EPIDEMIOLOGY OF GLAUCOMA IN THE REPUBLIC SAKHA (Yakutia)

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Abstract

Epidemiological indicators of glaucoma in the Republic Sakha (Yakutia) are analyzed. The prevalence and structure of glaucoma depending on the demographic and climatic conditions of the republic for 10 years (2001-2010) are examined.

Keywords: glaucoma, epidemiology, region.

Glaucoma problem is considered to be of great significance, for it causes blindness at 5,2-10,05 million persons in the world according to separate researchers. According to WHO researchers glaucoma in 13 % of cases serves as the blindness cause in the world, occupying the second place after cataract in blindness nosology. The researchers Quigley N.A. and Broman A.T. have noted that the number of patients with glaucoma in the world will increase up to 79,6 million by 2020 [14].

In the Russian Federation (RF) 1,025 million patients with glaucoma have been registered, 805 thousands of them being on dispensary treatment. Over the last 10 years in the Russian Federation the level of blindness owing to glaucoma has grown in 3 times [10].

The republic Sakha (Yakutia) is located in the northeast part of the Euroasian continent and is the greatest region of the Russian Federation. The area of Yakutia makes up 3,1 million in sq. km. Over 40 % of territory of the republic is behind the Polar circle. Yakutia is the coldest of the habited territories of the planet. Till now the republic is one of the most isolated and remote regions of the world in transport connection: 90 % of the territory have no all-the-year-round transportation [12].

According to the 2010th All-Russia census the total amount of population RS (Y) has made up 958,528 persons. Considering climatic and geographic conditions, the republic territory is conditionally divided into such regions as Arctic (Northern), Central, Viljujsky, Southern.

Survival factor of the population in the North is one of the major in contemporary

conditions. A lower level of the population's health is revealed in the territory of Siberia and the Far East. The most critical outcomes of health state are observed in the Asian North that is caused by extreme environment, unfavorable ecologic and hygienic situation in the centers of industrial concentration as well as poorly developed social infrastructure [1-3, 13].

Aim: to study glaucoma and its prevalence in RS (Y) concerning demographic and climatic – geographic conditions of regions in the republic within 10 years (2001-2010).

Material and methods: annual reports: 12, 14, 14 day patient departments, 16 temporarily disabled, 17, 30, 57, 201 annual reports: 12, 14, 14 DPD, 16 TD, 17, 30, 57, 201

Results and discussion. In 2001-2010 in the territory RS (Y) 85773 glaucoma patients were registered, including 9372 (10,9 %) with primary diagnosis established (Tab. 1).

In dynamics for ten years the increase of glaucoma disease was noted as a whole, up to 32,9% for addressing medical aid and 58,2 % for its primary reveal (in the Russian Federation the growth rate has made 7,6 % and 4,6 % accordingly) [8, 9].

In Fig. 1 it is visible that the intensive marker (IM) of the general disease (GD) among adult population in RS (Y) for ten years has grown up to 1394,9, i.e. 32,5 % (from 1052,9 to 1394,9), the average parameter in the investigated period was 1247,2. In structure of GD of eyes in RS (Y) glaucoma takes the third place after myopia and cataracts [8, 9].

The intensive marker of glaucoma in RS (Y) in 2006-2010 has increased by 2 %, exceeding markers of the Russian Federation on 48,5 %, the Far East Federal district (FED - 773,9) on 61,1 %, Tomsk region on 114,8 % [4-6, 8, 13] (Tab. 2).

High markers and growth of GD testify to high detection of glaucoma, though staff of ophthalmologists all over the RS (Y) has decreased from 83,8 to 79,4 % during the given period.

Fig. 2 demonstrates that markers of GD of glaucoma in various groups of areas RS (Y) are non-homogenous.

