

## Results of Studies of Primary Glaucoma in the Indigenous Inhabitants of Siberia

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Glaucoma as a disease that threatens human vision was known to Hippocrates. One of the first scientific articles in Russian language on glaucoma appeared in 1858 in the «Military Medical Journal» and belonged to the famous A. Graefe. Until 1900, several medical dissertations on glaucoma were defended, including the works of D.I. Dmitrovsky (1863), E.V. Adamyuk (1874), S.S. Golovin (1895) and others. Numerous works of domestic and foreign researchers treat glaucoma as a multifactorial disease with a very complex and not fully understood pathogenesis. According to the definition of the European Glaucoma Society, the diagnosis of «glaucoma» unites a large group of eye diseases with different etiologies, the characteristic symptoms of which are an increased intraocular pressure (IOP) beyond the level tolerant of the optic nerve and retina, the development of glaucoma optic neuropathy followed by atrophy of the optic nerve head and the occurrence of characteristic visual field defects.

Thus, glaucoma is a collective name for a group of diseases that differ in etiopathogenesis, but are conditionally united by the similarity of clinical signs, clinical course and irreversible blindness due to atrophy of the optic nerve. According to H. Quigley, the number of patients with primary open-angle glaucoma (POAG) in 2000 in the world was 66.8 million people and 6.7 million patients with glaucoma had bilateral blindness. According to World Health Organization, the number of glaucoma patients was predicted to double by 2030. However, in 2010, other figures were given - in the world there were already more than 105 million patients with glaucoma and blind in both eyes as a result of it 9.1 million people. According to the WHO, nine out of ten blind people live in

developing countries, and two-thirds of them could be cured, which seems doubtful to us, since it is known that glaucoma is a chronic progressive disease and currently mankind has not invented a cure for it.

Currently, in Russia, visual disability due to glaucoma is the main one among all eye causes. Over the past decades, there has been a steady increase in the number of patients with glaucoma and disability due to it. For example, at the end of the 20th and the beginning of the 21st century, due to glaucoma in the Krasnoyarsk region, 17.7% were recognized as visually impaired for the first time in the structure of primary disability in 1998, in 2000 - 23.0%, in 2001 - 26.9%; in 2002 - 24.1%; in 2003 - 24.2%; in 2004 - 28.2%; in 2005 - 31.8%, in 2009 - 29.9%. Primary disability due to glaucoma in 2010 in the Krasnoyarsk region was: total - 29.9%; among patients of working age - 11.3%; among patients of retirement age - 42.1%, which almost corresponded to the average data for Russia.

Unfortunately, at present, the situation with glaucoma has not undergone improvement, but has only worsened, which is due, among other things, to the cessation of the functioning of the system of early detection of glaucoma and medical examination of patients with glaucoma, which existed during the Soviet Union. Glaucoma places a heavy economic burden on health care around the world. The total economic damage consists of the costs of prevention, diagnosis, treatment, labor losses, payments to the disabled. The cost of glaucoma is already enormous, but given the global trend of population ageing, glaucoma will become an even heavier economic burden in the future.

### The purpose

The success of glaucoma treatment and the preservation of visual functions are mainly determined by the timing of its detection, which makes further study of the problem relevant. This is also true for the so-called «small» nationalities. This is especially true of Eurasia, as a continent on which a significant part of evolution took place, and on the territory of which representatives of different races and ethnic groups live side by side for many centuries.

### Outcomes

Studies were conducted on the ethnic characteristics of glaucoma in the Republic of Tyva and Republic Khakasia. The relevance of the research was predetermined by the high disabling ability of glaucoma. Thus, according to the Bureau of Medical and Social Expertise of the Republic of Tyva, for the period 2000-2005 the proportion of disability due to glaucoma in the republic increased from 54.2 to 71.0%. The share of primary open-angle glaucoma as a cause of persistent disability was 80.3% of all glaucoma's. During 2000-2005 in the Republic of Khakasia, the proportion of primary disability due to glaucoma increased from 26.1% to 39.6%.

