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CLINICAL ASSESSMENT OF MANAGEMENT WHEN CHOOSING A METHOD OF PROVIDING CARE TO PATIENTS WITH OPEN-ANGLE GLAUCOMA

Volodymyr O. Melnyk¹, Iryna V. Synchuk²

1 – Bogomolets National Medical University, Kyiv, Ukraine

2 – Ophthalmological clinic «VISIOBUD», Kyiv, Ukraine

Summary

Introduction: glaucoma is an essential international social and medical problem, as it leads to irreversible blindness in patients worldwide. Organization of treatment and prevention of complications using the most effective methods is the most important task of ophthalmologists at the present stage of the fight against glaucoma.

The purpose of the study: to evaluate the management of assistance under the monitoring program «STOP! Glaucoma» to patients with suspected glaucoma, open-angle glaucoma, and more advanced stages of glaucoma. To compare the effectiveness of therapeutic and surgical methods of glaucoma treatment.

Materials and methods: To detect and prevent the progression of glaucoma in patients, the LLC «VISIOBUD» Clinic developed and implemented the monitoring program «Stop! Glaucoma». The main task of program was to analyze the dynamics of glaucomatous changes in the optic nerve and, based on this, to determine whether glaucoma compensation is complete and whether the patient does not need a more radical treatment method to preserve visual functions. The following methods of empirical research were used: systematic approach – to determine the research elements between which there are relationships of objects and their properties; observation – to identify signs and external manifestations of facts; comparison – to determine similarities and differences and identify regularities; measurement; monitoring.

Results: In the course of the study, the dynamics of changes in intraocular pressure in patients who follow the annual monitoring program «Stop! Glaucoma» in the clinic of LLC «VISIOBUD». 4 groups of patients (116 patients – 156 eyes) were under observation. Installed that in 75 % of cases, patients need surgical treatment of glaucoma to preserve their visual functions. Surgical treatment of patients with open-angle glaucoma effectively preserves vision in 89 % of cases.

Conclusions: Timely detection, monitoring, and treatment of initial signs of open-angle glaucoma and symptoms of its progression affects the preservation and prolongation of visual functions in patients. In the long term, surgical treatment of glaucoma is more cost-effective, as the need to use expensive hypotensive drops is significantly reduced (by 2.5 times).

Key words: glaucoma, open-angle glaucoma, monitoring program, visual functions, glaucomatous optic neuropathy, prevention of glaucoma progression

INTRODUCTION

Glaucoma is an essential international social and medical problem, as it leads to irreversible blindness in patients worldwide. According to WHO, the total number of glaucoma patients by 2023 is more than 100 million. Experts' pessimistic forecast is that the incidence will increase by another 10 million in the coming decades [1]. According

to researchers, 3.5 % of the world's population between the ages of 40 and 80 have any form of glaucoma, with primary open-angle glaucoma being the most common form [2].

A growing and aging global population poses many challenges for the prevention of glaucoma-related diseases, even though the age-standardized prevalence of glaucoma-related blindness has decreased significantly

