gepatologii, koloproktologii [Rus. Journal of gastroenterology, hepatology, coloproctology]. Moscow, 2014, Prilozhenie [App.] № 43, p.27.
5. Slepcova S.S. Tihonova N.N. Samsonova V.K. Osobennosti techeniya hronicheskih virusnyh gepatitov v Yakutii [Features of the course of chronic viral hepatitis in Yakutia] Infekcionnye bolezni [Infectious diseases]. 2011, №9, p.343.
6. Plancoulaine S. Dissection of familial correlations in hepatitis C virus (HCV) seroprevalence suggests intrafamilial viral transmission and genetic predisposition to infection / S. Plancoulaine, M.K. Mohamed, N. Arafa [et al.] // J.Med. Virol.- 2008. - V.57, №9. - P. 1268-1274.
7. Yang Y.Hepatitis B virus infection in families with unfavorable prognoses in northwest China / Y.Yang, L. Jin, Y.L. He [et al.] // J.Med. Virol. - 2013. - V.85, №11.- P. 1893-1899.

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THE ACUTE LEUKEMIA EPIDEMIOLOGY IN CHILDREN OF THE SAKHA REPUBLIC (YAKUTIA)

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ABSTRACT

The article presents the analysis of frequency indicators: primary morbidity, mortality in acute leukemia in children of the Sakha Republic (Yakutia) for the period from 2000 to 2016. The incidence of acute leukemia, acute lymphoblastic leukemia, acute non-lymphoblastic leukemia in children's population of the SR are average and comparable with those of other regions of the Russian Federation. In dynamics there is a decrease in mortality from leukemia due to the therapy improvement and the quality of accompanying therapy.

Keywords: leukemia, epidemiology, children, Yakutia.

Introduction

The oncological diseases belong to the category of socially significant diseases in children. Mortality from these diseases in the group of children older than one year in Russia and other developed countries is on the second place, after injuries and accidents [4, 8].

Acute leukemia (AL) is the most frequent oncological disease of childhood, accounting for 31.3% in the structure of malignant tumors in children [8].

During the last 30 years there is an improvement of the AL treatment results and the disease from a fatal became curable for more than 70 % of patients [7]. This was made possible by the introduction of modern methods of diagnosis, high-intensity programs of polychemotherapy, improvement of accompanying therapy. Modern treatment of patients with acute leukemia belongs to the category of high-tech and expensive. The financial costs of treatment depend directly on the morbidity and mortality rate, which requires constant epidemiological monitoring [5].

The Oncology Department of the Pediatric center Republican hospital №1-National Medicine center is the only specialized Department in the Sakha Republic (Yakutia). Since 2003 it participates in the multicenter controlled clinical study of treatment protocols of ALL "Moscow-Berlin". Since 2000, the incidence of AL in the RS (Ya) has been continuously monitored [1].

The purpose of the study: the study of the frequency indicators: disease incidence, mortality in acute leukemias in children of the Sakha Republic (Yakutia) over the period 2000 to 2016.

Material and methods of research

A retrospective epidemiological study of AL in children aged 0 to 15 years living in the territory of Yakutia for the 17-year period (from 01.01.2000 to 31.12.2016) was conducted.

The Sakha Republic (Yakutia) is the largest region of the Russian Federation, its territory is 3103.2 thousand km^2. The population of Yakutia is 964 330 people. The average annual number of children aged 0 to 15 years during the observation period was 233427,5 ± 3170,8. The data for the child population of Sakha Republic (Yakutia) for the years were given in the Federal service of state statistics for Sakha (Yakutia). All nosological forms of acute leukemia (AL) corresponding to the codes of the International statistical disease classification and health-related problems were noted, 10th revision – ICD-10: acute lymphoblastic leukemia – ALL (C91.0), acute myeloid leukemia-AML (c92.0, C92.4, C92.5, C92.7, C92.9, C93.0, C93.3, S94.2).

