MAPPING DIURNAL IOP FLUCTUATIONS AT HOME

The Icare HOME tonometer helps pinpoint peak IOP to aid in guiding treatment decisions.

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I recently encountered a common dilemma in my practice, which many other glaucoma specialists also face. At his office visits, my patient's IOP consistently measured 13 mm Hg, which seemed a reasonable target. However, his visual fields tests were starting to show some progression, and his OCT scans also indicated similar changes, more than I would have expected. I needed more information.

One of the biggest shortfalls in glaucoma therapy is undertreatment.[1] Poor compliance, poor adherence, and late diagnosis are contributing factors, but one major cause is that we often are making treatment decisions without knowing a patient's peak IOP. The notion of measuring pressure at one time point—a 2-second measurement in one visit every X number of months—and relying on that to determine treatment feels archaic.

In today's world of glaucoma, peak IOP is critical information. That's where the potential risk to the optic nerve is greatest, and that was the missing piece of information I needed to help me decide how I would manage my patient. We sent him home with the Icare HOME tonometer to gain a more complete picture of his diurnal IOP.

THE IMPACT OF PEAK IOP

In the past, trying to determine a patient's peak IOP was time-consuming and unnatural. The patient would return to the office at various visits or at different time points during the day for pressure checks, a practice that is inefficient and does not account for pressure changes during daily activities. Alternatively, the water drinking test has also been advocated but has not been widely adopted.

Figure. The Icare HOME tonometer.

About 3 years ago, we added the Icare HOME tonometer to our diagnostic armamentarium so that patients can measure their pressures easily at home (Figure). The difference between readings we obtain in the office and the data from the Icare HOME is like the difference between a single snapshot and a continuous movie of a patient's daily life.

When the patient returned the device to our office in about 1 week, we downloaded the data and quickly learned that his IOP spikes to 22 mm Hg every morning before he instills his drops. Armed with this new information and considering the patient's age, level of disease, and risk for progression, he and I decided on subconjunctival microinvasive glaucoma surgery. Postoperatively, his pressures in the office have been slightly lower than before, but more importantly, his peak pressures as measured with the Icare HOME, particularly in the morning, are now about 12 mm Hg.

This case is a classic example of the value of home monitoring with the Icare HOME tonometer. While surgery was the course chosen in this case, data from

YOUR QUESTIONS ANSWERED

Every day, I recommend the Icare HOME tonometer to as many patients who are able to use it. Yet, I find some colleagues are reluctant to incorporate it into their practices. Having used this device for 3 years, I am happy to address some of their concerns. Frequently asked questions include the following:

Is it difficult to teach patients to use the Icare HOME tonometer?

Not at all. We have developed a nice training program, delivered by staff, that includes videos and handouts to help patients adopt the technology. This training typically takes less than 15 minutes per patient.

Are patients motivated to learn?

Patients love the idea of measuring their IOP at home. We explain that, similar to blood pressure, IOP can fluctuate throughout the day and can have a bearing on their disease.

What is your acceptance rate?

Our acceptance rate and ability to obtain good data is well over 95%.

Will patients worry and call the office when they see their IOP readings?

IOP readings are locked inside the device, and patients cannot see them. We download their data in the office.

Is there a risk of damage or theft of the device?

Patients rent the unit from us, and we incorporate those possibilities into our rental agreement. We have never had a device lost, stolen, or damaged.

What about the quality of the data?

Studies have shown that rebound tonometry correlates well with Goldmann applanation tonometry.[1] Therefore, I feel confident that we are getting reasonably close measurements. Importantly, we are not looking at the output measurement as much as the fluctuation measurement, the maximum and minimum IOPs, with the Icare HOME. I do believe the raw values are reasonably correlated to Goldmann for average pressures.

1. Termühlen J, Mihailovic N, Alnawaiseh M, Dietlein TS, Rosentreter A. Accuracy of measurements with the Icare HOME rebound tonometer. *J Glaucoma*. 2016;25:533-538.

the Icare HOME can also direct our medical therapy. For example, in some cases, I have added an IOP-lowering drop to a patient's morning regimen. In others, I have changed the order of the drops to maximize pressure lowering when peak IOP occurs.

SHOULD I PERFORM SURGERY OR NOT?

Patients who are using multiple medical therapies and have significant visual field damage present a dilemma. Do we wait and watch for their disease to worsen, or do we recommend surgery now? Surgery carries some risk, so we want to be certain the patient needs it.

I ask these patients to use the Icare HOME, usually for 5 to 7, days to measure their pressures as often as they can (at least first thing in the morning before they instill their drops and after they instill their drops during the day). I also ask them to wake up during the night at least 1 night to measure their pressure. These data, together with other test results and my clinical expertise, help us decide what our next step should be.

ASSESSING STABILITY

Diurnal IOP is an important variable in our assessment of disease stability. When we write "stable glaucoma" in our notes, that is a significant statement. Often, we make that statement without full knowledge of the patient's disease or pressure. When we can confirm stability, we can take a break from treatment and continue to observe with our diagnostics. IOP is one more asset we can use to determine stability along with OCT, visual fields, corneal hysteresis, corneal thickness, and demographic risk factors.

MOVING TOWARD MORE EDUCATED DECISIONS

IOP is an important guide to glaucoma therapy in terms of target pressure and treatment decisions based on target pressure. While certain factors, such as cost, may limit access to this device for some patients, in an ideal setting, I would offer the Icare HOME to every glaucoma patient.

The Icare HOME can be applied to a wide range of glaucoma patients and suspects and, as such, is a valuable tool for those practitioners who have an interest in glaucoma management. ■

1. Susanna R Jr, De Moraes CG, Cioffi GA, Ritch R. Why do people (still) go blind from glaucoma? *Trans Vis Sci Technol*. 2015;4(2):1.

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