in recent decades. In addition, the difficulties in the diagnosis and treatment of glaucoma, as well as its chronic and irreversible nature, prompt the development and implementation of innovative approaches to combating this disease and its complications. The international experience of managing patients with glaucoma in Ukraine is implemented through the Ukrainian version of «Terminology and Guidelines for Glaucoma», adapted by the Ukrainian Glaucoma Society as a collective member of the European Glaucoma Society (EGS). From February 2021, the updated recommendations (fifth edition) for treating glaucoma are in effect. According to the recommendations of the EGS, the goal for doctors remains preliminary – it is the preservation of visual functions and the quality of life of patients, as well as the prevention of glaucoma progression [3]. According to the mentioned recommendations, treatment of primary open-angle glaucoma is recommended, starting with monotherapy, except in cases with very high intraocular pressure (IOP) and a severe form of the disease. A treatment is considered adequate if it provides an IOP reduction comparable to evidence-based data (published data on the average range for that particular drug in a similar population). It is known that the most effective lowering of IOP is achieved with the use of prostaglandin analogs, which are prescribed non-selective beta-blockers, Pho-kinase inhibitors, alpha-adrenergic agonists, selective p-blockers, and local carbonic anhydrase inhibitors. The effectiveness of therapy with hypotensive drugs depends on the initial IOP level – the higher the IOP level before treatment, the stronger the necessary hypotensive effect. The primary control takes place after a week. When the target IOP is reached, visual functions stabilize or improve, acuity and field of vision, IOP, and the optic nerve disc (OND) condition are monitored quarterly. Suppose the effect is not achieved (deterioration of the visual field, progression of optic neuropathy, reduction of visual acuity). In that case, laser treatment (laser trabeculoplasty, selective laser trabeculoplasty) or surgical treatment – deep non-perforating sclerectomy and its varieties, sinusotrabeulectomy, etc. is recommended. Patients are advised to undergo medical trophic treatment twice a year for neuroprotection.

Scientists note that the modern practice of IOP monitoring as an indicator of the severity of the disease is the measurement of IOP during visits to the doctor. However, it is reliably known that IOP fluctuates within a day, and its indicators can differ significantly [4]. The need to find new preventive and treatment strategies, pointed out by scientists [5], determined the main requirement for the appointment of dispensary supervision under the program «STOP! Glaucoma» in the clinic of LLC «VISIOBUD». It consisted of achieving the target IOP in patients with no progression of glaucomatous optic neuropathy.

The aim: to evaluate the management of assistance under the monitoring program «STOP! Glaucoma»

to patients with suspected glaucoma, open-angle glaucoma, and more advanced stages of glaucoma. To compare the effectiveness of therapeutic and surgical methods of glaucoma treatment (indicator – assessment of the progression of glaucomatous optic neuropathy in patients under dispensary supervision under the «STOP! Glaucoma» monitoring program).

MATERIALS AND METHODS

To detect and prevent the progression of glaucoma in patients, the LLC «VISIOBUD» Clinic developed and implemented the monitoring program «Stop! Glaucoma», according to which the patients of the clinic are allowed to undergo an examination for the disease and a comprehensive exam for the diagnosis of the progression of glaucomatous optic neuropathy. According to monitoring, patients are measured intraocular pressure (IOP) four times a year; computer perimetry (examination of the field of vision) – twice or four times, depending on the initial data, and optical coherence tomography (OCT) (monitoring of the state of the retina, optic nerve, angle of the anterior chamber) – twice a year. According to the program, the patient is examined and consulted every three months by an ophthalmologist, who evaluates the IOP indicators obtained during diagnostic studies and data on the dynamics of optic nerve changes.

When performing the specified program, we analyzed the dynamics of the disease in 116 patients (156 eyes) with open-angle glaucoma. Distribution by gender: women – 82 (53 %), men – 74 (47 %). Distribution by age: patients under 40 years old – 1 (0.6 %), from 41 to 60 years old – 15 (9.6 %), from 61 to 80 years old – 106 (67.9 %), over 81 years old – 34 patients (21.8 %). The distribution of patients according to the stage of open-angle glaucoma – 14.8 % of patients with the primary stage of glaucoma, 52.3 % with an advanced stage of glaucoma, and 32.9 % of patients with an advanced stage.

According to the prescribed and carried out treatment, the patients were divided into two groups: the first group – patients with open-angle glaucoma, who were offered the installation of hypotensive drops or laser treatment with the installation of hypotensive drops (average number of drops, according to the type of active substance, was 1.95 ± 0.3) – 26 eyes, which was 15.9 %; the second group – patients who underwent surgical treatment to correct the intraocular pressure: phacoemulsification – in 46 eyes, in 29.5 %, combined phacoemulsification with a modified tunnel trabeculopuncture – in 77 eyes, which is, respectively, 49.3 %, and sinusotrabeulectomy (STE) – 7 eyes or 4.5 %.

