• It is important to clarify which prostaglandin/timolol fixed combination provides optimal 24-hour intraocular pressure (IOP) lowering efficacy in those glaucoma patients for whom monotherapy with latanoprost proves inadequate.

• There is paucity of clinical evidence documenting the comparative damage upon the ocular surface of fixed combination therapies with and without benzalkonium chloride (BAK).

• To the best of our knowledge this study is the first 24-hour comparison between latanoprost/timolol fixed combination preserved with BAK and travoprost/timolol preserved with polyquaternium-1. It is also the first investigation to combine 24-hour efficacy evaluation and ocular surface health metrics. We included an easy-to-perform clinical evaluation of 3 selected ocular surface signs.

• Both prostaglandin/timolol fixed combinations provided significant incremental 24-hour IOP-lowering compared with branded latanoprost monotherapy in open-angle glaucoma patients who needed further IOP reduction. There was a clinically meaningful and statistically significant 24-hour IOP separation between the two fixed combinations (LTFC 2.2 mm Hg and TTFC 2.6 mm Hg) and latanoprost.

• The mean 24-hour IOP lowering of travoprost/timolol fixed combination without BAK was significantly greater than that with latanoprost/timolol fixed combination preserved with BAK.

• Measurement of ocular surface health and tear film status favored TTFC BAK free compared to LTFC.

• More research is needed to further clarify the best fixed combination therapy and to delineate the optimal stepwise therapy to treat ocular hypertension and open-angle glaucoma.

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