Medical records were analyzed to obtain information about cases of diseases. A "rough" morbidity/mortality rate was calculated. The calculation of the morbidity rate was carried out according to the formula: Y = n × 105/N, where Y is the morbidity rate (per 100 thousand population of the corresponding age) for the year; n is the number of first – time cases of the disease for the year; N is the average annual population of the studied age group [9].

The calculation of the mortality rate was carried out by the formula: Z = n × 105/N, where Z is the mortality rate (per 100 thousand population of the corresponding age) for the year; n is the number of deaths per year; N is the average annual population of the studied

age group [9]. Statistical processing was carried out with the help of SPSS-16, MC Excel-07 application software package.

Research results and discussion

During this period, there were 144 cases of AL in children from 5 days to 14 years, including 113 (78.5%) children with ALL and 31 (21.5%) – with AML. On average, 8.5 ± 0.69 patients with AL, 6.6 ± 0.62 children with ALL and 1.8 ± 0.28 – with AML were detected annually. The information about the year on the AL identification is presented in table 1. Children with AL aged 0 to 4 years were 60 (41.6%), of the age to 1 year were 8 infants (5.5%), from 5 to 9 years – 51 (35.4%), from 10 to 14 years – 33 (23%). Among the cases of AL were 64 (44.5%) girls and 80 (55.5%) boys, the ratio of sex 1:1.25. Distribution of patients by ethnicity: Sakha-76 (52.8%), Russian – 51 (35.4%), others – 17 (11.8%). Children of the urban population were 76 (52.8%), rural – 68 (47.2%).

The average annual rate of primary morbidity in children was 3.8 ± 0.33 cases per 100 thousand children from 0 to 15 years (fluctuations from 1.86 to 6.63) (Fig. 1). This indicator is the average and close to those given for a number of regions of Russia [2, 3, 5, 7, 10 - 12], but lower than in Russia [8] and much lower than in Germany and Australia [13, 14]. The linear trend, constructed by regression analysis, is almost horizontal, indicating a stable level of morbidity during the observation period.

The average annual rate of morbidity in children of OL aged 0 to 4 years was 4.85 ± 0.59, 5 to 9 years-4.26 ± 0.64, 10 to 14 years-2.53 ± 0.48. The incidence was higher between 0 and 4 years and 5 to 9 years, lower between 10 and 14 years.

Out of 144 children with AL in remission are 98 (68.0%), of them in the second remission – 2 children (children with ALL). Died a total of 40 patients (27.8 percent), information about the 6 children are absent mainly due to the departure of their families outside the country. Mortality under AL amounted to 1.07 per 100 thousand children's population, which is slightly lower than the same indicator in Russia-1.22 [8]. Over 17 years of observation in the dynamics of mortality in AL significantly decreased, as seen by the linear trend (Fig. 2).

Out of 113 patients with ALL aged 0 to 4 years were 53 (46.9%), of them up to 1 year were 6 (5.3%), from 5 to 9 years – 40 (35.4%), from 10 to 14 years – 20 (17.6%) children. The largest number of children with ALL was between 2 and 5 years – 50 (44.2%), the so-called "infant peak", which corresponds to the literary data. Among ALL cases were 51 (45,2%) girls and 62 (54.8 %) boys, sex ratio 1 : 1.21.

The average annual rate of primary morbidity in children with ALL in the SR was 3.0 ± 0.27 cases per 100 thousand children (fluctuations from 1.86 to 5.68) (table 2). This indicator is comparable with similar indicators of other regions of Russia: the Republic of Buryatia – 2,22±0,16 [3], Astrakhan – 3,1±0,21 [12], Bryansk – 2,92±0,26 [7], Omsk region – 2,6 ± 0,25 [6], the Republic of Komi – 2,85 ± 0,26 [11], but lower than in economically developed countries [13, 14]. The linear trend is almost horizontal, which indicates a stable level of ALL morbidity during the observation period (Fig. 3).

The incidence of ALL children aged 0 to 4 years was 4.28 ± 0.49, 5 to 9 years – 4.34 ± 0.64, 10 to 14 years – 1.53 ± 0.48. The incidence is higher at ages 0 to 4 years and 5 to 9 years, and almost 3 times lower at ages 10 to 14 years.