For non-surgical reduction of intraocular pressure in cases of open-angle glaucoma, the following types of hypotensive drops are used: F2-alpha prostaglandin analogs, carbonic anhydrase inhibitors, beta-blockers,

and α 1-adrenomimetics. The number of drugs used depends on the effective reduction of intraocular pressure and the achievement of target pressure parameters. Therefore, the number of drugs used in one patient can vary from 0 (no hypotensive drops) to 4 (takes four types of hypotensive drops). In the studied groups of patients, we determined the parameter – «average number of types of hypotensive drops», which ranged from 0 to 4 units.

Monitoring program for patients with glaucoma «Stop! Glaucoma» was prescribed only to patients with glaucoma compensation determined by us according to control and monitoring of intraocular pressure. The main task of this program was to analyze the dynamics of glaucomatous changes in the optic nerve and, based on this, to determine whether glaucoma compensation is complete and whether the patient does not need a more radical treatment method to preserve visual functions.

Monitoring of visual functions and the state of the optic nerve in patients with open-angle glaucoma consisted of the control of an ophthalmologist, the performance of ophthalmotometry by the Goldman method, the performance and comparison of static computer perimetry and optical coherence tomography data on the same equipment every three months, which corresponds to modern monitoring and management recommendations patients with open-angle glaucoma. The basis for prescribing a more radical method of treatment in the form of anti-glaucoma surgery of the micro perforating or fistulizing type was the progression of glaucomatous optic neuropathy, which was combined with anatomical changes in the optic nerve of glaucomatous origin.

The following methods of empirical research were used: systematic approach – to determine the research elements between which there are relationships of objects and their properties; observation – to identify signs and external manifestations of facts; comparison – to determine similarities and differences and identify regularities; measurement; monitoring.

RESULTS

In the eyes of patients of the first group (who received conservative therapy-instilled hypotensive drops), the average IOP during six years of observation ranged from 19.6 ± 2.2 mm Hg. up to 22.4 ± 4.2 mm Hg. Initial or advanced (1-2 stages) glaucoma was detected in the eyes of all first-group patients. Out of 26 eyes of patients monitored by the «Stop! Glaucoma» monitoring program and prescribed hypotensive drops, only four eyes (15.6 %) were fully compensated for visual functions within six years. They did not require surgical treatment as a more radical method of treatment for glaucoma. In the remaining 22 eyes (74.4 %), anti-glaucoma surgery was performed due to the progression of glaucomatous optic neuropathy.

In the eyes of patients of the second group (who previously underwent anti-glaucoma surgery), the average IOP ranged from 14.8 ± 1.3 mm Hg. up to 16.8 ± 1.3 mm Hg. The second group included patients with initial, advanced, and more advanced glaucoma (1-3 stages of glaucoma). Out of 130 eyes of patients in the second group under observation for six years, repeated anti-glaucoma surgery was necessary in 14 cases (11 %). The remaining cases – 116 eyes (89 %) did not require additional surgical means of IOP correction to prevent the development of glaucomatous optic neuropathy. At the beginning of the study, the «average number of types of hypotensive drops» applied to the patients of the second group was 0.76 ± 0.16 , after six years – 0.66 ± 0.27 drops.

In 2 eyes of patients from the first group (7.7 %) and in 7 eyes of patients from the second group (5.5 %), antiglaucoma operations were performed during the studied period, which did not lead to the desired hypotensive effect due to this marked the progression of glaucomatous optic neuropathy with characteristic anatomical changes in the optic nerves.

