and an analgetic – Zoletil 100). In the right jugular vein established an intravascular catheter, through it the heparin — drug, anticlotting is entered (further the catheter serves for administration of drugs).

13 hours 15 minutes. Pulse was 39 beats per minute, respiration — 33 in a minute, temperature in a rectum — 32,1 degrees, muscular temperature of a femur – 31,1 degrees. The animal under a neuroleptanalgeziya was taken out.

13 hours of the 46th minute. Pulse

was 69 beats per minute, respiration — 20 in a minute, temperature in a rectum — 28,6 degrees, muscular temperature of a femur – 27,2 degrees. Along with reduce of respiration there was a gradual retardation of atrioventricular carrying out and corresponding retardation of a rhythm of heart- a bradycardia.

14 hours 00 minutes. The dog reacts to external stimuli, zoleti was added. Pulse was 59 beats per minute, respiration — 10 in a minute, temperature in a rectum — 27,1 degrees, muscular temperature of a femur – 20,4 degrees.

14 hours 17 minutes. Pulse was 62 beats per minute - there was single or group premature ventricular contraction which then turned into fibrillation of ventricles, respiration — 5, temperature in a rectum — 25,1 degrees, muscular temperature of a femur – 20,9 degrees.

14 hours 30 minutes. A heartbeat stopping, instead of respiration separate infrequent convulsive inspirations, temperature in a rectum — 24,7 degrees, muscular temperature of a femur – the 20th degree appeared. External dermal temperature – 6 degrees.

15 hours 15 minutes. Pulse was 0 beats per minute, respiration - No, temperature in a rectum — 23 degrees, muscular temperature of a femur – the 17th degree, external dermal temperature – minus 1 degree.

15 hours 26 minutes. Beginning of reanimation actions.

At experience No. 1 it was carried out: intraperitoneally through self-made pipes (polyvinylchloride) carried out water with the temperature of +40 °C, a direct and indirect cardiac massage, administration of adrenaline through in advance established catheter and it is endocardiac. The artificial respiration which was made by means of a respiratory bag of Ambu blowing air into lungs through an endotracheal catheter is at the same time begun.

Experiment No. 2 was made: perfusion of a blood the blood hemodialysis device with use of a defibrillator, administration of adrenaline. Arterial forcing of a blood in the right femoral artery and through the right femoral vein a blood back in the device is made. Temperature of the forced blood makes 37° degrees. The artificial respiration is at the same time begun. It is made by means of a respiratory bag of

Ambu blowing air into lungs.

As a result of our experiments it is possible to establish that pattern of depression of temperatures- rectal and muscular- depends on ambient temperature. At influence of low temperatures there is gradual retardation of atrioventricular carrying out and corresponding retardation of a rhythm of heart- a bradycardia. Experiences with animals gave the chance to establish a series of the factors complicating process of restoration of vital functions of an organism. The long cooling of animals, an imperfect narcosis leading to more frequent development of fibrillation of ventricles; the acute cardiomegaly supporting flaccid, difficult to remove fibrillation of ventricles new technical searches of resuscitation are necessary.

Pilot studies on a problem of resuscitation continue. The given experimental materials show that in the field of resuscitation there are still huge and complex challenges of further studying of this problem. The idea of a possibility of resuscitation of an organism after a dream in the freeze develops and, undoubtedly, will play a considerable role in fight for life and health of the person.

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SCIENTIFIC REVIEWS AND LECTURES

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MEDICAL AND BIOLOGICAL ASPECTS OF SOLAR-BIOSPHERIC INTERACTION AND HEALTH OF PEOPLE IN THE NORTH

ABSTRACT

The article presents a review of the literature on the effects on human of space and helio-geophysical factors.

Keywords: health, people, North, adaptation, cosmic factors.

Climate and geography conditions have influenced and continue to make a huge impact on human life style. Favorable conditions of moderately damp seaside climate of subtropics became a cradle of humankind and stimulated the civilization development.

People gradually perceived the protection means against the effects of environmental factors and cultivated new territories.

Simultaneously with a peaceful movement of people to free territories, there was a migration of completely ethnic groups in association with military actions, invasions, and the invaders' settlement among the subdued people and their partial assimilation. Both the people who had to leave the settled places because of their lands conquest and the conquerors adapted to new environment conditions, learnt to survive in these conditions and became natives at last.

Keeping features of their ancient ancestors, they acquired certain new

properties, partially due to mixed marriages with the native population, partially because of long-term evolutionary adaptive processes.

A considerable portion of the published scientific literature devoted to current research of human adaptation to the living conditions in Sakha Republic (Yakutia) belongs to our group of the authors (1-5, 9-11).

According to A.D.Slonim (6, 7, 8) the examined children can be divided into all the three groups of the adaptive phenomena: those experiencing individual adaptation, those experiencing hereditary fixation of adaptive processes, and those who are at the stage of population adaptation.

One should note that while the migrants of the first generation are at the initial stage of the adaptation to natural factors of the North, the schoolchildren of the contemporary population adjust to social conditions of their inhabitation.

The features of life activity in different national and social groups, geographical

conditions of inhabitation, character of environment, soils, water resources, minerals and ecological setting of the studied regions have been found significant.

At present there can be no doubt in A.L.Chizhevsky's (5) statement that we live in "the atmosphere of the Sun". The last decades coinciding with a rapid development of astronautics and with the considerably increasing range of methods to investigate the solar system achieved a definite success in studying the laws of solar activity, climate, and weather. The following items are considered relevant from the medical and biological points of view: discovering the sector structure of the interplanetary magnetic field, creating the concept on solar wind and its interaction with magnetosphere of the Earth, organizing a space system of meteorological information (13, 14, 15, 16, 17).

Considering space influence upon people (and biosphere as well) first of all it is necessary to specify such well known