EDITORIAL OPEN ACCESS

Dealing with glaucoma

Mercedes Hurtado-Sarrió

In the past two decades, the glaucoma treatment landscape has changed rapidly. It is amazing how glaucoma management has changed, with new diagnostic tools, new drugs, surgical options and devices, but still there is a long way to go.

Nowadays, glaucoma remains as a leading cause of irreversible blindness all over the world affecting around 60.5 million people, and this number of people with glaucoma worldwide is estimated to be increasing to 76 million in 2020 and 111.8 million in 2040 [1]. So, we have to consider glaucoma as a public health problem, despite the advances in diagnostic tools, drugs and surgical tecniques. These estimates are important in guiding the designs of glaucoma screening, treatment and related public health strategies.

Slowing disease progression and preservation of quality of life are the main goals for glaucoma treatment, but till now, reduction of intraocular pressure is the only proven method of treatment.

Two decades ago, we had only three kinds of topical drugs to treat glaucoma: pilocarpine, epinephrine and β-adrenergic blockers, with general adverse effects. Since the target intraocular pressure should be achieved with the fewest medications and mínimum adverse effects, in the 90's new drugs to reduce intraocular pressure were developed: acetazolamide, prostaglandin analogues, alpha adrenergic agonists, and more recently fixed combinations (two topical drugs). These drugs have few, if any, systemic adverse effects, however they can cause local adverse effects in cornea and conjunctiva, producing ocular surface alterations. With such amount of drug alternatives for treatment, less patients undergoe surgical treatment, but those who arrive to the surgical theatre, have chronic inflammation owing to the chronic topical treatment, which seems to be a significant risk factor for surgery failure [2]. Although development of new preservatives–free preparations could provide a promising approach in the prevention of ocular surface injuries [3], there is still major drug toxic effect over the cornea and conjunctiva. The ocular surface injury not only causes dry eyes, red eye, eye itching, photophobia and other discomforts, but also increases the risk of failure of glaucoma surgery in patients [4].

Today, we have many drugs to fight glaucoma, but cronic use results in histological changes in conjunctiva, cornea, and ocular surface alteration.

Simultaneously, considerable efforts have been made to develop neuroprotective glaucoma treatments that prevent optic nerve damage. Unfortunately, no good evidence exists that these agents can prevent disease progression in patients with glaucoma. The incomplete understanding of pathophysiological mechanisms that are associated with optic nerve damage as well the limited identification of medication, and lack of viable regulatory pathways for drug approval [5] have been responsible for incomplete success of neuroprotection.

Henceforth, early diagnosis of glaucoma is important to avoid permanent structural damage and irreversible vision loss.

Moreover, advances in functional and structural evaluation techniques provide more objective documentation and precisión for diagnosis and progression than the earlier subjective methods. Different diagnostic modalities are nowadays available alongwith optic disk and nerve fiber layer photography and campimetry. Techniques such as confocal scanning laser ophthalmoscopy, scanning laser polarimetry, optical coherence tomography, and selective perimetry techniques including short-wavelength automated perimetry and frequency-doubling technology perimetry. Despite these advances, there is still no gold standard for detecting the presence or progression of the disease. Although there is a rapidly evolving field for the development of both structural and functional technologies, and we are likely to see further technological advances to permit earlier detection of disease and its progression with higher levels of certainty than currently available [6].

Laser or incisional surgeries are indicated when adequate reduction in intraocular pressure with acceptable adverse effects is not achievable with medical treatment.

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Surgical treatment of glaucoma has advanced a lot in two decades, looking for safer procedures without sacrificing efficacy [7]. Although trabeculectomy is the most commonly performed surgery [8] and the gold standard procedure which is used when medical and laser therapy fail to maintain the ideal intraocular pressure for glaucoma, the development of minimally invasive glaucoma surgery (MIGS), has significantly altered the surgical approach to primary open-angle glaucoma (POAG).

Minimally invasive glaucoma surgery procedures expand the options for glaucoma surgeons and patients, providing a series of treatments that are generally safer, although perhaps less efficacious, than trabeculectomy and tube-shunt procedures [7]. Some such procedures shunt aqueous humor into Schlemm canal or the supraciliary space, whereas others divert aqueous humor to the subconjunctival space, forming a filtering bleb. It aims to provide medication-sparing and conjunctival sparing. The current approaches include modest results but a safer risk profile, with a great variety of devices like iStent, Hydrus, Xen, Cypass. This last one device called CyPass micro-stent being voluntarily withdrawn from the market by Alcon laboratories last year 2018, correlated with endothelial cell loss. It is important to recognize that every procedure has potential risks, and our definition of "safe" depends on the risk/benefit relationship.

The limitation of this procedure is the lack of study standarization, lack of cost-effectiveness data, and incomplete knowledge for patient selection. Directly comparing the evidence of each MIGS type is difficult due to the varied study designs, patient populations and outcome measures. Long-term outcomes over the years is unknown, with potential risk of scaring.

In future, studies will be needed to tell us the longevity of these MIGS procedures. Future data and advances in imagining will allow to localice MIGS type.

Dealing with glaucoma is not easy. Research in neuroprotection and neuroregeneration, along with genetics and new surgical techniques and devices will allow us a great advance in the diagnosis and treatment of glaucoma.

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Author Contributions

Mercedes Hurtado-Sarrió – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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