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Glaucoma - the significant challenge for the healthcare system in Poland

Natalia Osial⁽¹⁾, Agnieszka Kaczyńska⁽¹⁾, Adrianna Gorecka⁽¹⁾, Piotr Stępień⁽¹⁾,
Dr n. med. Dorota Pożarowska⁽²⁾, Prof. dr hab. n. med. Tomasz Żarnowski⁽²⁾

1. Students' Scientific Association at the Department of Diagnostic and Microsurgery of Glaucoma, Medical University of Lublin
2. Department of Diagnostic and Microsurgery of Glaucoma, Medical University of Lublin

Abstract

Introduction

Glaucoma is a group of optic neuropathies characterized by progressive degeneration of retinal ganglion cells (RGCs) and visual field loss. Glaucoma is the leading cause of irreversible blindness in the world. *The World Health Organization* classifies it as a social and civilization disease and emphasizes the need to improve ophthalmic care systems in order to meet the constantly growing challenge for public health, which is glaucoma. The aim of this article is to identify the main problems that affect the health care system of patients with glaucoma in Poland.

Review methods

The review of literature on glaucoma was performed using the PubMed and Google Scholar databases. The latest available epidemiological data and the current legal acts concerning the health care system of patients with glaucoma in Poland were also analyzed.

Abbreviated description of the state of knowledge

The incidence of glaucoma in Poland is constantly increasing, due to the aging of the population. The insidious course of the disease, low public awareness and difficulties in access effective ophthalmic services mean that the disease is diagnosed too late, when significant damage to the optic nerve has already occurred. In addition, the poor mental health of patients, treatment difficulties related to the frequent comorbidity of general diseases and the use of other drug therapies, complicate the course of glaucoma and make it difficult to inhibit its progression.

Summary

Glaucoma is a significant challenge for public health and the healthcare system in Poland. Therefore, it is very important to take systemic measures as soon as possible that contribute to improve public awareness of eye diseases, increase the availability of ophthalmic care, early detection and appropriate monitoring of the course of glaucoma.

Keywords: glaucoma, glaucoma epidemiology, ophthalmic care, health care in Poland

Introduction

Glaucoma is a group of diseases, classified as neuropathy and characterized by the progressive loss of retinal ganglion cells, which leads to irreversible damage to the optic nerve. As a consequence, there are characteristic morphological changes on the optic nerve disc and, as a result, various degrees of visual field disturbance, and even blindness [1]. The pathophysiological mechanisms leading to the entry of the ganglion cell into the apoptotic pathway are very complex and, despite the advances in medical science, are still not fully characterized. However it is recognized that the most important risk factor for glaucomatous neuropathy is elevated intraocular pressure (IOP) [2]. IOP value exceeding the upper limit of normal, i.e. 21 mmHg, indicates an imbalance between the production and outflow of aqueous humor in the eye. The production of aqueous humor takes place in the ciliary body, while its outflow path begins at the drainage angle, located between the cornea and the iris in the anterior chamber of the eye. This site is made up of a trabecular structure through which the aqueous humour leaves the eye. The causes of the imbalance between fluid production and its outflow allow to distinguish the main types of glaucoma: congenital glaucoma, primary open angle glaucoma (POAG), primary angle-closure glaucoma (PACG), secondary open angle glaucoma (SOAG) and secondary angle closure glaucoma (SACG) [3]. The only effective therapy for glaucoma is to lower IOP with medications, laser treatments, and surgeries. There are many different factors that increase the risk of developing optic neuropathy, but according to the *European Glaucoma Society*, the most important of them are: age (over 40 years of age), ethnicity, presence of glaucoma in the immediate family, pseudoexfoliation, disc hemorrhages of the optic nerve and myopia [4].

After cataract, glaucoma is the second leading cause of total vision loss and the fourth most common cause of moderate and severe visual impairment (MSVI) worldwide. At the same time, due to the fact that the process of optic nerve degeneration cannot be reversed, it is the most common cause of irreversible blindness [5]. In 2013, over 64 million people aged

40-80 years suffered from glaucoma. Moreover, it is estimated that this number will increase to over 111 million cases by 2040 [6]. Due to the severe course, high prevalence and constant increase in the incidence of glaucoma, especially in highly developed and developing countries, the *World Health Organization* (WHO) recognizes it as a social disease of civilization. "*World report on vision*" published by WHO in 2019 highlights the magnitude of the problem and the need to improve ophthalmic care systems in order to meet the ever-growing public health challenge of glaucoma [7].

Aim of the study

The aim of this article is to identify the main problems that affect the health care system for patients with glaucoma in Poland.