Out of the 113 children with ALL, 86 children are in remission, which is 71.6%. 22 (19.3%) of the child died, there is no information about 5 children. The mortality rate for ALL was 0.59 per 100,000 children. This indicator at ALL during the time of observation is steadily decreasing (Fig. 4)

Among children with AML there are 13 (42.0%) girls , 18 (58.0%) boys, the sex ratio 1,0:1,3, as well as in ALL indicates the prevalence of boys. Age distribution: 0 to 4 years-7 (22.5%), 5 to 9 years – 11 (35.5%), 10 to 14 years – 13 (42.0%) children. In AML, unlike ALL, older children prevailed, with a positive correlation with the age of 10 years (r=,180, p<0.05) and 14 years (r=,240, p<0.01). The primary incidence of AML was 0.83 ± 0.1 per 100 thousand children, which is also comparable with data from other regions of the Russian Federation. The linear trend in the incidence of AML is also almost horizontal. The average annual AML incidence in children aged 0 to 4 years was 0.56 ± 0.17, 5 to 9 years-0.92 ± 0.19, 10 to 14 years – 1.0 ± 0.23. This figure is higher at the age of 5 to 14 years, in the age aspect of 0 to 4 years, the incidence is almost 2 times lower.

Out of 31 children with AML in remission are 12 (38.7%), 18 died (58.1%), there is no information about 1 child. The death rate was 0.48 per 100 thousand children's population. During the observation, this indicator also decreases, but remains at a high level (Fig. 5).

The number of children with AL in the period from 2000 to 2015

Year	Number of identified cases		
	AL	ALL	AML
2000	9	8	1
2001	9	8	1
2002	10	7	3
2003	12	8	4
2004	8	6	2
2005	6	5	1
2006	8	5	3
2007	8	8	0
2008	9	7	2
2009	7	7	0
2010	12	8	4
2011	5	5	0
2012	14	12	2
2013	4	4	0
2014	11	8	3
2015	7	4	3
2016	5	3	2
Total	144	113	31

Conclusion

The primary morbidity rates of AL, ALL, AML in the children's population of the Sakha Republic are average and comparable with similar indicators of other regions of the Russian Federation,

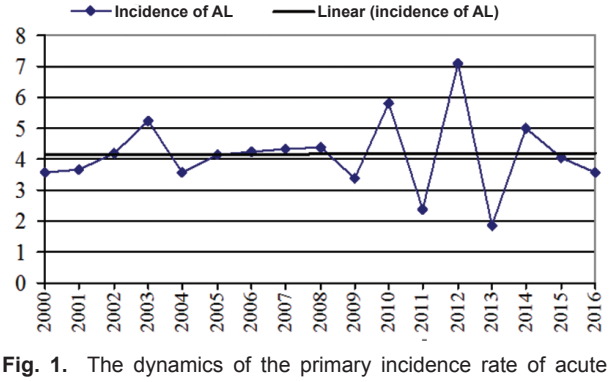

Fig. 1. The dynamics of the primary incidence rate of acute leukemia of the child population of the Sakha Republic for the period 2000-2016 and linear trend.

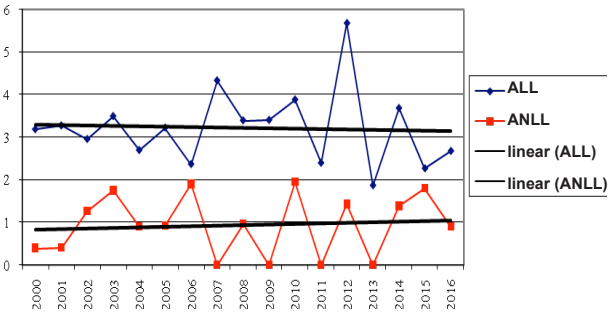

Fig. 2. The dynamics of the death rate in the case of AL for 100 thousand children from 0 to 14 years in the Sakha Republic for the period from 2000-2016 and linear trend.

