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A METHOD FOR PREDICTING A POLYDEFICIENCY STATE IN ELDERLY AND SENILE PERSONS

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Abstract. The purpose of this study is to carry out a comparative analysis of hematopoietic trace elements - iron, copper and zinc - in apparently healthy elderly men and women, depending on the age range. For these purposes, all surveyed men and women living both in urban and rural conditions were divided into two age ranges - surveyed - up to and over 70 years. The results of the analysis showed that there is no statistically significant difference between the indicators of blood hemoglobin and hematopoietic microelements - iron, copper and zinc in the whole group of examined elderly men and the group of examined elderly men and examined elderly women in old age.

Keywords: hematopoiesis, trace elements, blood serum, hemoglobin, age range.

Introduction. It is generally accepted that the development of iron deficiency states, primarily iron deficiency anemia (IDA) in elderly and senile people, is an unfavorable sign, worsens the quality of life of these people, creates an unfavorable premorbid background for the development of various diseases in them. Therefore, the task of predicting the development of such conditions in order to prevent them in the elderly seems to be very important for both theoretical and practical medicine [1, 2].

Currently, there are a number of ways to predict the development of iron deficiency states, both anemia itself and pre-anemic iron deficiency state. In the model of pregnant women, there is a method for predicting the development of anemia, based on tracking the dynamics of changes in

hemoglobin depending on age, the number of pregnancies and childbirth, and the duration of pregnancy [2, 4, 5, 7].

At the same time, in pregnant women of the high-risk group for the development of IDA, mainly consisting of repeated and multiparous with a short interval between childbirth and the lactation period, indicators were obtained indicating the critical timing of the development of the disease. The data show that for women 20-24 years of age, the critical period is 28 weeks of pregnancy, over 25 years of age 32 weeks, the beginning of the critical period corresponds to 20-22 weeks. At the same time, with the same initial levels of hemoglobin, its decrease is more pronounced in pregnant women over 30 years old [6, 8, 9].

However, it can be seen that in this case, the indicator of total blood hemoglobin is used as the analyzed variable, which is used in this forecasting method, which changes only at the stage of an obvious pathological process, i.e. the development of anemia itself, the pre-pathological state is almost impossible to determine and the prognosis can be given only by the outcome of the influence of IDA on the course and outcome of pregnancy. The proposed version of the forecast can be used only in pregnant women and it is practically impossible to apply it in other conditions, including in elderly and senile people. In this regard, at the present level, this method of predicting a polydeficiency state is not acceptable in geriatrics [10, 11].

The system of ferrokinetic monitoring, based on a quantitative analysis of indicators reflecting the mechanisms of early changes in various functional iron funds in the body, as indicated in another proposed method, makes it possible to effectively predict the development of an iron deficiency state. At the same time, the development of a preanemic iron deficiency state - latent iron deficiency in pregnant women is considered

most likely if at the end of the first and at the beginning of the second trimester of pregnancy, the level of transferrin in the blood serum is determined above 3.60 g / l, the level of circulating transferrin receptors is determined above 10, 0 mg / l, and the serum ferritin content is determined below 30.0 ng / ml. It can be seen from this method that indicators reflecting changes in the status of iron are described as the analyzed variables.

It should be emphasized that a common disadvantage of these methods is the use of only indicators for analysis that depend on the state of the iron status itself. At the same time, as shown above, iron, in the process of its metabolism, enters into cooperative relationships with other nutrients, in particular, into a synergistic relationship with copper and zinc. It is precisely such factors that can be classified as nutritional, which can also cause, determine the development of anemia.

In turn, such nutritional anemia may be due to a deficiency of certain nutrients that are directly related to hematopoiesis, for example, copper, zinc. Therefore, the monitoring of nutrients, along with iron itself, namely copper, zinc in elderly and senile persons, carried out during preventive examinations of these persons, makes it possible to realistically predict the risk of developing iron deficiency and polydeficiency states, the development of anemia itself if nutritional deficiencies in copper are detected in the surveyed. , zinc, given their role in hematopoiesis.

MATERIALS AND METHODS.

The very method we recommend is carried out as follows:

during the examination, blood from the examined person of elderly and senile age is taken from the cubital vein in an amount of 5 ml into a clean centrifuge tube. The blood is centrifuged at 3000 rpm for 5 minutes to isolate blood serum;

the isolated blood serum from the subjects for the analysis of iron, copper and zinc is taken in an amount of 1 ml;

the iron in the blood serum is analyzed by the batophenanthroline method, the level of copper in the blood serum is analyzed by the bathocuprein method, the level of zinc in the blood serum is analyzed by the dithizine method.