The central region is located in the central part of the republic, its structure includes Yakutsk city, the total population is 509273. The indigenous population (Yakuts) make up 61,1 % (2010) . The intensive marker of glaucoma (1557,2) has exceeded data all over the RS (Y) on 24,8 %. The growth rate of the given markers during research has amounted for 14,4 %, in age category 40 years and over has grown up to 21,6 % (from 2180 to 2652). Somewhat this increase is connected with population migration in the republic, due to inflow of rural inhabitants to the capital of republic Yakutsk. For the previous decade the number of adult population has grown on 16,5 %, while in age category of 40 years and over it was noted on 29 %. The high level of glaucoma and its growth is caused by the adjusted organization system for glaucoma diagnosing

due to high concentration of specialists (the amount of personnel has increased from 73,5 to 81,7 %) and affinity of the Yakut republican ophthalmologic hospital (YOC), equipped with updated diagnostic devices.

Northern (Arctic) region occupies one of the most extensive territories of Yakutia. The climate is arctic and subarctic.

In 2001 105,215 people inhabited the arctic areas of the republic , but further due to active departure of the arrived population by 2010 the population has amounted 840,36 persons, the population density comprising 0,01-0,08 people per 1 sq. km. This region is known as the territory of primary residence of the indigenous people Yakuts (45,6 %) and other small nationalities of the North: Evens, Evenks, Yukagirs, Chukchi (30,6 %) [1, 12, 13]. The intensive marker of glaucoma (1479,1) exceeds the markers of RS (Y) on 18,5 %, for ten years it has increased up to 77,3 %, in age category of 40 years and more it increased on 140 % (from 1520 to 3632,5). There is a higher rate of disease markers despite lacking of ophthalmologists in 4 areas: Anabarsky, Allaihovsky, Verkhoyansky and Srednekolymsky, due to organizing of the "mobile" work by YROH for rendering advice and surgical treatment to the population of remote areas. The intensive marker of glaucoma since 2004 is probably connected with a specialist's arrival in Srednekolymsky region. Though, in general the personnel maintenance has decreased from 89,7 to 84,6 % since 2006 .

The Viljujsky region occupies the plain of the river Vilyui and the territory located to the north. The climate of region is milder than in the north. 173,271 persons inhabit the territory, Yakuts comprising 56,2 % (2010).

In Viljujsky region the intensive marker of glaucoma is 945,3, i.e. lower than the marker of GI over the republic on 31,9 %, in dynamics for ten years its increase on 45 % has been noted, and in age category of 40 years and over it has grown on 56,5 % (from 1339 to 2096,6). Considering the growth of GI markers, relatively dense population (1,2-2,8 people on 1 sq. km) as compared with the whole republic (0,3 people on 1 sq. km), personnel maintenance (84,2 %), in 2008 a glaucoma treatment office was founded on the basis of the central regional hospital in Njurba.

The southern region occupies southern and southwest parts of the republic. The climate here is much milder [1, 13]. 191,948 persons have been registered, the population was formed for the account of new-arrived from other regions and republics of USSR. Among the new arrived population Russians occupy the first place (73,7 %), while the indigenous population Yakuts make up 9,9 %.

The intensive marker of glaucoma (555,5) is lower than the marker on RS (Y) on 124,5 %, for ten years it has amounted 43 %, in age category of 40 years and over 62 % were noted. Rather

low markers of GD in the region are connected with personnel shortage. If in 2001 personnel acquisition reached 100 %, in 2010 it amounted only 55,8 % due to the departure of specialists.

On Fig. 3 the dynamics of intensive marker of primary disease (PI) (on 100 thousand adult population) is presented. For the investigated period the intensive marker of PD has increased up to 57,7 % (from 104,8 in 2001 to 165,3 in 2010), and reached a maximum level in 2008 (181,6) [8, 9].

Average value of the intensive marker of PD for five years (2006-2010) has amounted to 159,4, this parameter being higher on 45,1 % than the markers in the Russian Federation [4-7, 9] (Tab. 3).

From Fig. 4 it is to be noted that the markers of PD in regions of the republic are as follows: high values during the investigation are noted in the Arctic region (190,8), they exceeding the data on RS (Y) on 19,6 %. In the Central (155,1), Viljujsky (114,3), Southern (94,4) regions the intensive marker of PD is considerably lower as compared with the republican marker on 2,7 %, 39,4 % and 68,8 % accordingly.