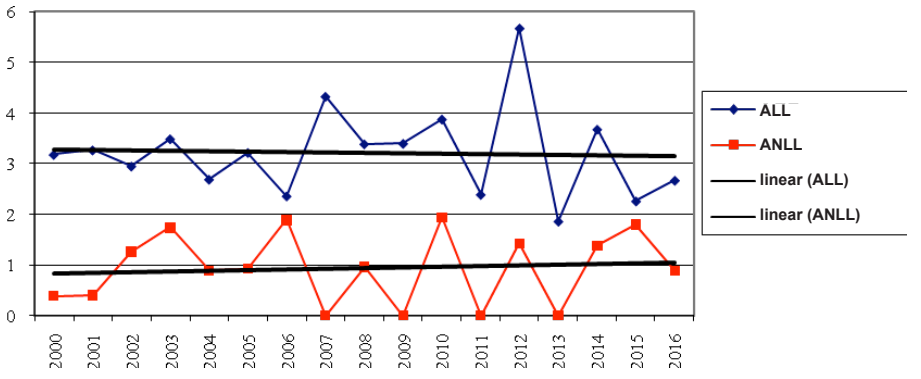

Fig.3. The dynamics of the primary incidence rate of ALL and AML in the children's population of the Sakha Republic for the period from 2000-2016 and linear trend.

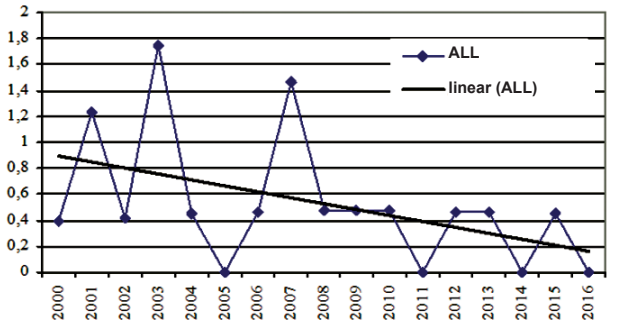

Fig. 4. The dynamics of the mortality rate in case of ALL in 100 thousand children's population from 0 to 15 years in the Sakha Republic for the period from 2000-2016 and linear trend.

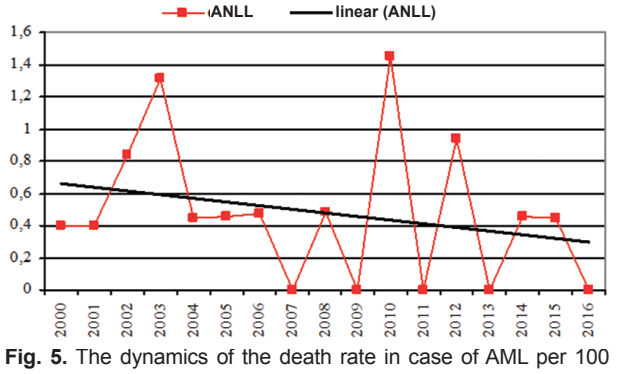

Fig. 5. The dynamics of the death rate in case of AML per 100 thousand children's population from 0 to 15 years in the Sakha Republic (Yakutia) for the period from 2000-2016 and linear trend.

but lower than in economically developed countries. The incidence rates of AL, ALL, AML remain stable during the follow-up period. The ALL more common in patients aged 2 to 5 years, with AML are older than 10 years. Mortality in AL remains at a fairly high level, mainly due to high mortality in AML. Over the period of observation, there is a decrease in this indicator, both, in General, and with ALL and AML. The significant reduction in mortality was observed in ALL. Participation in multicenter studies of treatment protocols of ALL "Moscow-Berlin" and quality improvement of accompanying therapy contributed to the reduction of this indicator.

