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HYGIENE, SANITATION, EPIDEMIOLOGY AND MEDICAL ECOLOGY

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ENVIRONMENTAL HEALTH MONITORING IN THE ZONE OF ACTIVITY OF THE MINING INDUSTRY IN THE REPUBLIC SAKHA (YAKUTIA)

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Introduction

The activities of mining industry are fraught with pollution of the environment, primarily water sources which are a priority for the field being developed by heavy and rare-earth metals. Their subsequent entry into river ecosystems and migration along the ecological chain: phyto-zoobenthos - fish population - floodplain vegetation - milk, meat of domestic animals - man, further threatens the development of severe somatic and neurological diseases, included in the literature under the common name “microelementoses”.

The content of the work and discussion

The mining industry is one of the main components of the industrial development of Yakutia in the 20th century, including gold mining in the Aldan region, diamonds in Mirny, tin in Ust-Yansky, and so on. With all its huge contribution to the economy and state budget of the republic, one should not forget the negative aspects of the activities of various enterprises of the industry.

Fresh in memory a sad precedent with the Vilyui group of uluses, when as a result of careless negligence of the enterprises of ALROSA in the 80-90s of the last century, the incidence of abnormalities in the development of children and malignant tumors increased sharply among the population, which was explained in our studies joint with Tomsk geneticists as a manifestation of chemical mutagenesis. In addition, the incidence of endocrine pathology, the pathology of the blood system, cardiovascular, digestive, urinary and other body systems has increased significantly. There were signs of negative trends in the demographic indicators of the population. This precedent was studied by the participants of the research expedition of the SB RAS, the results of the studies were formalized in the form of a Scientific Report, the materials of the expedition were published in numerous publications in the form of scientific articles and monographs. The medical part of the expedition was headed by prof. V.G. Krivoshapkin.

With the aim of “restoring the health of the population and the ecology of the region”, ALROSA has so far paid 8 regions of the diamond province to the budget, and in recent years, one-percent deductions from its profits. Recently, the activity of mining enterprises in the Arctic zone of the Republic of Sakha (Yakutia) has significantly increased - the Tomtor deposit of rare-earth metals (niobium), the Anabar diamond deposit are being developed, and the development of the Mangazeya silver-mercury deposit will start next year, etc. In doing so, consider the following:

The Arctic ecosystem is characterized by a very limited ecological capacity, therefore, it is less resistant to anthropogenic and technogenic pollution, and much more time is required to inactivate and detoxify pollution compared to other regions. Under these conditions, even the minimum concentrations of contamination in a relatively short period of time can increase to toxic and life-threatening concentrations. This is a shortening of the food (trophic) chain in the Arctic.

The Arctic is the territory of compact residence of indigenous small-numbered peoples of the North (indigenous peoples). According to the population census of 2002 and 2010, in 8 years out of 45 ethnoses from the number of indigenous peoples in 25 there was a decrease in the population, 7 of which reduced the population by 3-7 times, 2 ethnic groups disappeared altogether [1]. Consequently, environmental pollution and the inclusion of heavy and rare earth metals in the food / food chain under northern / arctic ecosystems can be detrimental to the fate of the ethnic groups that inhabit them.

Nowadays, according to our studies of 2015, the content of microelements in the blood of residents of village of Zhilinda of the Olenek Evenk national ulus are within the limits of reference values (Table 1). In addition, there are data from the administration of the Olenek Evenk national ulus on the content of microelements in the water environment of the Tomtor rare-earth metal deposit (Table 2). Another matter, their dynamics in the conditions of industrial production on the territory of this region is of interest.

To exclude the negative impact of environmental pollution on the health of the population in the mining zone, we developed a methodology for medical and environmental monitoring (annex). At the same time, it should be noted that in practice there is an Environmental Monitoring carried out by the Center for Environmental Monitoring of the Ministry of Nature Protection of the Republic of Sakha (Yakutia). And Medico-ecological monitoring is purely our Yakut know-how.

Medico-ecological monitoring is a dynamic study of environmental pollution (annex) with a periodicity of 3 or 5 years.

An important part of monitoring is the study of the level of morbidity in the body’s basic systems, such as cardiovascular, respiratory, digestive, urinary, endocrine, musculoskeletal, etc. The peculiarity of medical-ecological monitoring is the search in the clinical manifestation of the pathology of these body systems of the features characteristic for this and that type of microelementosis. The obtained indicators are analyzed each time in comparison with the initial state of the environment, the health of the population, incl. demographic indicators, quality of life before the development of this field.

