

Setting Meaningful Pressure Goals for Patients With Glaucoma

Elevated intraocular pressure (IOP) is a well-recognized risk factor for glaucoma, and efforts to lower IOP—often to a prespecified target—are a mainstay of glaucoma management. Yet whether and how to set a pressure goal and apply it as a therapeutic guide remains a source of contention among ophthalmologists.

Target IOP: Defined and Debated

In the Academy's 2015 *Preferred Practice Pattern (PPP)* for primary open-angle glaucoma (POAG), an expert panel defined target pressure as the upper limit of a range of IOPs in which "visual field loss is unlikely to significantly reduce a patient's health-related quality of life over his or her lifetime."¹

Opinions. Target setting gives the practitioner a clear therapeutic goal, said L. Jay Katz, MD, of Wills Eye Hospital in Philadelphia. "It would be a mistake not to have a target pressure because lowering pressure is what we're doing with every therapy for glaucoma."

Even so, Kuldev Singh, MD, MPH, of Stanford University in California, cautioned that having a target IOP does not necessarily lead to better medical care. The natural history of glaucoma cannot be predicted prospectively and depends, in part, on factors that we don't fully understand.² He explained, "When we're setting a target IOP, we're trying to predict the pressure that will

allow patients to see well for the rest of their lives, without knowing the patient's life span or the relationship between IOP and disease progression for that individual."

Ahmad A. Aref, MD, MBA, from the University of Illinois College of Medicine in Chicago, said that the concept of target setting can be valuable in practice, but only if the physician recognizes that "the target is not written in stone."

Measuring IOP

When and how should IOP be measured? Dr. Katz noted that eye pressures vary during the day, and the highest pressures usually occur outside of office hours. During the night, pressures often peak.³ "Ideally, you would ask the patient to be checked at different times of day and obtain a diurnal curve of the pressure," he said.

The reality, however, is that measurements are limited by practicality and logistics, said Dr. Aref. Even conscientious patients whose disease status is urgent may not come in for multiple IOP checks, especially if they have to go



TRACKING PRESSURE. New pressure monitoring devices, the Triggerfish Sensor (left) and HOME tonometer (right), allow for around-the-clock monitoring to help track peak pressures.

through all kinds of barriers to make it into the office for an eye pressure check, he said.

New technology. Dr. Katz noted that emerging technologies may soon make it easier to determine peak pressures at baseline and after treatment. The HOME tonometer (iCare) and the Triggerfish Sensor smart contact lens (Sensimed AG) have recently been approved for use in the United States and can generate many IOP-related measurements in a day, he said. In a recent study, ocular volume and elasticity-derived parameters obtained by a contact lens sensor for a 24-hour period offered a better explanation of glaucoma progression rates than did a series of traditional, in-office IOP measurements.⁴

Setting the Initial Target

Although there is no universally accepted formula for calculating a target pressure, much of the decision-making

is based on the peak IOP at baseline, said Dr. Katz.

Methods of target setting. Dr. Aref summarized three methods for setting a target IOP for a new glaucoma patient: 1) a percentage reduction from the baseline pressure, 2) a fixed number or range based on the disease stage, or 3) a formula that includes individual factors such as age, visual field loss, and baseline pressure. His preferred method is the percentage reduction from baseline. The 2015 *PPP* concurs that “a reasonable initial treatment in a POAG patient is to reduce IOP 20%-30% below baseline.”¹ Well-known randomized controlled trials support this recommendation.⁵⁻⁷

Dr. Aref also considers factors like risk tolerance and life expectancy to help establish a safe target IOP. Dr. Katz added that family history can give important clues about how the glaucoma may progress.

Determining baseline IOP. Dr. Aref noted that he often sees referred patients who already have a diagnosis of glaucoma and are on treatment. In these cases, “I make every effort to determine the patient’s unmedicated baseline IOP, either by contacting the physician who started the patient’s treatment, or, if I think the patient’s optic nerve can handle it, with a drug washout.”

