# Early Detection of Choroidal Neovascularization Using Home Monitoring

Raising the standard for at-home monitoring can help us help our patients save their vision.

**BY ALLEN C. HO, MD**

The use of anti-VEGF therapy for choroidal neovascularization (CNV) and wet age-related macular degeneration (AMD) has helped reduce vision loss by 41% and onset of severe vision loss and blindness by 46%.[1] Despite this, AMD remains the leading cause of acute visual impairment in elderly patients in the United States,[2] and we can do better for our patients.

Early detection of AMD remains a key factor in successful treatment. Patients treated for CNV within 1 month of detecting visual symptoms are far more likely to experience an increase in visual acuity than those who are not treated within that timeframe.[3]

The current mechanism for early detection requires frequent monitoring and clinical examination. However, frequent office visits are impractical and inconvenient for patients and physicians. Therefore, patient home monitoring becomes an attractive option, particularly if we can improve upon the Amsler grid.

## STANDARD HOME CARE OPTIONS VERSUS NEW TECHNOLOGY

When it comes to at-home monitoring, options vary from the very simple to newer high-tech devices. Patients can do something as simple as looking at the same photograph each day, as long as they take care to isolate each eye and call their doctor should the image become wavy or blurry. This method is not the most reliable, but it is certainly preferable to no monitoring.

For many decades, the standard for home monitoring has been the Amsler grid (Figure 1). These grids have improved over the years and are now even available on smartphones. However, the value of the grid is questionable due to neurologic compensation,[4] with studies showing sensitivity to vary between 34%[5] and 56%[4] and false negative rates as high as 77%. Nevertheless, I often recommend the Amsler grid to patients.

Recently, I have started to use preferential hyperacuity perimetry (PHP; ForeseeHome AMD monitoring, Notal Vision) for patients who are comfortable with digital technology and who have the financial resources to participate. I especially advocate its use by patients for whom I am particularly concerned about progressing disease, including those at high risk for wet AMD, patients who have wet AMD in one eye and dry AMD in the other eye, and those

## At a Glance

- At-home monitoring may facilitate earlier detection of visual changes that are indicative of disease progression.
- The ForeseeHome device requires some comfort with technology, and at the moment, use of the device requires a small user fee paid out of pocket by the patient.
- Study data indicate that patients in the HOME trial using the device had significantly less loss of visual acuity compared with patients using an Amsler grid.

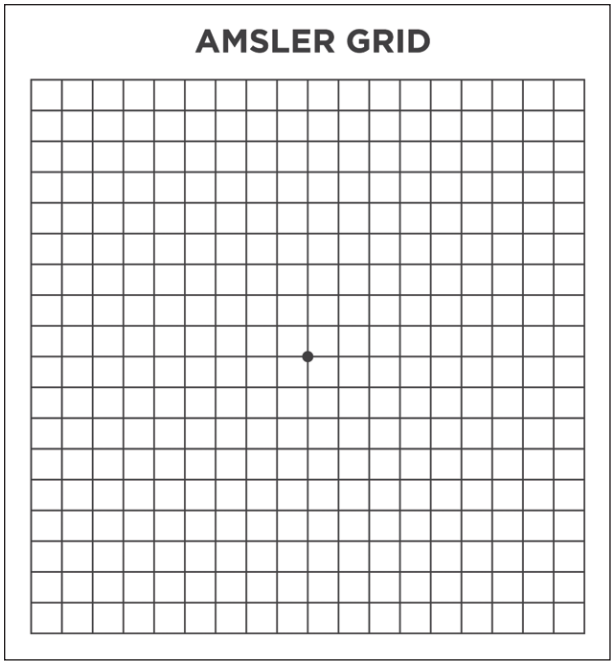


**Figure 1. The current standard of care for patients monitoring for vision loss outside the clinic is the Amsler grid.**

**Figure 2. Example of a patient using the ForeseeHome preferential hyperacuity perimetry device.**

who want to be proactive—patients with a strong family history, for example. Most are enthusiastic and, for about $2 a day, can have the peace of mind of knowing that their vision is being monitored for any slight changes in their AMD progression. Hopefully, payers will quickly assess the value of this technology as needed to provide access to more patients with macular degeneration.

This patented technology has a much lower rate of false positives than the Amsler grid and a sensitivity rate of 80%. The device accurately detects visual defects and distortions by measuring 500 retinal data points over 14° of a patient's central visual field. Each data point is measured three to five times in approximately 3 minutes. The patient must have some degree of comfort with technology, as the monitoring is conducted using the device and a computer mouse (Figures 2 and 3). But the test is simple, quick, and noninvasive, requiring the patient only to click on specific points on the test screen.

