

Suspected glaucoma: who is who?

Abstract

Glaucoma is the second cause of blindness worldwide, being the first cause of irreversible blindness. It is estimated that in 2040 there will be around 111.8 million patients with glaucoma, reaching a 3.5% prevalence in patients between 40 and 80 years old; This situation can be preventable if we can identify early the cases at risk of developing the disease, who correspond to the suspected diagnosis of glaucoma.

Keywords: suspected glaucoma, pre-perimetric glaucoma, early diagnosis

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Introduction

It is known that Glaucoma is the second cause of blindness worldwide after Cataract¹⁻³ with the aggravating factor that it is the first cause of irreversible blindness, which has very few symptoms and is of such magnitude that it is estimated that by 2040 it will affect 111.8 million people.⁴⁻⁶ However, it should be noted that its detection and timely treatment can stop the progression towards blindness.¹ The diagnosis of suspected glaucoma was described by Shaffer (1977)³; it was previously called ocular hypertension, which is why both terms are normally mixed. We define that a patient has suspected glaucoma when they present risk factors for the disease, which may or may not have clinical signs of damage to the optic nerve and which may also be associated with intraocular pressure (IOP) above 21 mmHg, without the need to present some alteration in the visual field.^{1,4,7,8} therefore, we can say that any patient is a possible candidate for the disease, regardless of their age, since there are secondary factors that can lead to the development of glaucomatous pathology.

Etiology

The development of the disease cannot be pigeonholed into a single cause; the vast majority is associated with elevated IOP that will lead to axonal damage to the optic nerve, but this is not the only mechanism of action; There are also vascular alterations and other factors that may predispose to the loss of nerve fibers.² Glaucomatous damage begins with an increase in cellular apoptosis that leads to progressive loss of ganglion cells, leading to significant damage to the retinal nerve fiber layer, which finally translates into progressive loss of the visual field that, without treatment, will end in blindness total.

Risk factor's

Many risk factors have been identified, which we can separate by importance and later associate them with the possible clinical condition that it could cause. IOP, family history and age are the most important factors for the onset of the disease. IOP is the main risk factor and fortunately it is the factor that can be modified with treatment; Several studies have shown that elevated IOP or daily fluctuations directly influence the progression of the disease, concluding that reducing it decreases the rate of progression.⁹ Age is another of the major risk factors; it is observed that the prevalence increases as the age of the group to be evaluated increases, varying from 2.7% at 40 years of age to 7.7% at 75 years of age.^{1,7,10}

Family history increases the probability of suffering from the disease by 3.7 times; It has also been seen that between 10 to 20% of diagnosed patients have family members with glaucoma^{1,7,10} and that within the family history, having siblings with glaucoma increases the risk more than having parents or children with glaucoma.¹¹ Corneal thickness less than 550 microns has been associated with an increase in the presence of glaucoma, being an independent risk factor. The need to adjust the pressure value according to corneal thickness was once mentioned, but there is not enough evidence to justify it.^{1,7,10} Myopia is also a known risk factor, mainly when its magnitude is greater than 6 diopters; Therefore, regardless of the IOP value, patients with this degree of myopia should be considered and evaluated as suspicious; even more so considering that the evaluation of the optic nerve in these patients is difficult due to changes secondary to myopia, such as: tilted disc, wide excavations and peripapillary atrophy.^{1,4,10,12}

Some systemic diseases are also related to a greater risk of developing glaucoma, thus, in cases of arterial hypertension, care must be taken with episodes of hypotension, which, as in patients with vasospastic phenomena, can increase the progression or appearance of glaucoma normal tension; Diabetes, on the other hand, causes microvascular changes that can lead to damage to the optic nerve head. Although attempts have been made to find some association with elevated IOP, there is no direct relationship¹⁰; Furthermore, poor metabolic control can lead secondarily to the appearance of neovascular glaucoma.^{1,7,13,14} The chronic use of corticosteroids, topical or systemic, can lead to the presence of secondary ocular hypertension; Each individual will present a different response, with 30% - 40% of the general population responding to corticosteroids, with the pediatric population especially being the most susceptible.¹⁵

Assessment

It is important to associate the risk factors to determine the type of clinical condition that we can expect and depending on each condition, focus the evaluation of each patient, paying special attention to what we expect to find. The study of the patient suspected of glaucoma should begin with a detailed anamnesis, emphasizing the search for risk factors; in addition, questions should be asked about the chronic use of prescribed and self-prescribed medications.¹⁶ A thorough clinical examination is essential, starting from taking IOP to continue with the evaluation of the anterior and posterior segment (Cornea, Iris, Gonioscopy, Optic Nerve (ON)). The IOP is something that we cannot miss, we must always record it, as accurately as possible;

