Editorial

Managing Side Effects on Ocular Surface Caused by Glaucoma Eye Drops

Glaucoma is an optic neuropathy, characterized by the death of the retinal ganglion cells and the loss of their axons in the retina [1]. This loss leads to reduction in the thickness of the peripapillary retinal nerve fiber layer, cupping of the optic nerve head and typical visual field defects. Glaucoma is the second leading cause of blindness worldwide [2], and it is estimated that 4.5 million people globally are blind due to glaucoma (11.2 million by 2020) [3]. Primary open-angle glaucoma is the most common form of glaucoma. Currently, elevated intraocular pressure is the only treatable risk factor to prevent glaucoma progression and avoid visual impairment. The first line therapy to decrease intraocular pressure is medical treatment, administered as topical eye drops. Multidose eye drops require preservatives to avoid microbial contamination. Benzalkonium chloride is the most widely used chemical preservative in glaucoma medications, which disrupts the ocular surface and generates or increases preexistent ocular surface disease. Because glaucoma is a chronic disease, drugs to treat glaucoma should be administered on a daily basis. Consequently, the prolonged use of benzalkonium chloride-preserved drops frequently causes ocular surface disease in patients with glaucoma, contributing to poor adherence or noncompliance with medical treatment. The use of preservative-free drugs and artificial tears would help restore the ocular surface health by decreasing tear osmolarity and inflammation.

In the present issue, different authors evaluated the effect on ocular surface of different glaucoma medications and the role of artificial tears, as adjunct therapy, to reduce the side effects of glaucoma eye drops. This issue includes three papers regarding the relevance of ocular surface in clinical management of patients with glaucoma.

Mastropasqua *et al.* [4], highlighted that the tear film is a dynamic fluid that plays a key role in maintaining the ocular surface integrity and the quality of vision. In glaucoma patients, the tear film can be altered by several factors, such as the use of intraocular presure-lowering medications with preservatives, the number of eye-drops applied per day and the duration of the treatment. The authors provide a detailed review of the changes caused by glaucoma eye-drops and surgical approaches in the tear film, and their impact on adherence to therapy and quality of life. Additionally, they suggested that tears could be an attractive source of biomarkers for glaucoma.

Fogagnolo *et al.* [5], appraised the importance of the assessment of tear film osmolarity in dry eye disease, as a part of ocular surface disease. Tear instability and tear reduction with increased osmolarity are objective signs of dry eye disease. This review evaluated the relationship between glaucoma, ocular surface disease and dry eye disease, with a particular focus on tear film osmolarity. Glaucoma medications interact with the ocular surface mostly due to the presence of preservatives and active compounds, leading to an increase in tear film osmolarity. Accordingly, the measurement of tear film osmolarity could be useful to monitor the effects of lubricating or artificial tears in recovering ocular surface disease in glaucoma patients.

Roberti *et al.* [6], reported that glaucoma patients usually suffer from ocular surface disease caused by the continuous application of preserved glaucoma medications. The effect of benzalkonium chloride, which is the preservative most frequently included in hypotensive eye drops, on conjunctiva, cornea and tear film was widely discussed in their review. Chronic exposure to benzalkonium chloride causes conjunctival metaplasia, corneal damage and disruption of the tear film. Therefore, the authors recommended to switch treatment to preservative-free eye drops to improve adherence and compliance to treatment, as well as success of glaucoma surgeries.

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1875-533X/19 $58.00+.00

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