Conclusion

Thus, a series of medical and

Table 1

The content of microelements in the blood (μg / l)

Microelements	n	Me (Q25-Q75)	Reference values
Nickel (Ni)	100	< 13	1-28
Cadmium (Cd)	79 21	0,8 (0,6-1,1) < 0,5	0,01-2
Cobalt (Co)	100	< 6	0,05-0,1
Chromium (Cr)	20 80	1,0 (0,7-1,2) < 6	0,05-0,5
Zinc (Zn)	47 53	975 (754-1289) <625	543-1130
Copper (Cu)	100	959 (664-1295)	750-1300
Arsenic (As)	100	< 13	2-62
Ferrum (Fe)	100	2515 (2020-3347)	600-1800

Table 2

Micronutrients content in the water environment of the Tomtor rare-earth metal deposit (in MPC, 2015) *

Microelements	Water environment	Excess of MPC
Fe (ions)	brook Pomanistochka	in 9-10 times
	R. Anabar	2.5 times
Cu (copper)	R. Malaya Kuonapka	in 3,5-4,4 times
Mn (manganese)	R.Malaya Kuonapka	in 1,5 times

* The content of aluminum, lead, arsenic, mercury, antimony, bismuth, beryllium, uranium, thorium, etc. is lower than the established standards.

environmental studies in the monitoring mode with a certain periodicity in the zone of activity of mining enterprises will allow to identify environmental pollution and the development of human medical pathology caused by it in the form of microelementoses in their early stages, which will be a significant contribution of Yakut scientists to environmental medicine. Such a methodical approach will help to save the population of the North / Arctic, including the indigenous small population of the North, from the negative impact of the inevitable further development of the Arctic's natural resources.

Reference

Data of the All-Russia Population Census of 2002 and 2010 www.gks.ru.

Parameters of Medical and Environmental Monitoring

- Radiation situation;
- The content of priority for this field of heavy and rare earth metals in the environment;
- The content of the same metals in human blood;
- Basic medical and demographic indicators - birth rate, mortality, natural population growth, life expectancy, etc .;
- Morbidity of the population with diseases of the circulatory system, respiratory and digestive organs, urogenital, musculoskeletal and endocrine systems, blood and hematopoietic tissue, and other pathologies;
- Disability;
- Indicators of the main types of metabolism - lipid, protein, carbohydrate, mineral, vitamin;
- The main indices of immunological homeostasis - AFP, REO, gamma-IFN, IL-16, IL-6, SRB;
- Quality of life of the population on the questionnaire of WHO KZh-100.

Application

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CLINICO-LABORATORY FEATURES OF MENINGITIS IN CHILDREN

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ABSTRACT

Meningitis continues to be the most common form of central nervous system damage in children. In the structure of neuroinfections, the frequency of meningitis in children is about 30%, remain an important medical and social problem due to the weighting of their current course. Acute meningitis has a high frequency of severe forms, high lethality, expansion of the spectrum of etiopathogenesis and their resistance to the most common antibiotics, difficulties in differential diagnosis.

The article analyzes the clinical and laboratory features of meningitis in children and their outcomes according to the data of the State Institution of Children's Departments of the Republic of Sakha (Yakutia) «Children's Infectious Clinical Hospital». The clinical manifestations, the etiological landscape of meningitis in children, and the demonstrators of laboratory analyzes were studied. A retrospective analysis of 40 medical charts of inpatient patients according to the GBU RS (Y) «Children Infectious Clinical Hospital» for 2016 was conducted.

In the etiologic structure, serous meningitis of enterovirus etiology (90%) predominated among meningitis with refined etiology, which was confirmed by laboratory tests. The causative agents of enteroviral meningitis in children in Russia, European countries, the United States and Japan in the last 10-20 years were most often ECHO30, ECHO11 [1, 4].

In children with meningitis, in most cases, moderate forms of the disease with a hypertensive syndrome leading in the clinic, polymorphism of clinical manifestations, febrile fever, rigidity of the occipital muscles, catarrhal phenomena were observed. Most of the children were hospitalized 24 hours after the onset of the disease, while there were certain difficulties in the clinical diagnosis at the prehospital stage. Thus, meningitis was suspected only in 70% of cases, in others, food toxicoinfection, acute gastroenteritis, acute respiratory viral infection, acute nasopharyngitis, enterovirus infection, acute enterocolitis, acute enteritis were suspected.

At the hospital stage, the most informative for the diagnosis of a neuroinfectious disease are changes in the cerebrospinal fluid, which closely contacts the structures of the nervous tissue.

Keywords: neuroinfections, meningitis, children, etiology.

Introduction

Meningitis is an inflammation of the membranes of the brain and subarachnoid space, which often lead to adverse effects. In the structure of neuroinfections, the frequency of meningitis in children is about 30%, remain an important medical and social problem due to the weighting of their current course. Acute meningitis has a high frequency of severe forms, high lethality, an expansion of the etiological spectrum and difficulties