The Gold Standard is Goldmann aplanatic tonometry or, secondly, Perkins tonometry.) This is one of the fundamental points that must be recorded in the clinical history, in each consultation^{1,2,4} in addition, it is the only modifiable parameter what we have to control glaucoma. We know that the average IOP will be between 15 and 16 mmHg with an acceptable variation of 3 mmHg and we will consider IOP over 21 mmHg abnormal.⁴

The corneal evaluation must be exhaustive, carefully looking for the presence of alterations that may be related to secondary glaucomas such as the presence of the Kruckenberg spindle that we associate with pigmentary glaucomas, or the presence of keratic deposits that will refer to a uveitic condition. Curvature and thickness are also a factor to consider, which may influence the IOP measurement.⁶ Careful evaluation of the iris and pupil will provide great information about possible secondary causes that may lead to the development of glaucoma; areas of atrophy, presence of synechiae, rubeosis iridis, sequelae of old trauma, pseudoexfoliation, etc. should be looked for. It is very important to keep a detailed record in each consultation to analyze the progression of underlying pathologies that can lead to the development of glaucoma, because many times, the presence of the aforementioned elements will indicate a condition that is asymmetrical and in some cases, high prevalence and rapid progression.⁶

Gonioscopy should be done in every consultation, regardless of whether it is a patient with suspected glaucoma or not; It is with this exam that the type of glaucoma is classified and will give us guidelines for the management of each patient, allowing us to choose between laser treatments, medical or surgical treatment. In gonioscopy we must perform indentation with a four-mirror lens, looking for the presence of synechiae, pigment, angular neovascularization, inflammatory signs or signs of old trauma.^{10,17} The evaluation of NO is essential, and must be as exhaustive and detailed as possible, recording the characteristics of the neuroretinal ring, the excavation/disc relationship, the presence of hemorrhages in flames and vascular alterations so that we can follow up consultation by consultation to evaluate the evolution. This evaluation should be done, ideally, under pupillary dilation to have a good stereoscopic view of the nerve and better detail the findings⁴ thus allowing a better peripapillary evaluation looking for possible alterations of nerve fibers (Hoyt's sign) with aneritra green or beta zones.

Studies

Just as the clinical evaluation of the patient must be fundamental, it is very important to corroborate the suspicion with functional and structural studies; as already mentioned, glaucomatous damage begins with molecular changes that will progressively increase until causing functional alterations, which will be easily identifiable.

The visual field is a mandatory study in all patients with suspected glaucoma, being the gold standard in the study of the disease.^{1,4,18} It is necessary to take into consideration that the glaucoma suspect may have a normal field, without no classic glaucoma alteration, but monitoring should still be carried out, since a series of reliable fields will provide the necessary information to take future actions; The recommendation is to have at least 3 courses in a year during the first 2 years^{1,4} to establish the rate of progression. It is important to consider that, as it is a subjective exam, it will have a learning curve, so we must always evaluate its reliability.

Currently, the structural study that can be obtained with optical coherence tomography (OCT) can be correlated with functional alterations of the visual field, although sometimes there may be

discordance between functional and structural studies, which could be pre-perimetric glaucoma; OCT provides quantitative information on the layer of retinal nerve fibers, the head of the optic nerve and the layer of ganglion cells, which provides an approximation of the early appearance of glaucomatous damage before damage to the visual field, losing its usefulness. In frames with advanced damage; The damage is observed as an increase in damage to the nerve fiber layer, the appearance of new lesions or a deepening of an existing lesion.^{4,19,20} OCTA will provide information on the existing vascular density and some studies show a sectoral decrease in patients suspected of glaucoma when compared with normal patients.²¹ It will also serve to evaluate the anterior segment, being a complement to gonioscopy, helping to quantify the chamber angle.¹⁷

Photographic recording of the optic nerve with a red-free filter is a study that provides easily interpreted information and is useful for clinical follow-up in suspicious patients, especially in those where campimetry and OCT are inconclusive; Furthermore, there is a study that shows that in the qualitative evaluation in initial to moderate conditions, photography can be a good tool as an alternative to other structural studies, but it cannot be used as a gold standard.²² The IOP must be taken at each consultation; in addition, the baseline IOP must be determined, which will be the starting point to control the response to the different treatments; Basal pressure should be determined without hypotensive treatment, ideally with a pressure curve, recording the fluctuation and the hypertensive peak.²