Review methods

The review of literature on glaucoma was performed using the PubMed and Google Scholar databases. The latest available epidemiological data and the current legal acts concerning the health care system of patients with glaucoma in Poland were also analyzed.

Increase in the incidence of glaucoma, associated with an ageing population

Ageing remains one of the most important risk factors for the development of optic neuropathy [4]. This is confirmed by the collective data from epidemiological studies, showing that the incidence of glaucoma rises rapidly with age. Prevalence increases from 0.5% among adults younger than 50 years to 10% in patients aged 80 years or older [8].

Currently, 38.2 million people live in Poland, of which 18.6% are people aged >65 years [9]. Central Statistical Office of Poland (CSO) population projection indicate that the share of these people will exceed 30% by 2050 [10]. Life expectancy will also increase, reaching values higher than those currently recorded by about 10 years for men and 7 years for women. In 2020 life expectancy was 71.1 years for men and 80 years for women, while it is estimated that in 2050 these values will increase to 82 and 87 years, respectively [10].

The analysis of the cited data shows that the Polish society is ageing and therefore we should expect an increasing incidence of age-related diseases, including glaucoma. According

to CSO, in 2004 there were around 417 000 people suffering from glaucoma in Poland (1.3% of the general population) (11). It is estimated that by 2035 the number of individuals with the disease will increase by nearly 35% reaching 600 000 cases. (12). Experts of the Polish Society of Ophthalmology (Polskie Towarzystwo Okulistyczne, PTO) warn that many patients remain undiagnosed and in fact this number may be much higher (currently it may even exceed 800,000) [13].

Insidious course of the disease, making early diagnosis difficult

The vast majority of glaucoma cases are primary open angle glaucoma (POAG). The global prevalence of POAG is 3.05%, compared with 0.5% of primary angle-closure glaucoma (PACG) and an even lower percentage of other types of the disease [6]. Most of the society associates glaucoma with a sudden, very severe attack of eye pain, characteristic of PACG. People are not aware that, contrary to appearances, POAG is more dangerous. In this type, the destruction of the optic nerve develops insidiously, painlessly, without any disturbing symptoms for many years. It is worth knowing that the visual field loss perceived by the patient appears only when at least 40-50% of the nerve fibers of the retina are damaged [14]. At the present state of knowledge this process is irreversible and it is impossible to restore the functions of damaged nerve fibers. The only therapeutic option is to stop the disease progression, so it is very important to detect glaucoma early and initiate appropriate treatment before any severe damage occurs. The PTO guidelines clearly indicate the need for preventive examinations. In people over 40 years of age without glaucoma, tests (IOP measurement, ophthalmoscopy, visual field examination, imaging examination of the optic nerve disc: the assessment of the retinal nerve fiber layer (RNFL) and the Ganglion Cell Complex (GCC) analysis) should be performed every 2 years, even annually in people with risk factors for developing glaucoma [15]. In Poland, healthcare services related to the early detection of glaucoma are financed by the National Health Fund (Narodowy Fundusz Zdrowia, NFZ). These examinations are aimed at people without glaucoma aged >35 who have not been diagnosed with glaucoma in the last 24 months [16]. Despite this, very few people take advantage of this opportunity. As it turns out, in 60% of patients with glaucoma, the disease was diagnosed accidentally, and 70% of diagnoses were made too late, when the chances of saving eyesight were small [13].

Low public awareness

As mentioned earlier, glaucoma is an insidious disease and initially does not raise any suspicions of the disease. It poses a serious risk of vision impairment, and thus incapacity for work and the negative effect on the quality of life. Therefore, for many years, doctors, pharmaceutical companies and various organizations, such as the PTO, the Glaucoma Section of the PTO or the Polish Blind Association (Polski Związek Niewidomych, PZN), have been conducting educational activities increasing public awareness about eye diseases, including glaucoma. Every year, Sight Days and World Glaucoma Week are organized. Despite this, public awareness in this area remains low. Polish people are not aware of the seriousness of glaucoma, which is related to the neglect of ophthalmological follow-up examinations. The results of a study conducted by TNS Polska in 2012 on a group of 1,000 Polish residents aged over 15 years, showed that every fourth person (28%) visits an ophthalmologist less frequently than every 3 years, and every third Pole (32%) has never visited an ophthalmologist. Moreover, 39% of the respondents could not indicate the consequences of eye diseases [17]. The lack of knowledge about glaucoma means that they are unaware of the danger of the disease. People do not know that they may be at risk of glaucoma and they are unable to notice its early symptoms, which contributes to delaying visits to specialist doctors.