References

1. Argunova E. F., Kondrat'eva S. A., Slepcov O. V. Struktura, ehpidemiologiya i lechenie zlokachestvennyh novoobrazovanij u detej respubliki Saha (YAkutiya) [Structure, epidemiology and treatment of malignant neoplasms in children of the Sakha Republic (Yakutia)] Mezhregional'naya nauch.-prakt. konf. «Aktual'nye voprosy klinicheskoj mediciny na Severe» [Interregional scientific.-prakt. Conf. "Actual issues of clinical medicine in the North"]. Yakutsk, 2013, p. 24-30.
2. Balasheva I. I., Luchinina L. F., Desyatova L. F. 50 let kliniko-ehpidemiologicheskih issledovanij ostryh lejkozov u detej Tomskoj oblasti [50 years of clinical and epidemiological studies of acute leukemia in children of Tomsk region] Sibirskij onkologicheskij zhurnal [Siberian journal of Oncology]. Tomsk, 2010, No 1 (37), p. 23-28.
3. Budaeva D. D., CHernov V. M., Rumyancev A. G. Lejkozy u detej v Respublike Buryatii [Leukemia's in children in the Republic of Buryatia] Gematologiya i transfuziologiya [Hematology and Transfusiology]. Moscow, 2000, V. 45, No 6, p. 16-21.
4. Davydov M. I., Durnov L. A., Polyakov V. G. Sovremennye aspekty organizacii detskoj onkologicheskoj pomoshchi v Rossijskoj Federacii [Modern aspects of the organization of children's cancer care in the Russian Federation] Consilium medicum. Detskaya onkologiya. Prilozhenie [Consilium medicum. Pediatric Oncology. Application]. Moscow, 2002, p. 6-8.
5. Zhukovskaya E. V., Spichak I. I., Basharova E. V. Zabolevaemost' ostrymi lejkozami i ih rasprostranennost' v detskoj populyacii CHelyabinskoj oblasti za period 1974-2003 gg. [Incidence of acute leukemia And their prevalence in the children's population of the Chelyabinsk region for the period 1974-2003] Voprosy gematologii/onkologii i immunopatologii v pediatrii [Hematology/Oncology and immunopathology in Pediatrics]. Moscow, 2005, V. 4, No 1, p. 24-20.
6. Kockaya N. N. EHpidemiologicheskie harakteristiki ostrogo limfoblastnogo lejkoza u detej Omskoj oblasti za period 1993-2010 gg. [Epidemiological characteristics of acute lymphoblastic leukemia in children of Omsk region for the period 1993-2010] Voprosy gematologii/onkologii i immunopatologii v pediatrii [Hematology/Oncology and immunopathology in Pediatrics]. Moscow , 2012, V. 11, No 1, p. 9-13.
7. Krylova V. V., Rakov M. A., Rogacheva E. R. Zabolevaemost' ostrymi lejkozami v detskoj populyacii razlichnyh territorij Bryanskoj oblasti za period 1994-2007 gg. [Incidence of acute leukemia in the children's population of various territories of the Bryansk region for the period 1994-2007] Voprosy gematologii/onkologii i immunopatologii v pediatrii [Hematology/Oncology and immunopathology in Pediatrics]. Moscow, 2010, V. 9, No 4, p. 15-18.
8. Men' T. H., Polyakov V. G., Aliev M. D. EHpidemiologiya zlokachestvennyh novoobrazovanij u detej Rossii [The Epidemiology of malignant tumors in children of Russia]. Onkopediatriya [Onkopediatriya]. Moscow, 2014, No 1, p. 7-12.
9. Savilov E. D. [et al.] Primenenie statisticheskih metodov v ehpidemiologicheskom analize [The application of statistical methods in epidemiological analysis]. Moscow: MEDpress-inform, 2004, 112 p.
10. Teplyakova U. D., Savis'ko A. A., Aslanyan K. S. Zabolevaemost' ostrymi lejkozami u detej Rostovskoj oblasti za period 1991-2010 gg. [Incidence of acute leukemia in children of Rostov region for the period 1991-2010] Fundamental'nye issledovaniya [Basic research]. Moscow, 2012, No 2, p. 363-367.
11. Shestakova V. V., Turabov I. A., Karmanov A. L. Zabolevaemost' ostrymi lejkozami detej v Respublike Komi [Incidence of acute leukemia in children in the Republic of Komi] Onkopediatriya [Onkopediatria]. Moscow, 2015, V 2, No 1. - p. 48-53.
12. Halturina I. L. Ostrye lejkozy u detej Astrahanskoj oblasti: chastotnye harakteristiki, kachestvo diagnostiki i rezul'taty lecheniya : avtoref. dis. … kand. med. nauk : 14.00.09, 14.00.29 [Acute leukemia's in children of the Astrakhan region: the frequency characteristics,

