Practical Strategies for Preventing Blindness Caused by AMD

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In January 2019, the following key opinion leaders met to map out strategies to make AMD education more practical for optometric audiences and to agree on practical ways to effectively prevent avoidable vision loss in patients with AMD.

In the pages that follow, these doctors share best practices to help optometrists in diverse practice settings make a difference early in the disease continuum.

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AMD Manifesto:

Guidelines for Preventing Avoidable Vision Loss

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It's time for us, as optometrists, to rethink our responsibilities as they relate to AMD diagnosis and management. For too long, we've sat on the sidelines absorbing academic knowledge about late-stage disease treatments that have little bearing on the patients we see day-in and day-out. Likewise, it may be said that we have a fatalistic view of our ability to help early to intermediate AMD patients before they progress and lose vision.

Perhaps such opinions are driven by the poor outcomes we've historically witnessed. For example, as many as 78 percent of AMD patients seek their first treatment after having already suffered irreversible vision loss in one eye, and nearly half of them have an acuity of 20/200 or worse.[1,2] Is there no way to improve these statistics? Is saving the second eye good enough? Are anti-VEGF injections our patients' best and only hope? Should we really be waiting until a patient needs an injection before we talk with them about AMD?

There is currently no cure for AMD, but with proper care, significant visual acuity loss may be prevented in many patients. To be clear, the goal of managing AMD is to preserve vision—not to wait until vision has already been lost.

The purpose of this paper is to assure you that optometrists can—and will—do better. After reviewing the literature and changing the way we deliver AMD care in our own practices, the authors of this paper have mutually agreed upon five clinically appropriate practice guidelines. Here's how you too can incorporate these improved standards to more effectively fight the devastating consequences of AMD.

Practice Guideline #1: The goal of managing AMD is to preserve vision—not to wait until vision has already been lost.

Easy Answers to Big Problems

AMD is more prevalent than glaucoma and diabetic retinopathy combined. But consider this: Do you have three times as many AMD patients as you do glaucoma patients in your practice? Most optometrists would say they do not.

ODs are great diagnosticians, but observing the macula with a 90D lens and evaluating fundus photos for small drusen and pigmentary changes isn't easy—for optometrists or for ophthalmologists. A study published in *JAMA Ophthalmology* showed just how often diagnoses are missed by optometrists and ophthalmologists alike—even when the doctors were aware that their findings would be double-checked by trained graders.[3]

This cross-sectional study, which included 1,288 eyes (644 adults) from patients enrolled in the Alabama Study on Early Age-Related Macular Degeneration (ALSTAR),[4,5] revealed that doctors are missing AMD about 25% of the time. Also quite concerning is that 30% of the undiagnosed eyes in the study had large drusen, a well-known risk factor for progression to advanced disease.[3]

Based on this and other research, as well as clinical observations and in accordance with the preferred practice patterns of the American Academy of Ophthalmology,[6] it

is clear that dark adaptation functional testing can overcome the practical challenges associated with diagnosing AMD using only traditional subjective clinical assessment. In fact, this functional test enables eye care professionals to detect AMD and can identify subclinical AMD at least 3 years before clinically visible. This can give your patients a three-year head start when it comes to managing and treating AMD.

Practice Guideline #2: It is the opinion of this panel that dark adaptation testing can overcome the practical challenges associated with diagnosing AMD using only traditional subjective clinical assessment.

An Opportunity for Optometry

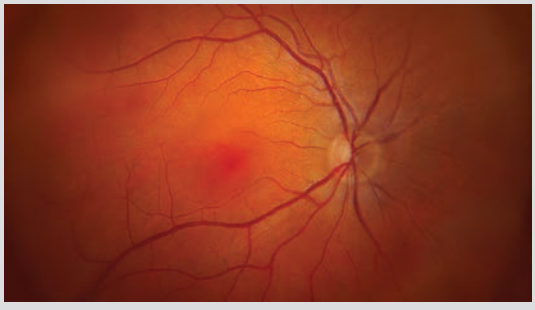
We've left AMD management largely in the capable hands of retinal specialists. Unfortunately, patients don't typically see a retinal specialist until it's too late. Currently, 58,000 eye care professionals are licensed to perform comprehensive eye exams; 40,000 of these are optometrists, 18,000 are ophthalmologists.[7] Retinal specialists account for about 10% of all ophthalmologists. We need to strengthen the front line.