Prediction of the development of a polydeficiency state in elderly and senile persons is carried out on the basis of identifying the level of these nutrients, namely, iron, copper, zinc in the blood serum. Separately, in men and women, below the lower limit of the normative reference interval derived for each of these indicators, based on the examination of healthy elderly and senile persons.

RESULTS AND IT'S DISCUSSION.

Below are our recommended levels for urban residents of elderly and senile age:

the iron level is below 12.03 μmol / l (for urban elderly and senile men), below 10.0 μmol / l (for urban elderly and senile women);

the copper level is below 9.11 μmol / l (for urban elderly and senile men), below 8.29 μmol / l (for urban elderly and senile women);

the zinc level is below 14.1 μmol / l (for urban elderly and senile men), below 11.9 μmol / l (for urban elderly and senile women).

Attention is drawn to the fact that there are gender differences for all essential trace elements.

When predicting the development of a polydeficiency state in elderly and senile people, it is necessary to strictly adhere to these quantitative parameters and gender differences among the subjects. In this case, the efficiency of the proposed forecasting method will be high.

Below we give the recommended levels of iron, copper and zinc in serum for elderly and senile people permanently living in rural areas, which are used for the proposed method of forecasting:

the iron level is below 11.2 μmol / l (for rural elderly and senile men), below 9.81 μmol / l (for rural elderly and senile women);

the copper level is below 8.11 μmol / l (for rural elderly and senile men), below 8.0 μmol / l (for rural elderly and senile women);

the level of zinc is below 12.0 μmol / l (for rural elderly and senile men) and below 11.0 μmol / l (for rural elderly and senile women).

As well as among urban residents and people of the elderly and senile age, permanently residing in rural areas, gender differences have been preserved.

I would like to emphasize that the given data must be taken into account when predicting the development of a polydeficiency state in the examined elderly and senile persons permanently residing in rural areas.

It should be borne in mind that when using the method for predicting the development of a polydeficiency state in elderly and senile people, there are not only gender differences between the parameters of iron, copper and zinc, but also differences at the place of residence (city or village).

If the first regularity comes from the anatomical and physiological characteristics of the body of men and women, the sex differences in the use of nutrient composition, then the second regularity is derived by us after our results obtained in the study of elderly and senile people permanently residing in urban and rural areas.

We have proved that there are differences in the standard content of iron, copper and zinc in the blood serum in elderly and senile people, depending on the place of residence, which is the basis of the proposed

method for predicting the polydeficiency state in the examined category of persons.

Thus, when the indicated indicators are found less than the specified limits of the norm, they predict the development of a polydeficiency state in the examined men and women of elderly age permanently residing in urban and rural areas.

Thus, the method developed and proposed for use in health care practice for predicting the development of a polydeficiency state in elderly and senile people makes it possible, based on the analysis of the nutritional status of the body of these individuals, to identify a polydeficiency state caused by a deficiency of hematopoietic nutrients - microelements, which is important in the implementation of ongoing programs for mass prevention iron deficiency, other nutritional deficiencies in risk groups.

We have also studied and evaluated the leading factors leading to the development of polydeficiency in these patients in the formed groups of elderly and senile people with a verified diagnosis of a polydeficiency state on the basis of the history of life and illness of patients.

It has been proved that in elderly and senile people living in urban and rural areas, the main etiopathogenetic causes of the development of a polydeficiency state were:

- chronic diseases of the digestive system, causing the effect of malabsorption of hematopoietic nutrient factors in the gastrointestinal tract, which leads to a reduced deposition and metabolism of these factors in the body of these individuals;

- liver diseases, causing a decrease in the protein synthesizing function of the liver, entailing a decrease and secretion into the bloodstream, in particular, of the iron transport protein transferrin and, as a consequence, a decreased transport of iron to the hematopoietic organs, a decrease in the

synthesis and secretion into the bloodstream of albumin, a universal transport protein for a number of hematopoietic metals, vitamins;

In addition, we have also developed a program for the adequate diagnosis of polydeficiency states in elderly and senile people, which is based on the use of developed and unified methods:

- analysis of trace element status (determination of the level of serum iron, copper, zinc in the blood serum) in the blood serum;

- metalloproteins, reflecting the exchange of trace elements (determination of serum transferrin, ceruloplasmin, isotransferrin and isoceruloplasmin spectrum of blood serum) in the blood serum;

- derived standard values of these indicators and their reference intervals in elderly and senile people.

The next stage of research was to study the effectiveness of the use of the polymicroelement preparation Teravit in combination with the use of a domestic activator of protein metabolism - Ekdisten.

Theravit preparation is a balanced multivitamin - microelement complex of 12 vitamins and 12 minerals. The drug Ekdisten is an effective metabolic stimulant that intensifies the basal metabolism.