the quality of diagnosis and results of treatment: author. dis. ... kand. honey. sciences : 14.00.09, 14.00.29]. Moscow, 2007, 26 p.
13. Childhood Cancer Incidence in Australia, 1983-2006. URL: http://www.cancerqld.org.au/
14. German Childhood Cancer Registry. Annual Report. 2015/ URL: http:// http://www.kinderkrebsregister.de/dkkr-gb/latest-publications

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ACTUAL TOPIC

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DYNAMICS OF ONCOLOGICAL DISEASES MORBIDITY INDICATOR OF CHILDREN AND ADOLESCENTS IN THE REPUBLIC SAKHA (YAKUTIA)

DOI 10.25789/YMJ.2018.63.22

ABSTRACT

We have analyzed the morbidity rates of oncological diseases of children and adolescents of the Sakha Republic for 2000 - 2015 according to hospitalization data in the Pediatric Center RH № 1-NCM.

The data of official medical statistics on the population's appeal to the medical and prophylactic institutions of the Sakha Republic are very contradictory and determine some morbidity dynamics. The data of hospitalized morbidity tend to increase and are mainly associated with the repeated income of children and adolescents contingent with a diagnostic and therapeutic purpose. The most real picture of the oncological morbidity extent in children and adolescents is given by the number of newly diagnosed neoplasms according to the data of the department in the Sakha Republic for children with oncological pathology. Annually about 30 cases of newly diagnosed tumors are noted. In the dynamics of the number of children and adolescents with oncopathology has a tendency to increase.

In our opinion, the real picture of oncological morbidity extent in the Sakha Republic (Yakutia) can be given by a single register of cancer patients created by using information technologies, which will take into account the personal data of patients with a mandatory indication of residence place, ethnicity, age, sex and other characteristics of the child.

Keywords: children, morbidity, oncology, Yakutia.

Introduction

The study of the cancer epidemiology in children and adolescents has special significance every year. Annually, the morbidity of malignant neoplasms in the Russian Federation is 15.0 per 100,000 people, about 3,500 children and adolescents with newly diagnosed neoplasms [5]. The oncogenesis processes of children are very interesting, because they have a rare probability of malignant neoplasm, selectivity of damage to certain organs and systems. One of the main points in conducting oncoepidemiological studies in children and adolescents is to elucidate the factors leading to oncological pathology. It can be environmental, genetic and other endogenous factors.

Meanwhile, the literature has few works devoted to the study of morbidity, mortality of children and adolescents from malignant neoplasms by regions of the Russian Federation. The reasons for this are not only a small number of cancer registers that control oncological morbidity and mortality in the field for a long time, but also the methodological level in the use of information bases in epidemiological studies in the Russian Federation [4]. Meanwhile, children and adolescents with oncological pathology in the Sakha Republic are observed in the only oncological unit of the Republican Hospital Pediatric Center №1-National Medicine centre. And this gives preconditions for the study of oncoepidemiology in children and adolescents.

We have analyzed the morbidity rates of oncological diseases of children and adolescents of the Sakha Republic for 2000 - 2015 according to hospitalization data in the Pediatric Center RH № 1-NCM.

Results

The general morbidity indicator of children under 14 in the Sakha Rebublic for the period 2000-2015 has increased by 70.8% (Table 1). Today, changes in the sickness structure of children are evident. Reduction in the overall children morbidity has occurred in such classes: «some infectious and parasitic diseases», «endocrine system diseases, eating disorders, metabolic and immunity disorders.» A significant increase in the overall morbidity in the following classes of diseases: «neoplasms», «diseases of the nervous system», «eye and