DISCUSSION

Open-angle glaucoma is one of the most significant problems of irreversible vision loss and, as a result, disability of the population not only in Ukraine but also in the whole world. In addition to being a significant medical problem, glaucoma is essential as a social and economic problem. Scientists say that in England, from 2000 to 2012, the number of prescribed prescriptions for the treatment of glaucoma increased by 67 %. Drug costs during this period increased by 88 % [6, 7]. In our cohort of studied patients, people of working age (up to 60 years) made up more than 10 %.

One of the most critical factors that allows the reduction of the level of morbidity and loss of working capacity is the timely detection of both glaucoma itself and its progression. In this context, modern methods of examination – static computer perimetry and optical coherence tomography of the optic nerves acquire great importance. It is essential in the dynamic monitoring of patients to regularly conduct such studies and compare data obtained on the same equipment.

A monitoring program for patients with open-angle glaucoma, «Stop! Glaucoma», was developed, according to modern trends, based on the need to find new strategies for neuroprotection and IOP stabilization [8] and applied in the LLC «VISIOBUD» Clinic meets the criteria for dynamic monitoring according to the recommendations of the European Glaucoma Society and the Standard of Medical Care «Glaucoma», which was approved by order of the Ministry of Health No. 959 of 26.05. in 2023. When determining and comparing the effectiveness of treatment in patients with open-angle glaucoma, it was

established that anti-glaucoma surgery was performed in 75 % of patients who received hypotensive drops due to the lack of a sufficient hypotensive effect and, as a result, the progression of glaucomatous optic neuropathy. On the other hand, patients who immediately underwent antiglaucoma surgery had a more pronounced and sufficient long-term hypotensive effect. Repeat anti-glaucoma surgery was recommended for these patients only in 11 % of cases.

The research established a difference in the number of types of hypotensive drops received by patients of the first and second groups. The average number of hypotensive drops in the first group was 2.0 ± 0.2 , and in the second group – 0.7 ± 0.15 . In our opinion, this can be regarded as a positive factor since the high cost of hypotensive drugs and the need for their constant use affects patients' quality of life and reduces their economic opportunities. And if medicines are supplied at the expense of programs of the state or territorial communities, then the economic effect increases significantly.

In 94 % of cases, the monitoring algorithm proposed by us under the program «Stop! Glaucoma» and the transition to a more radical surgical method of treating open-angle glaucoma made it possible to maintain a stable condition of the optic nerve and maintain the absence of disease progression during the 6-year follow-up. However, in 6 % of cases, surgical treatment and repeated surgical interventions did not allow for achieving a sufficient hypotensive effect to prevent the progression of glaucomatous optic neuropathy.

CONCLUSIONS

1. Glaucoma takes 1-2 places as a cause of irreversible blindness and visual disability in the world. Open-angle glaucoma, the most common type of glaucoma, is an essential social and economic problem.
2. Timely detection, monitoring, and treatment of initial signs of open-angle glaucoma and symptoms of its progression affects the preservation and prolongation of visual functions in patients.
3. The developed LLC «VISIOBUD» Clinic's program for monitoring patients with open-angle glaucoma «Stop! Glaucoma», which is based on the need for regular examination of patients with open-angle glaucoma, ensures timely detection of signs of disease progression and convenient appointment of more radical treatment methods.
4. Based on the data of the six-year follow-up of patients under the program «Stop! Glaucoma» in 75 %

of cases, patients need surgical treatment of glaucoma to preserve their visual functions.

5. Surgical treatment of patients with open-angle glaucoma effectively preserves vision in 89 % of cases.

6. In the long term, surgical treatment of glaucoma is more cost-effective, as the need to use expensive hypotensive drops is significantly reduced (by 2.5 times).

7. Progression of open-angle glaucoma, despite repeated surgical methods of treatment, in patients who were initially treated therapeutically (with hypotensive drops) is more frequent (7.7 %) compared to patients who were initially operated on for glaucoma (5.5 %). Due to our study's small number of cases, this result is not statistically significant and requires further investigation.