The effectiveness of these drugs was studied in 16 elderly women with a verified diagnosis of a polydeficiency state. We analyzed the dynamics of variable parameters, namely, the indicator of protein and essential trace elements - iron and zinc. Theravit and Ekdisten drugs used 2 tablets of the drug per day in the morning and in the evening for 14 days.

The initial hemoglobin level in the examined elderly women with PDS averaged 102.1 ± 0.31 g / l with fluctuations in this indicator from 90.0 g / l (min) to 112.0 g / l (max). The use of Teravit and Ekdisten drugs in these elderly women increases the hemoglobin level of blood after 2 weeks on

average to a level of 127.2 ± 0.12 g / l, with fluctuations in this indicator from 120.4 (min) to 126.2 g / l (max).

Positive dynamics is also noted for such an indicator as total blood plasma protein. So, the average level of total protein in the surveyed women before the use of drugs was 61.1 ± 0.12 g / l with the range of fluctuations of this indicator from 60.0 g / l (min) to 62.4 g / l (max). After 2 weeks of using the drugs, the level of total protein increases on average to 70.3 ± 0.19 g / l with fluctuations in this indicator from 68.4 g / l (min) to 71.6 g / l (max), i.e. e. by 9.2 g / l for 2 weeks of drug use.

The iron content in the blood serum of the examined women from an initial level of 9.02 ± 0.12 μmol / L with a range of fluctuations of this indicator from 8.87 μmol / L (min) to 9.57 μmol / L (max) increased after 2 weeks the use of drugs on average up to a level of 13.5 ± 0.14 μmol / L with a range of fluctuations of this indicator from 12.6 μmol / L (min) to 14.1 μmol / L (max) or 4.48 μmol / L.

The content of another essential trace element zinc during the use of drugs also significantly increases from the initial level on average 9.67 ± 0.2 μmol / L with a range of fluctuations of this indicator from 9.2 μmol / L (min) to 10.0 μmol / L (max) to an average level of 15.0 ± 0.2 μmol / l after 2 weeks.

The content of essential microelements in the surveyed women during the period of prophylaxis with preparations of vitamin-microelement and protein enhancement thus reaches the values characteristic of conventionally healthy elderly women.

CONCLUSIONS.

Thus, the effectiveness of the use of vitamin-microelement and protein enhancement drugs - Teravit and Ekdisten drugs in the prevention of imbalances of hematopoietic nutrients in elderly women with a

polydeficiency state in order to preserve the health of such women - has been proven.

At the end of the fifth chapter, we came to the following conclusions:

- when using the method for predicting the development of a polydeficiency state in elderly and senile people, there are gender differences between the parameters of iron, copper and zinc, as well as differences at the place of residence (city or village);

- gender differences come from the anatomical and physiological characteristics of the body of men and women, and the differences at the place of residence were revealed by us when studying in elderly and senile people who permanently live in urban and rural areas;

- when identifying indices of essential trace elements less than the specified limits of the norm, they predict the development of a polydeficiency state in the examined men and women of advanced age;

- a method for predicting the development of a polydeficiency state in elderly and senile people, developed and proposed for use in health care practice, makes it possible, on the basis of an analysis of the nutritional status of the body, to identify a polydeficiency state caused by a deficiency of hematopoietic nutrients;

- it has been proved that in elderly and senile people living in urban and rural areas, the main etiopathogenetic reasons for the development of a polydeficiency state were: chronic diseases of the digestive system; liver disease; hidden bleeding from the gastrointestinal tract;

- all interrelated parameters obtained by correlation analysis were positive, mainly of medium strength ($\rho = 0.5\text{-}0.7$) and strong connections ($\rho > 0.7$). The power of interrelated variants is greater in the elderly as compared to the elderly. In addition, the established fact of the relationship between the studied trace elements of blood serum in the surveyed

indicates that a decrease in one indicator leads to a decrease in another;

- strong, close positive correlations were found between the level of essential trace elements and the level of protein (iron / protein $\rho = 0.89$; copper / protein $\rho = 71$; zinc / protein $\rho = 0.75$) in elderly and senile people, which indicates on the general mechanism of the development of the deficiency of the studied nutrients in persons of these age groups when they develop a polydeficiency state;

- a program for the diagnosis of polydeficiency states in elderly and senile people has been developed, which is based on the use of developed and unified methods for the analysis of trace element status, some metalloproteins, reflecting the exchange of trace elements in the blood serum, derived standard values of these indicators and their reference intervals in elderly and old people ;

- hidden bleeding from the gastrointestinal tract, entailing the loss of trace elements and other nutrients.

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