Based on practical challenges associated with access to care, optometrists must establish improved practice protocols to proactively identify early disease. Once AMD is diagnosed, optometrists can actively treat the disease and closely monitor progression on a regular basis. If a patient progresses to advanced AMD while being closely managed, the optometrist now has a much better opportunity to save both eyes with a timely referral to a retina specialist at the first signs of CNV.

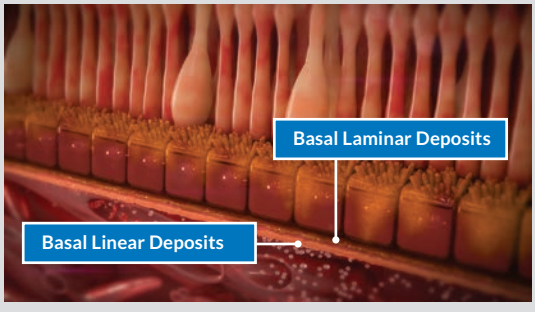
Practice Guideline #3: Based on practical challenges associated with access to care, optometrists must establish improved practice protocols to proactively identify early disease and monitor it on a regular basis to ensure that CNV is detected as soon as it occurs.

A Better Strategy

Imagine if you could refer CNV patients with BCVA of 20/20—in both eyes! The authors of this paper do it all the time and so can you. To achieve this goal, proper early detection, diagnosis, monitoring, and treatment must be practiced.



In subclinical AMD, the retina will not show visible signs of drusen.



However, invisible layers of cholesterol are forming along Bruch's Membrane, blocking transport of vital nutrients and impairing dark adaptation function.

Unfortunately, many doctors are too passive when diagnosing and treating nonexudative AMD.[1,2,8] This mindset has to change. It must be recognized that—beyond our training as diagnosticians—optometrists can and should recommend treatments that make a meaningful difference. Even in a complex disease like AMD, optometric care holds significant value because we can intervene on time by prescribing lifestyle changes, diet and exercise modification, systemic disease management, nutritional supplementation, retinal light protection, and more careful follow-up. (See "AMD Treatment Protocol," page 5). While these treatments will not cure AMD, they have each been shown to slow or even

halt the progression of the disease. Doing this will allow patients to enjoy additional years of high-quality central vision, enhancing the odds of a better quality of life.

Practice Guideline #4: It must be recognized that—beyond our training as diagnosticians—optometrists can and should recommend treatments that make a meaningful difference.

Summary

In January of 2019, 25 optometric key opinion leaders met at the industry's first AMD Speaker Alliance meeting. For two days, the group collaborated with the goal of reaching consensus on AMD standards of care in optometry. The guidelines published here are the result of this and several months of follow-up meetings and correspondence.

The authors recognize that changing practice patterns is not a small or simple task, yet it is our responsibility as primary care providers to always do what's best for our patients. We saw this change several decades ago with the adoption of visual field testing in glaucoma, and we are seeing it again now with dark adaptation testing for age-related macular degeneration.

This panel spent many months and countless hours learning from one another and working together to create a roadmap to a better, healthier future. We recognize the great opportunity for progress in terms of improving outcomes and are committed to doing everything possible to achieve our vision of eliminating blindness caused by AMD. We call upon all of our optometric colleagues to join us in providing our AMD patients with the best possible outcomes. ■

Practice Guideline #5: The treatment of AMD should be initiated at first detection, regardless of the stage.

Practice Guidelines

The authors of this paper have mutually agreed upon the following clinically appropriate practice guidelines:

1. The goal of managing AMD is to preserve vision—not to wait until vision has already been lost.
2. Dark adaptation testing can overcome the practical challenges associated with diagnosing AMD using only traditional subjective clinical assessment.
3. Optometrists must establish improved practice protocols to proactively identify early disease and monitor it on a regular basis to ensure that CNV is detected as soon as it occurs.
4. Optometrists can, and should, recommend treatments that make a meaningful difference.
5. The treatment of AMD should be initiated at first detection, regardless of the stage.