When distributing glaucoma patients on gender structure, sex differentiation had no significant influence on glaucoma frequency ratio, men were noted at 45,5 %, women at 55,5 %.

It is known that the glaucoma frequency ratio increases with the years. At the age of 40-50 years the percent of patients ranges from 0,1 to 1 %, after 70 years this figure increases up to 10 % and more [11].

In RS (Y) for ten years the relative density of glaucoma patients in age category of 40-49 years has decreased from 7,7 to 6,1 %; 50-59 years has increased from 16,9 to 21,6 %; 60-69 years has decreased from 37 to 31 %, at senior 70 years has increased from 36,9 to 40 %.

According to Tab. 4 the growth of absolute amount of “D” (dispensary) patients with glaucoma was detected, they comprising 44 % (from 5745 to 8278). During the investigation the number of «D» patients has increased up to 43,6 % (from 825,1 to 1184,8). In RS (Y) in 2001 the total number of registered glaucoma patients amounting to 27,6 % did not refer to «D» account, in 2005 their number reached 31 %, the next years the given marker has decreased to 15 % in 2010 (all over the Russian Federation - 20 %) [10].

The representatives of indigenous population (the Yakuts) comprise 68,1 % among «D» patients with primary glaucoma (PG) in the republic. The intensive marker of GD among the given category of the population amounted to 1581, it being higher than the data all over the republic on 26,7 % (Tab. 5).

The analysis of PG structure has shown the essential prevalence of open-angle glaucoma (OAG) form during all period of the supervision (67-75,3 %).

On estimating the efficiency of «D» supervision the clinical and functional characteristics are taken into account, including illness stage.

From Fig. 5 it is visible that during the investigation among «D» patients with glaucoma there was increase in quantity of patients of I stage on 3,8 %, II - on 2,6 %, III - on 0,6 %, with simultaneous decrease in the amount of patients of IV stage on 7 %.

Prevalence of PG in republic regions.

In the Central region «D» patients with PG has grown on 21 % (from 3366 to 4744). Prevalence of PG among the Yakuts amounted to 1132,7. OAG predominates of all glaucoma forms which frequency rate in dynamics has increased from 63 to 73,5 %. The efficiency of «D» supervision has revealed growth of the quantity of patients with I stage from 16 to 18 %, II - from 43 to 47 %, III - from 14 to 18 % and corresponding decrease at patients with terminal stage from 27 до17 %.

In Northern region the number of «D» group has increased to 79,7 % (from 653 to 1174). Prevalence of PG among the indigenous Yakuts has been estimated at 1524,9. Among PG forms OAG is the prevailing in the region, making up 72 %. Throughout all period of the supervision II stage of disease prevails (41 %). In dynamics the number of patients with I stage has decreased from 33 to 26 %, with III and IV stages has increased from 15 to 19 % and from 3 to 15 % accordingly.

In Viljujsky region the number of «D» group of patients with PG has increased up to 31 % (from 1048 to 1376). The prevalence of PG among the natives is 1231,9. Among PG forms OAG prevails in the region which has increased from 71 to 79 %. II stage prevails, comprising 43-42 %, the quantity of patients with III stage is stable - 17 %, with I stage it has increased from 23 to 26 %, and with IV – it has decreased from 17 to 15 %.

In Southern region the number of «D» group of patients with PG has increased up to 45 % (from 678 to 984). The prevalence of PG among the natives has made up 1694,7. In the region the OAG is at a higher rate which prevalence for 10 years has increased from 79 to 83 %. The quantity of patients with II stage has increased from 26 to 33 %, III - from 20 to 23 %; with I stage has decreased from 33 to 28 %, IV - from 21 to 16 %.

Thus, the analysis of epidemiological markers of glaucoma in RS (Y) in 2001-2010 has revealed:

1. A high level of general glaucoma in the republic (1247,2) which exceeds the data all over the Russian Federation on 48,5 %.
2. Increase of intensive marker of general glaucoma on 32,5 % (from 1052,9 to 1394,9).

