Glaucoma Drugs May Skew Eye Pressure Readings

NEW YORK (Reuters Health) - Chronic use of prostaglandin analogues (PGAs) may cause reversible corneal changes contributing to underestimation of intraocular pressure (IOP) in glaucoma patients, according to Canadian researchers.

As Dr. Paul Harasymowycz told Reuters Health by email, "This study confirms and corroborates previous ones (finding) that prostaglandin analogues, the most frequently used class of medications in the treatment of glaucoma, change the physical properties of the cornea. These must be taken into account by physicians when estimating the amount of intraocular pressure lowering in their patients"

In a paper online May 9 in the British Journal of Ophthalmology, Dr. Harasymowycz of the University of Montreal and colleagues note that Goldmann applanation tonometry is the standard technique for IOP measurement. It measures the force necessary to flatten a 3.06 mm diameter corneal surface area.

However, chronic use of topical PGAs may modify corneal biomechanical properties and hence influence such readings.

To investigate, the researchers studied 70 eyes in 35 patients with primary open-angle glaucoma who were on chronic PGA therapy. The treatment continued in the control eye but was stopped in the contralateral eye for six weeks before being reinstated.

Although baseline characteristics were comparable, at six weeks there was a significant increase in corneal hysteresis (CH), corneal resistance factor (CRF) and central corneal thickness (CCT) in the study eyes.

In particular, IOP as measured by Goldmann tonometry, rose from 15.4 to 18.4 mm Hg ($p<0.0001$). The control eyes did not demonstrate any significant changes over the study period.

At 12 weeks, the effects were reversed in the study eyes as was the discrepancy between IOP as measured by Goldmann tonometry and corneal-compensated IOP.

The researchers further established that "IOP underestimation was more important in eyes with lower CH values and that CH and CCT were positively correlated in these eyes." In patients with glaucoma of moderate severity, they add, "lower CH and CRF values were associated with more severe damage."

They conclude that the results "warrant caution when clinicians assess accuracy and adequacy of IOP control in patients under chronic PGAs therapy."

Commenting on the findings by email, Dr. Nathan Congdon of Queen's University Belfast, Northern Ireland, told Reuters Health, "Though the interaction between IOP, glaucoma damage and corneal hysteresis is complex, these results provide some evidence that measured pressure reduction with PGA use might be partly due to induced reduction in hysteresis with resulting underestimation of IOP."

Dr. Congdon, who was not involved in the study but has conducted research in the field, concluded that, "More work in this area is warranted, given the very widespread use of PGAs, and possible effects on hysteresis of the IOP increase of PGA must also be considered"

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