

Original article



DISTINGUISHING CHARACTERISTICS IN THE DIAGNOSTICS AND THERAPY OF GLAUCOMA IN CHILDREN AND ADULTS

Tsvetomir Dimitrov¹, Tsvetelina Mihaylova², Desislava Todorova³

1) *Clinical Department of Ophthalmology, First General Hospital for Active Treatment Sofia AD, Sofia City, Bulgaria*

2) *Department of Medical Pedagogy, Faculty of Public Health, Medical University, Sofia City, Bulgaria*

3) *Department of Preventive Medicine, Faculty of Public Health, Medical University, Sofia City, Bulgaria*

ABSTRACT

Glaucoma is characterized by increased intraocular pressure (IOP), which results in impairment of the optic nerve and vision both in children and adults. The aim of the study is an analysis of the distinguishing characteristics of diagnostics and therapy of glaucoma in children and adults. A documentary method of investigation of scientific sources - based on clinical practice - is applied. The methodology of study comprises investigation of the diagnostics of glaucoma and of the methods for its treatment. It was found that the specification of diagnosis of glaucoma is possible after confirmation of the results from the application of different methods and examinations, which were described. The methods of the present day for medicinal and surgical treatment were systematized. The monitoring of the condition of eyes and vision for early detection of abnormalities is an important part of the cares for the general health in every human age.

Keywords: glaucoma, diagnostics, therapy, distinguishing characteristics

INTRODUCTION

Glaucoma is characterized by increased intraocular pressure (IOP), which results in impairment of the optic nerve and vision both in children and adults.

The childhood glaucoma occurs in infants and small children. It is usually found during the first years of life. The disease may be hereditary - it is caused by irregular development of the drainage system of an eye before birth. This is a precondition for an increase of intraocular pressure (IOP), which on its part results in impairment of the optic nerve. The congenital glaucoma is an eye disease, which usually has a sporadic character, and sometimes hereditary character as well. It affects more frequently both eyes, even though to a different extent. Depending on the extent of blockage of the trabecular apparatus congenital glaucoma may manifest as early as birth, or to develop clinically in the first, and rarely up to the third year of life. [1, 2, 3]

In adults, glaucoma begins to manifest after the age of 40 years. The causes for occurrence the disease remain unclarified, based on which multiple etiological theories exist. The unlocking mechanism (due to which loss of retinal nerve cells and their axons - with resulting vision impairment typical for glaucoma) is still not found as well. [2, 4]

MATERIALS AND METHODS

The aim of the study is an analysis of the distinguishing characteristics of the diagnostics and treatment of glaucoma in children and adults. A documentary method of investigation of scientific sources - based on clinical practice - is applied. The methodology of study comprises investigation of the diagnostics of glaucoma and of the methods for its treatment. The analysis was performed based on usage of data from scientific literature on the subject.

RESULTS

The making of glaucoma diagnosis is possible after confirmation of the results from the application of different methods and examinations.

The detailed medical history has particular significance for the diagnostics of glaucomas - attention is to be paid not only to the symptoms but also to the family history and the intake of various medications. Glaucoma in children is most frequently a congenital or a hereditary disease. Children with grey corneas are rarely born; that is a symptom for the presence of glaucoma. More frequently the problem is found several months after birth. Parents or family doctors not always pay enough attention to the eyes because in the first month's babies have other problems as well (e.g., colics, secretions in the mouth, etc.). Day after day the eyes of a child grow in size, and at the age of one month - on some occasion - it is found that they are grey or very big. The eyes subsequently begin excretion of tears, and corneas are not clean and transparent. Due to the laceration, an ophthalmologist is visited, who frequently begins therapy with drops for choked up lacrimal ducts. After another several months, the eye becomes even bigger,

and the problems with vision progress.[5,6,7]

The visual acuity is examined by the methods known in ophthalmology. The biomicroscopy is decisive for the inspection of the anterior segment of the eyeball, a disc of the optic nerve, and nerve fiber layer - it provides information on concomitant pathology.

The increased IOP is one of the most important risk factors for the development of the glaucomatous process. That requires measuring of IOP upon suspected glaucoma with the determination of the twenty-four hours amplitude and the difference of IOP between the two eyes. In infants, the measurement of IOP is not a routine practice because performing of that procedure requires the child to be under general anesthesia. In order to be undertaken total anesthesia of an infant, examination of blood and urine must be performed for a finding of possible allergies. [3,7,8]

The gonioscopy represents a method for examination of the angle between the cornea and iris. The width of the chamber angle - open, narrow, or closed - has significance in the assessment of the risk of its closure and development of acute glaucomatous attack, and also in the identification of some forms of secondary glaucoma - pigmented and exfoliation glaucoma.[8,9]

The ophthalmoscopy allows inspection of the eye fundus, while greatest attention is paid to the nerve fiber layer and the disc of the optic nerve.

The following different present-day methods for assessment of the nerve fiber layer and the disc of optic nerve exist:

- Confocal scanning laser tomography
- Scanning laser polarimetry
- Optical coherence tomography
- Retinal thickness analyzer.

The visual field examination is important for all neuropathies, particularly in glaucomas. Importance is related not only to the description of the defects in the visual field but also to their monitoring in dynamics, which has significance for assessment of the progression of the disease as well. [10, 11, 12]

The making of correct diagnosis is a precondition for effective treatment of health problems of vision. The final aim of therapy is prevention of the progression of the losses in the visual field and from blindness. The decreased IOP is the only indirect neuroprotector so far, and, hence, the only aim of the applied medicinal and surgical treatment. [5, 13]

The medicinal treatment includes the application of local medications and of systemic medicinal agents.