Barriers in accessing ophthalmic care

According to the data of the Ministry of Health presented in the “Map of health needs for the period from January 1, 2022 to December 31, 2026” (“ Mapa potrzeb zdrowotnych na okres od 1 stycznia 2022 r. do 31 grudnia 2026 r.”) between 2015 and 2019 there was a significant drop (by 7%) in the number of ophthalmological clinics. In Poland in 2020 the average waiting time for an ophthalmologist appointment was 139 days and the number of ophthalmologists providing services within the common insurance system was 3,630, while the average number of consultations per one of them was 1834. Consultations provided by the private sector accounted for over 30% of all ophthalmological visits, proving that the growing needs of patients are not sufficiently met by the public health care system. Moreover, in the period between 2016 and 2029, a significant increase in the demand for health services in the field of ophthalmology should be expected. According to forecasts, the number of ophthalmic hospitalizations will increase from 288,000 in 2016 to 366,000 in 2029, i.e. by over 27% [18]. In addition, in 2015 the requirement to have a referral to an ophthalmologist was introduced,

which was supposed to reduce queues [19]. However, it did not bring the expected results. The need to have a referral from a primary care physician may be a limitation in access to a specialist and could be another barrier in the early diagnosis of glaucoma.

Difficulties in treatment related to the presence of comorbidities

Glaucoma is most frequently diagnosed in the elderly people, who often suffer from other comorbidities and take various medications.. Systemic drugs, such as atropine derivatives and sympathomimetic drugs, can cause side effects that affect eye pressure and even induce angle closure and an acute attack of glaucoma. On the other hand, drugs used in the pharmacotherapy of glaucoma are also not without systemic side effects. The only effective treatment for glaucoma is to lower IOP, most often with eye drops, including adrenergic agonists, β -blockers, prostaglandin analogues, carbonic anhydrase inhibitors and cholinergic drugs [15]. Although they are applied topically, there is a possibility of absorption of drops from the eye, and thus the possibility of systemic side effects [20]. For example, β -blockers should not be administered to patients with diabetes and depression, and they are absolutely contraindicated in patients with bronchial asthma, chronic obstructive pulmonary disease and some heart diseases [21]. Adrenergic agonist – brimonidine, is not recommended in patients with depression and heart disease, and is contraindicated in people with diabetes. Additionally, the use of pilocarpine, prostaglandins and beta-blockers should be avoided in patients with respiratory diseases [22]. It causes great difficulties in the selection of a treatment that ensures appropriate IOP values, and at the same time does not aggravate the course of systemic diseases.

The influence of glaucoma on the patients' mental health

Patients with visual impairments have a greater tendency to develop mental disorders [23]. Many patients who are first time diagnosed with glaucoma do not have any information about the condition that may be a source of fear and anxiety. It is also undoubted that glaucoma, as a disease leading to irreversible loss of visual function, has an impact on the mental state of patients. The prevalence of anxiety and depression among patients with glaucoma ranges 12% [21] and 26%, respectively [24]. In Poland, a study in which the emotional state of patients was assessed using the The Beck Depression Inventory (BDI), The

State-Trait Anxiety Inventory (STAI) and the Acceptance of Illness Scale (AIS) was performed [24]. The results showed that the level of depression and anxiety in individuals with primary glaucoma was significantly higher than in the control group of patients without the disease. Additionally the level of psychological distress was positively correlated with the age of patients, treatment duration and disease advancement [25]. The goal of glaucoma treatment is to maintain the visual function and the quality of life, which may deteriorate due to mental disorders accompanying glaucoma. Therefore a multifaceted approach to the patient is important, including psychological evaluation and possible referral to an appropriate specialist.

Conclusions

Glaucoma, as a disease leading to irreversible visual impairment and even blindness, is not only a personal tragedy for the patient, but also a social problem. The deterioration of eyesight related to glaucoma may preclude normal, everyday functioning, leading to the social exclusion and the inability to fulfill social roles. Hence, the patients often have to use state support, which causes an economic burden on the country's budget. All these facts make glaucoma a serious challenge for public health and the healthcare system in Poland. Moreover, this problem will continue to increase due to the increasing incidence of glaucoma associated with the ageing of the population. The insidious course of the POAG – the most common type of this disease, low public awareness and difficulties in accessing ophthalmic care in Poland lead to too late diagnosis of glaucoma, when significant damage to the optic nerve has already occurred. In addition, the poor mental health of patients and treatment difficulties complicate the course of the diseases. Therefore, it is very important to take systemic measures as soon as possible to improve public awareness of eye diseases, increase the availability of ophthalmic care, early detection and appropriate monitoring patients with glaucoma. The need for an interdisciplinary approach to the patient, constant cooperation between the ophthalmologist and other specialists, especially the general practitioner, cardiologist, diabetologist as well as a psychologist and psychiatrist, should also be emphasized.

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