We conducted a study in the Republic of Tyva on the topic: «Primary open-angle glaucoma in the indigenous inhabitants of the Republic of Tyva». As a result, for the first time, features were revealed that, along with social factors, have an impact, forming a peculiar picture of the clinical course of POAG among the indigenous inhabitants of the Republic of Tyva. The proportion of POAG among the indigenous adult population of the Republic of Tyva was 75.4% against 91.3% among the Caucasians inhabiting it. Primary angle-closure glaucoma in Asian patients was 13.4% versus 3.8% in Caucasians, mixed glaucoma in Asian patients was observed in 11.2% versus 4.9% in Caucasians patients. Thus, POAG was the most common form of primary glaucoma in Asian patients (75.4%), in contrast to the of China and Mongolia and brings them closer to the inhabitants of Japan, where POAG is also the more frequent of glaucoma. The results obtained by us were regarded as a consequence of the genetic proximity of the Asian population to the Altai people, who belong to the intermediate ethnoses between the Caucasians and races.

Unlike most, Asian patients for Tyva were more likely to suffer from a narrow-angle variety of POAG. Pseudoexfoliative syndrome in patients with POAG to Asian patients accompanied

glaucoma much more often than in other - 36.6% versus 0.4%. The narrowness and increased pigmentation of the iris-corneal angle, as well as the frequency of pseudoexfoliative syndrome, identified as a result of studies, are factors that can complicate the outflow of intraocular fluid through the anterior outflow pathway.

It is also noted that the transition of glaucoma from one stage to another in Asian patients faster than in Caucasians, and they reach the far-reaching stages of glaucoma earlier than Caucasians. Asian patients more often and earlier suffered from lipid metabolism disorders, the early development of atherosclerosis increases the risk of glaucoma and contributes to the less effectiveness of existing treatments and, as a result, the early loss of visual functions. Thus, we found that POAG in the indigenous inhabitants of the Republic of Tyva begins significantly earlier, at a younger age, starting from the age of 35, and proceeds with a higher level of intraocular pressure.

In general, among the indigenous inhabitants of the Republic of Tyva, the POAG is characterized by a more unfavorable course, progresses faster than in Caucasians living in the same conditions, and leads to irreversible blindness earlier. Hence, important are the recommendations to detect glaucoma in Asian patients, starting from the age of 35, and be sure to conduct a study of the iris-corneal angle. Due to the peculiarities of the structure of the iris-corneal angle, antihypertensive therapy should also consist in activating the uveoscleral outflow pathway of intraocular fluid. Based on the characteristics of the course of the disease, the treatment tactics in patients with POAG of indigenous nationality should be more active, ensuring an early transition to surgical treatment. Fistulations operations are recommended that provide a good hypotensive effect with a narrow profile of the iris-corneal angle and pronounced pigmentation of its structures. In addition, all types of treatment of glaucoma should be carried out against the background of correction of lipid metabolism, anti-sclerotic therapy, taking drugs that improve the rheological properties of the blood.

In modern ophthalmology, there are practically no data on the biometric parameters of the eyes in patients with POAG and healthy individuals belonging to different ethnic and racial groupings, despite the clear relationship between the anatomical size of the eyeball and the development of different forms of primary glaucoma. We studied the problem of glaucoma in the

indigenous inhabitants of the Republic of Khakasia, depending on the belonging of patients to the indigenous population - the Khakas patients. The iris-corneal angle and eye sizes of patients with POAG and healthy Khakas patients were studied. As a result, it was revealed that the indigenous inhabitants of the republic - the Khakas patients - had eye parameters close to the parameters of the eyes of Caucasians patients suffering from primary angle-closure glaucoma. The structure of the iris-corneal angle and the biometric dimensions of the eyes of the Khakas patients indicate that this ethnic group does not seem to belong to Asians, at the same time, they cannot be attributed to Caucasians. The Khakas peoples are most likely a small people formed as a result of the connection of the South Siberian and Ural-Altai types of Turkic-speaking peoples of Southern Siberia, which also corresponds to anthropometric data.

### Conclusion

Thus, at present, glaucoma does not cease to cause active scientific and practical interest and continues to be a relevant subject of study. However, in addition to the study of glaucoma “in width”, research is also needed “in depth”, which is confirmed by interesting findings obtained by us when studying glaucoma in individual indigenous ethnic groups inhabiting the territory of Siberia, in comparison with glaucoma in Caucasians living there.

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