The group of medications for the local application includes beta blockers and alpha-agonists.

The beta blockers are the most popular medications for treatment of glaucoma because they reduce the production of intraocular fluid. Timol, levobunolol, carteolol, and metipranolol - among the non-selective beta blockers - are locally administered. The only cardioselective beta blocker - applied in ophthalmology - is betaxolol. Having knowledge of the systemic side effects of beta blockers is particularly important when they are prescribed. Contraindications for their administration are as follows:

bronchial asthma, severe chronic broncho-obstructive syndrome, sinus bradycardia. [11, 13, 14]

Alpha agonists are a new group of medicines, which have decreasing effect on the IOP as a result of the reduction in the production of intraocular fluid. Among the more known alpha agonists are apraclonidine, brimonidine, and clonidine. The most frequent eye side effect is allergic conjunctivitis, while among the common side effects - tiredness, etc.

As systemic medicinal agents for treatment of glaucoma are used the systemic inhibitors of the carbonic anhydrase acetazolamide and methazolamide, which have rapid and powerful hypotensive effect, but also serious systemic side effects as follows: paresthesias, anaphylaxis, Stevens-Johnson syndrome, thrombocytopenic purpura, hemolytic anemia, leukopenia, pancytopenia, agranulocytosis, etc. [14, 15, 16, 17]

The medications are administered for up to ten days.

Osmotic preparations as glycerol and mannitol are administered for a rapid and brief decrease in IOP. They are a drug of choice in acute glaucomatous attack with the purpose of reduction of pressure and administration of miotics, which free the chamber angle.

The medicinal therapy of children is administered only in the period from making of diagnosis up to performing of the surgical intervention (time for preoperative preparation). The local therapy of children is administered with particular attention due to the increased frequency of systemic side effects. [4, 17, 18]

The surgical treatment of glaucoma is of leading significance. The treatment of congenital glaucoma is only surgical, regardless of the age of the child. Despite the systematic use of drops, the definitive treatment is almost always surgical - trabeculotomy and goniotomy, while the latter operation is used in children below ten years of age for improvement of the outflow through the trabecular meshwork. Upon lack of success with those techniques, trabeculectomy and shunt operations are performed as in adults. [19, 20]

The surgical treatment of glaucoma may be performed with a laser. The main methods are:

- laser trabeculoplasty - a procedure, applied in connection with the primary open-angle glaucoma with the purpose of improvement of the edema by means of laser applications on the trabecular meshwork;
- laser iridotomy - formation of an opening of the iris, ensuring unobstructed communication between the anterior and posterior chamber, and preventing the pupillary block and closure of the angle;
- laser destruction - powerful laser applications on the ciliary body with the purpose of decrease of the production of chamber fluid. [1, 7, 13]

The manual surgery is the last treatment method of choice, when the medications do not provide the desired results in relation to IOP, or there are contraindications for their administration. A classical procedure in connection with "open-angle" glaucoma is the trabeculectomy, in which a possibility is provided for outflow of chamber fluid through artificially formed fistula between the anterior

chamber of the eyeball and the subconjunctival space. In connection with “closed-angle”, non-complicated glaucoma, manual iridectomy is performed, which ensures unobstructed communication between the anterior and posterior chamber of the eyeball, and prevents the pupillary block and closure of the angle. [6, 15, 19]

In the context of treatment of children with eye problems (glaucoma, etc.), it must be considered that they also usually suffer from other diseases. When the child becomes ready to be given general anesthesia, drops for reduction of the secretion and of the IOP are administered. However, that approach is poorly effective, and it comes to a surgical operation. The intervention presents formation of openings, which to replace the congenital defect of the eye. The postoperative approach in babies is delicate - the drops in the operated eye must be dripped very carefully. Very often one surgical operation is not sufficient due to the specifics of the visual organ. Sometimes 5-6 interventions are required. Despite the advance achieved in the surgical treatment, the prognosis of congenital glaucoma remains serious, particularly if the beginning is omitted and the optic nerve is impaired.[10, 13, 14, 20]

In non-complicated cases, the surgical treatment may correct the structural defects, and the final result may be favorable for the vision of the patient, which underlines the significance of the early making of the diagnosis.

DISCUSSION

The diagnosis is made by means of examination of the anterior segment of the eyeball and the optic nerve, measurements of the cornea and sizes of the eye, measurements of IOP with modern tonometers. The examination of IOP in infants is not a routine practice.

CONCLUSIONS

1. In people above 40 years of age, regardless of the occasion for the visit to an ophthalmologist, the IOP is always to be examined in order not to be omitted dangerous for vision disease.

2. Because the increased or irrespectively high IOP is the most important contributing factor for glaucoma, the reduction of IOP is the primary aim of antiglaucomatous treatment both in children and in adults.

Final Statement

Glaucomas are a group of polyetiological neuropathies, which result in impairment of the optic nerve, corresponding changes in the perimeter, and loss of vision. The monitoring of the condition of eyes and the vision - for early detection of abnormalities - is an important part of the care for the general health in every human age.

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Address for correspondence:

Tsvetomir Dimitrov

Clinical Department of Ophthalmology, First General Hospital for Active Treatment Sofia AD,

37, Patriarch Evtimiy Blvd., Sofia 1000, Bulgaria,

E-mail: tsdimitrov.or@gmail.com