Assessing structure and function. To gauge glaucoma severity, Dr. Aref and his team use structural measures, such as stereoscopic optic disc examination and optical coherence tomography, as well as functional methods, such as automated visual field tests. “Based on these assessments, we can stage a patient’s glaucoma as ocular hypertension or mild, moderate, or severe glaucoma.” He added that some physicians then select a fixed target IOP based on disease stage, for example, 18 mm Hg for mild glaucoma, 15 mm Hg for moderate glaucoma, and 12 mm Hg for severe glaucoma. It is important to clarify that staging based on structural and functional measures for the purpose of target pressure determination does not always correspond with current ICD-10 glaucoma staging definitions, which only take into account functional data, he said.

The Safety Factor

The concept of target IOP does not address the safety of the therapies required to reach a predetermined pressure level, Dr. Singh said. “You have to ask yourself, ‘What are the risks of getting to that IOP goal, and are they worth taking?’” This is especially true when the patient has mild glaucoma or when disease progression has not been observed, he said.

Incremental risk. You should never treat a patient to the point beyond which the expected harm of the next therapeutic step would be greater than the expected benefit, given what you know about that patient’s disease at that time, Dr. Singh said. This thinking lies at the foundation of starting with relatively safe treatments, like eyedrops, before advancing to riskier surgical options.

He added that this dynamic approach, based on risks and benefits of therapy, is more abstract than setting an IOP target and treating until you reach it. Yet he emphasized that the dynamic approach is “unquestionably the one used by most experienced practitioners.”

Advanced disease. Dr. Singh considers the concept of target IOP to be “hypothetically useful in very severe glaucoma,” in which risks of glaucomatous visual loss considerably outweigh risks of treatment. Dr. Katz summed it up as “Generally, the more severe the disease, the more aggressive we are with trying to reach a low target pressure.”

Changing the Goal

“The target IOP is fluid, and we may decide that the target set initially was overly conservative or aggressive,” said Dr. Katz. He added, “Each of the patient’s eyes may have a different pressure goal, and the target can change over the course of the disease.”

Dr. Singh said that with a target pressure approach, ophthalmologists need to be prepared to change the IOP goal at every visit, based on available clinical findings and the safety profile of the remaining therapeutic options.

The 2015 *PPP* states that physicians should adjust the initial target pressure as indicated by disease course and

severity,¹ but Dr. Singh noted that this recommendation omits mention of the side effects and risks of treatment. He stressed that these factors “should be at the forefront of your mind, especially because glaucoma does not always lead to visual impairment.”

Realistic Expectations

Although Dr. Singh does not dispute that lowering IOP can slow glaucoma progression, he said, “the notion that achieving a target IOP will completely arrest the disease is problematic.” Instead, he advocates thinking in terms of rates of change. “Glaucoma is always progressing because of the aging component of ganglion cell loss layered onto the disease component.” Accordingly, he said that practitioners should take time to inform patients that glaucoma management is complex, the disease course can be unpredictable, and treatment adherence is strongly recommended, but it will not guarantee a good outcome.

Dr. Singh and his colleagues have identified several obstacles to meaningful IOP targeting: suboptimal measuring tools, the uncertainty of a patient’s life span, unforeseeable complications of therapy, and the likelihood that the patient’s priorities or risk tolerance may shift during the course of the disease.⁸

The Bigger Picture

“The main goal is preserving the patient’s vision,” said Dr. Aref. “The status of the patient’s optic nerve and visual field are the metrics that I’m actually following, but they don’t change rapidly. The IOP is a surrogate for those more important measures.”

Dr. Singh added, “We must make decisions within the limits of resolution of our diagnostic tools.”⁸ He explained that specifying and achieving a target IOP are not necessarily indicative of treatment success, disease stabilization, or an eliminated risk of blindness. “Ultimately, glaucoma care is not about the IOP or even about saving every ganglion cell and optic nerve fiber. Rather, it is about optimizing the patient’s health.”

Dr. Aref reiterated that the target pressure is a starting point. “Even in

two hypothetical patients with the same baseline pressures, same targets, and same visual fields, you may end up treating each very differently.”

Dr. Katz added, “There is considerable science behind what we do in managing glaucoma, but there is art to it as well. You must weigh a lot of factors specific to the patient.”

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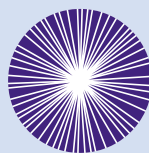
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