

HOME CARE

Glaucoma management using pressure measurements by the patient.

BY SANJAY ASRANI, MD



Patients' ability to measure their own IOP reliably at times outside of traditional office hours might provide clearer insight into glaucoma's pathogenesis, not to mention a way to manage the disease better. What has been missing is a reliable device for patients or their caregivers that does not require use of a topical anesthetic.

GAPS IN INFORMATION

Glaucoma management for patients whose IOP measurements, optical coherence tomography (OCT) scans, and visual fields are stable is generally based on a few IOP measurements in the clinic per year. This strategy provides physicians with three to four IOP data snapshots of 2 seconds each for a year. A huge amount of data is therefore unavailable to the clinician, who must make assumptions based on the available information.

In some cases, it is only when OCT reveals irreversible changes in tissue thickness or when perimetry demonstrates visual field loss that the clinician realizes that the presumed IOP control was inadequate in terms of the mean or the quality (ie, fluctuation). Avoiding short- and long-term fluctuations is very important in preventing glaucoma from progressing.¹⁻³

EARLY DAYS

Home tonometry could either confirm that the desired control of IOP has been achieved (providing reassurance to the patient and the physician) or show that it has not. The data could provide insight into which parameter(s) might be the best to monitor in glaucoma, especially because measurements are performed in the patient's own environment.



AT A GLANCE

- Home tonometry is the next logical step in the understanding and management of glaucoma.
- Recent FDA approvals of devices may spur the use of home tonometry.
- Self-testing will increase patients' participation in glaucoma management and may improve compliance.

At present, however, home tonometry is in its infancy. Is it the peak IOP, the frequency of the peaks, the range of fluctuations over 1 day or more, the change in IOP over a few months, the mean IOP, or the troughs of IOP that need to be monitored? Unclear at present are the ideal frequency of IOP measurements, the number of days over which measurements should be taken, the impact of other environmental factors that influence IOP, which data (such as IOP spikes with eye squeezing/rubbing) can and should be ignored, etc.

TODAY'S TOOLKIT

The FDA has approved two tools for home tonometry. The first is the Triggerfish (Sensimed), a contact lens with embedded electronics that can wirelessly relay IOP data to a simultaneously worn device. The device provides a surrogate measure of IOP and can deliver readings even when the patient is asleep. Because the contact lens fits tightly, however, the Triggerfish cannot be worn for more than 24 hours at a time. Moreover, the device is not available in the United States.

The Icare Home tonometer (Icare USA; Figures 1 and 2) provides actual IOP measurements (rebound tonometry) that have been found to be comparable to Goldman readings, whether the device is operated by a technician or a patient/caregiver.⁴ The Icare's biggest advantages are that it does not require the administration of an anesthetic and that patients can use the unit over multiple days, multiple times a day. Of course, they cannot use the device while they are sleeping, so the unit cannot provide nearly continuous data. The device does not display IOP readings so as not to alarm the patient; upon return of the unit to the physician, the readings (with laterality, date, and time stamp) can be downloaded and analyzed.

LOOKING AHEAD

Home tonometry can be valuable when adherence is in question, although those performing home tonometry multiple times a day may be more compliant with prescribed therapy than others. In addition, home tonometry is valuable when surgical intervention is being considered, because these measurements can confirm the presence of either peaks of IOP or fluctuations.

Home tonometry could also be a valuable tool for monitoring IOP in postoperative patients; for example, it could flag a gradual rise in IOP as a bleb scarred or as the ligature around



Figure 1. The Icare Home tonometer.



Figure 2. A patient uses the Icare to measure her own IOP.

the tube of a Baerveldt glaucoma implant (Johnson & Johnson Vision) dissolved. The practice has already been shown to be invaluable in the management of pediatric glaucoma.^{5,6}

CONCLUSION

The future of glaucoma management may include implantable devices for monitoring IOP, but clinicians and researchers will have to determine how to use the data collected. What is learned from this information may improve the parameters for observing patients and help prevent disease progression. ■

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