PERSPECTIVES OF SUBSEQUENT SCIENTIFIC RESEARCH

The results obtained in the course of this experimental research are the basis for a more detailed study of the problem glaucoma treatment.

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COMPLIANCE WITH ETHICAL REQUIREMENTS

The researchers followed all protocols and procedures required by the Biomedical research Ethics Committee and conform to the directive of the Ukrainian Legislation on health care, Helsinki Declaration 2000 and European Society Directive 86/609 on human participation in biomedical research to ensure adherence to all standards for adequate protection and well-being of participants.

CONTRIBUTION OF THE AUTHORS TO THE PREPARATION OF THE ARTICLE

Melnyk Volodymyr Oleksiyovych – idea and concept, development of research design, selection of patients into groups and formation of research groups, review of literature data, critical review, scientific supervision, final approval of the article;

Synchuk Iryna Viktorivna – responsibility for statistical analysis, data collection and analysis, dispensary examination of patients, and monitoring.

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*Резюме***КЛІНІЧНА ОЦІНКА МЕНЕДЖМЕНТУ ПРИ ВИБОРІ МЕТОДУ НАДАННЯ ДОПОМОГИ ПАЦІЄНТАМ З ВІДКРИТОКУТОВОЮ ГЛАУКОМОЮ****Володимир О. Мельник¹, Ірина В. Сінчук²**

1 – Національний медичний університет імені О. О. Богомольця, м. Київ, Україна

2 – Офтальмологічна клініка «ВІЗІОБУД», м. Київ, Україна

Вступ. Глаукома є важливою міжнародною соціальною-медичною проблемою, оскільки призводить до незворотньої сліпоти пацієнтів у всьому світі. Організація лікування і профілактики ускладнень з застосуванням самих дієвих методів є важливим завданням офтальмологів на сучасному етапі боротьби з глаукомою.

Мета дослідження: оцінити організацію допомоги пацієнтам із підозрою на глаукому, відкритокутову глаукому та при її пізніх стадіях у рамках програми «СТОП! Глаукома». Порівняти ефективність терапевтичних і хірургічних методів лікування глаукоми.

Матеріали та методи: Для виявлення і попередження прогресування глаукоми у пацієнтів в клініці ТОВ «VISIOBUD» розроблена і започаткована програма моніторингу «Стоп! Глаукома». Основним завданням програми був аналіз динаміки глаукоматозних змін оптичного нерву і на основі цього визначитися чи є повною компенсація глаукоми і чи не потребує пацієнт більш радикального методу лікування для збереження функції зору. Використано такі методи емпіричного дослідження: системний підхід – для визначення елементів дослідження між якими є відносини об'єктів та їх властивостей; спостереження – для виявлення ознак і зовнішніх проявів фактів; порівняння – для визначення подібності і відмінності та виявлення закономірностей; вимір; моніторинг.

Результати: В ході дослідження було проаналізовано та вивчено динаміку змін внутрішньоочного тиску у пацієнтів, які спостерігаються за річною програмою моніторингу «Stop! Глаукома» у ТОВ «Клініка Візіобуд». Під спостереженням перебували 4 групи пацієнтів (116 пацієнтів-156 очей). Встановлено, що у 75 % випадків для збереження зорових функцій пацієнти потребували хірургічного методу лікування. Хірургічний метод лікування відкритокутової глаукоми ефективно зберігає зір у 89 % випадків.

Висновки. Своєчасне виявлення, моніторинг та лікування початкових ознак відкритокутової глаукоми і симптомів її прогресування впливає на збереження і пролонгацію зорових функцій у пацієнтів. В довгостроковій перспективі хірургічне лікування глаукоми є більш економічно вигідним, оскільки значно (у 2,5 разів) зменшується необхідність застосування високовартісних гіпотензивних крапель.

Ключові слова: глаукома, відкритокутова глаукома, програма нагляду, зорові функції, глаукомна оптична нейропатія, профілактика прогресування глаукоми