The measurement of the central thickness of the cornea is normal when the pachymetry is between 520um and 540um, and will be a risk factor when it is less than this thickness; Although some authors suggested making an adjustment to the pressure according to the thickness; Currently what is accepted is that having a thin cornea is a risk factor; Another history that we must look for is that of previous refractive surgery, since this will alter the corneal thickness and biomechanics, giving an alteration and imprecision in the evaluation of the IOP, causing an underestimation of it 4. Within the corneal evaluation, it must also be considered corneal hysteresis, which will have a direct relationship with the IOP measurement and it is postulated that it could better predict progression.²³ Both parameters must be studied for a correct assessment. Among other alternatives that we can use in initial symptoms, there is the electro-retinogram, which analyzes the response of the ganglion cells, which will be decreased in initial and advanced symptoms of glaucoma, helping to differentiate if we are facing a condition of ocular hypertension or the process of glaucomatous damage has already begun.²⁴⁻²⁶

Diagnosis

Glaucoma is a neurodegenerative disease, so its diagnosis will be made with confirmation of damage to the optic nerve consistent with glaucomatous lesions, whether or not associated with lesions in the visual field (confirmed with at least 2 reliable fields), but when we talk of the patient suspected of glaucoma, we are faced with a large group of patients with risk factors as well as some clinical findings. Faced with this, we can also divide the diagnosis of glaucoma into pre-perimetric and perimetric conditions, based on the absence of visual field lesions associated with structural lesions of the optic nerve, for this reason the diagnosis of suspected glaucoma will normally be performed in a clinical consultation, but monitoring and testing will be what raises the suspicion to confirmation or eventual rejection.⁴

Driving

The decision to treat a suspected patient is complex and must be evaluated taking into consideration the presence of risk factors and

existing alterations, both in the clinical evaluation and in functional and structural studies; in addition to involving the patient in this decision, since it will be a permanent treatment and a definitive cure will never be achieved, but we will be trying to delay the speed of progression if there is glaucomatous damage.^{2,4,10,27} If damage is confirmed, treatment should be initiated accordingly; but when there is no confirmation of the presence of damage, one of the aspects that must be taken into consideration when making the decision is whether the risk of developing glaucoma is imminent or if the patient, faced with the possibility of irreversible damage, decides to start treatment.¹ Something that must be considered when deciding whether or not to treat a suspicious patient is the possibility of follow-up, since if adequate and periodic control cannot be ensured according to the alterations found, starting treatment is a good option to prevent the appearance of damage.

If it is decided to start treatment, the objective will be to reduce the IOP by at least 20% of the baseline, reaching a maximum of 24 mmHg^{2,4,16} but the final objective, considered as the target IOP or IOP target, will be to reach that pressure that prevents the appearance or stops the progression of glaucomatous damage, always considering the presence of risk factors and existing alterations in functional and structural examinations.^{4,6} At the time of starting treatment, it must be decided which alternative to take, depending on each patient, taking into account the type of glaucoma, the patient's chances of compliance and socioeconomic characteristics. Hypotensive medications have a very good response, but adherence must be controlled and the most appropriate alternative must be chosen according to the patient to maximize the hypotensive response while reducing side effects. Selective laser trabeculoplasty (SLT) may be beneficial for high-risk suspects. Although it does not work the same in all patients and over time it loses its effect, it is a procedure that can be repeated more than once, maintaining few adverse effects, but the great advantage it has is that you do not have to worry about the compliance or possible drug toxicity and depending on the time the effect lasts, the economic factor will also be an advantage.^{4,28–30} In a patient with suspected angle closure, there are no studies that document the benefit of performing a preventive iridotomy, but against the risk of developing an acute condition due to angle closure, always evaluating and considering the risk that each patient has, not only due to the presence of narrow angles in the gonioscopic evaluation, if not the conditions that may lead to the appearance of a block, it is recommended to perform a preventive peripheral iridotomy.^{17,31}

Conclusion

It is necessary to emphasize that suspicion of glaucoma is a diagnosis itself, and as such, any patient with risk factors or clinical alterations that suggest the possibility of presenting glaucomatous damage is a suspicious patient and must be followed and studied, step by step, individualizing the monitoring and management for each patient, according to the alterations and risk that exist, to determine the need to start treatment or avoid unnecessary treatments; It must be studied appropriately, using all the available alternatives, combining them and individualizing the follow-up on a case-by-case basis. This review was carried out in order to broaden the vision of the suspected patient, considering those cases that do not necessarily present damage and that do merit a complete study and adequate follow-up to avoid late diagnosis and its consequences.

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Conflicts of interest

The author declares that there are no conflicts of interest.

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