The information gathered is automatically transmitted to the Notal Vision data monitoring center, where the data are reviewed and compiled and then provided to the physician via a phone call and email. The physician also has online access to patients' data. If a statistically significant change is detected in a patient's test results, an alert is issued by Notal Vision to the physician's office so that the physician can follow up with the patient to schedule an appointment for a clinical examination. The time between when a patient has a significant change in test data and the time he or she sees the physician is usually about 2 to 3 days.

The ForeseeHome device was studied in the

**TABLE. PERCENTAGE OF PATIENTS PARTICIPATING IN CLINICAL TRIALS WITH 20/40 VISUAL ACUITY AT THE TIME OF AMD DIAGNOSIS**

| | Amsler Grid | ForeseeHome Monitoring |
|---|---|---|
| HOME Study[6] | 62% | 94% |
| Ying et al[7] | 36% | |
| Fong et al[8] | 13% | |
| Acharya et al[9] | 17% | |
| Olsen et al[10] | 22% | |

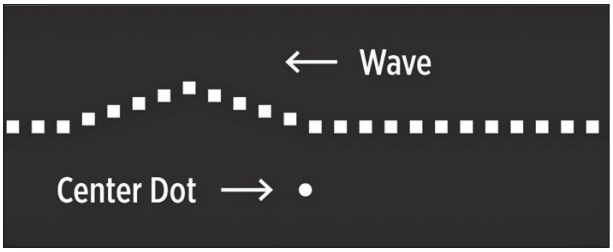


**Figure 3. The testing algorithm viewed by the patient using the preferential hyperacuity perimetry device.**

randomized Home Monitoring of the Eye (HOME) study, and the results are compelling. The HOME study, a substudy of the National Eye Institute's AREDS2, compared the ForeseeHome device with standard of care (Amsler grid) in detecting progression to neovascular AMD.[6] A total of 1520 patients from 44 clinical sites, all with visual acuities of 20/60 or better, participated by testing their eyes several times each week with either the ForeseeHome device or the Amsler grid. A preliminary analysis of the study showed that users of the device demonstrated a median visual acuity loss of 3.0 ETDRS letters compared with a median loss of 9.0 letters in the standard of care group. This difference is not only statistically significant; in my opinion it is clinically meaningful. Only 62% of patients in the standard care arm had functional vision (ie, 20/40) at the time of wet AMD detection, versus 94% of those using the ForeseeHome device as recommended (Table). Because such a significant difference between the ForeseeHome device and other detection methods was demonstrated during the interim analysis, conducted at approximately 80% of the planned sample study, the Data Safety and Monitoring Committee recommended that the HOME study be terminated early. However, because the device was so successful, Notal decided to release it to market before reimbursement was available for its use, which is still pending at the time of this publication.

## POTENTIAL LACK OF AWARENESS

I believe there may be a general lack of awareness among retina specialists regarding this new technology. There may also be barriers that prevent the adoption of new devices such as this. The data on the ForeseeHome device, however, are compelling and speak to the medical adage that the sooner a problem is detected, the better the outcome with treatment will be.

The data from the HOME study strongly suggest that the ForeseeHome device catches CNV or the onset of AMD significantly sooner than the Amsler grid. It also detects issues at a point when patients have better vision—and this is very important. Beginning treatment early, before a patient's vision has declined significantly, increases that patient's chances of improved outcomes and preservation of more useful vision, for example for driving and reading. Cost can be a barrier, but, if it were not an issue, I would consider recommending ForeseeHome to most of my patients at high risk for AMD.

> "Beginning treatment early, before a patient's vision has declined significantly, increases that patient's chances of improved outcomes and preservation of more useful vision."

## RAISING THE BAR FOR TREATMENT AND DETECTION

Although we have access to effective pharmaceutical treatments, and thus many patients with wet AMD will have their reading and driving vision preserved, we can raise the bar even higher—noninvasively and with no medical risk. At the end of the day, patients do not care about clinical results. They care about their vision and whether their level of visual acuity will allow them to live the lifestyle they prefer. With that in mind, the PHP home monitoring device is an effective method to raise the bar for patients with AMD. We can help more of our patients preserve greater visual acuity with this technology. ■

*Allen C. Ho, MD, is an attending surgeon and the director of retina research at Wills Eye Hospital in Philadelphia and is a professor of ophthalmology at Sidney Kimmel College of Medicine at Thomas Jefferson University. He is the Chief Medical Editor of* Retina Today. *Dr. Ho may be reached at acho@att.net.*

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