3. High markers of general glaucoma in Central (1557,2) and Arctic (1479,1) regions, exceeding republican on 24,8 and 18,5 % accordingly.

4. Increase of intensive marker of general glaucoma in Arctic on 77,3 %, in Central on 45 %, in Viljujsky on 56,5 %, in Southern on 43 %.

5. Growth of primary glaucoma ratio in RS (Y) on 57,7 % (from 104,8 to 165,3), it being higher than the data all over the Russian Federation on 45,1 %.

6. High values of primary glaucoma marker in the Arctic region (190,8) that higher than the republican data on 19,6 %.

7. Increase of absolute number of patients with PG registered in dispensary observation has amounted to 44 % (from 5745 to 8278). The coverage of 100 thousand adult population for medical examination is estimated at 43,6 % (from 825,1 to 1184,8).

8. Incidence rate of OAG (75,3 % in 2010) in RS (Y).

9. Positive quantity growth of relative density among patients with I-III stages is noted with simultaneous quantity reduction of patients with terminal stage. However in the Arctic region the negative quantity growth of patients with advanced and terminal stages is revealed.

10. Incidence rate of PG in the republic among the natives (Yakuts) in Arctic (1524,9) and Southern (1694,7) regions, they being much higher as compared with the markers all over RS (Y) on 9,3 and 21,4 % accordingly.

The epidemiological data of glaucoma in RS (Y) testify to necessity of adequate monitoring of glaucoma patients, especially in the remote areas of the republic. For what it is necessary to establish a republican glaucoma center on the basis of YROH with introduction of medical information systems and telemedical technologies for carrying out remote medical consultations, teleconferences, introduction of new technologies and diagnostics and treatment methods.

Table 1

Absolute quantity of registered glaucoma patients in RS (Y) in 2001-2010

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All patients with glaucoma	7331	7212	7259	8614	8374	9297	9128	9518	9294	9746
Including primary glaucoma patients	730	779	709	858	804	1076	954	1250	1057	1155

Table 2

Intensive marker of general glaucoma in RS (Y) in 2006-2010 in comparison with showings of the Russian Federation (per 100 thousand adult population)

	2006	2007	2008	2009	2010
IM of General Glaucoma in RS(Y)	1365,1	1319,8	1369,9	1335,4	1394,9
IM of General Glaucoma in RF	892,4	899,5	906,4	918,0	951,2

Table 3

Intensive marker of primary glaucoma in RS (Y) and the Russian Federation in the period 2006-2010

(per 100 thousand adult population)

	2006	2007	2008	2009	2010
IM of Primary Glaucoma in RS(Y)	155,3	142,5	181,6	152,4	165,3
IM of Primary Glaucoma in RF	108,5	107,3	104,3	104,9	107,2

Table 4

The quantity of «D» patients with primary glaucoma and coverage of «D» supervision in 2001-2010 in RS (Y)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Absolute quantity of «D» patients	5745	5812	5593	6172	6069	6925	7151	7150	7706	8278
Coverage of «D» supervision	825,1	842,7	804,1	930,6	902,6	1016,8	1033,9	1029,1	1107,2	1184

Table 5

Distribution of PG in forms in RS(Y) among «D» patients (%)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
OAG	67	68,3	68	69,2	71,4	72,2	71,6	73,4	75,4	75,3
CAG*	28,4	27,8	26,4	25,4	23,5	21,9	21,3	19,9	18,4	17,8
MAG**	4,6	3,9	5,6	5,4	5,1	5,9	7,1	6,7	6,2	6,9

* CAG – angle-close glaucoma; ** MAG - mix –angle glaucoma

Picture 1. Dynamics of IM of General Glaucoma per 100 thousands adult population in RS (Y) in the period 2001-2010.

Picture 2. Dynamics of General Glaucoma in regions of RS (Y) in 2001-2010.

Picture 3. IM of primary glaucoma in RS(Y) per 100 thousands adult population in 2001-2010.

Picture 4. Dynamics of IM of primary glaucoma in regions RS(Y) in the period 2001-2010

Picture 5. Glaucoma distribution in RS(Y) by stages in the period from 2001 to 2010 (%)

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