AMD Treatment Protocol

Based upon our current understanding of AMD pathogenesis, the stages of subclinical, early, and intermediate AMD all represent different clinical manifestations of the same underlying disease process. Thus, the treatment of AMD should be initiated at first detection, regardless of the stage.

The following treatment recommendations apply to patients with all stages of AMD:

Prescribe smoking cessation programs. Smoking is the largest modifiable risk factor for the progression of both CNV and GA[9] yet in one study, 90% of patients with AMD were not advised to stop smoking. Although most patients have been counseled on the ill effects of smoking,[10] most don't realize that it affects their eyes and potentially their vision.

Prescribe nutritional supplementation. Although there is extensive debate about which supplements are most appropriate, evidence strongly suggests prescribing them because, on average, treated patients have better outcomes than untreated patients.[11-13]

Discuss lifestyle modifications with respect to diet and exercise. Following a healthy diet, exercising regularly and maintaining overall health are sound goals for all patients.[13] These lifestyle choices may act synergistically to prevent or delay onset or progression of AMD. One study found that women who followed a healthy diet, engaged in physical exercise, and avoided smoking had substantially lower risk of early AMD compared with women who did not follow these healthy lifestyles.[14,15]

Systemic disease management. Several systemic conditions carry an increased risk of the development of AMD, based on epidemiological studies. Cardiovascular disease, diabetes, high cholesterol, and obesity have all been associated with increased risk of AMD and/or progression of AMD.[16-19] Body mass index and abdominal obesity are independent risk factors for progression to advanced AMD.[16]

Prescribe retinal light protection. Epidemiological evidence suggests that chronic sunlight exposure increases the risk of incident AMD and its progression.[20] Based on increased study in this area, you may also want to consider recommending HEVL-blocking eyeglass lenses.

Finally, for a patient with AMD, more frequent retinal examinations are recommended. Moving from a 12-month follow-up interval to a six-month (or even shorter in some cases) follow-up interval may be useful for monitoring disease progression.[6] More frequent visits provide the clinician increased opportunity to detect CNV before visual acuity loss.

Definitively Diagnose AMD
in the Absence of Evident Structural Damage

By Paul Karpecki, OD, FAAO

We live in a very different world today than we did a few short years ago. Because structural signs of AMD are notoriously challenging to detect and drusen exhibit behaviors that are virtually impossible to predict, most AMD patients developed substantial, irreversible vision loss before they were ever even treated.[1,2] Today, this need not be most patients' fate thanks to our recent access to affordable technology that removes the guesswork from this unpredictable disease.

Structure versus Function

Nothing can replace a comprehensive dilated exam. Likewise, fundus photography, OCT and other structural tests have a critical place in practice because they help us document and measure clinically detectable damage. However, a great deal of structural destruction takes place before we can see it with these tests; and too often the harm it's caused comes as an alarming surprise during a regularly scheduled annual exam. This is where functional testing excels.

Functional testing not only makes us aware of what we can't see—it objectively measures the effects of invisible damage by reliably measuring patients' ability to dark adapt. The AdaptDx (MacuLogix) is a functional testing device that has been shown in clinical trials to identify patients with the earliest stages of AMD—even when they have no other structural signs of AMD. It does this by revealing impaired dark adaptation function associated with early AMD, or even subclinical AMD, at least three years before it becomes clinically evident.[21]

Why Function Is Impaired So Soon

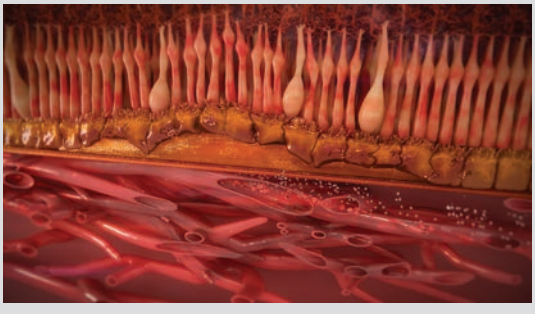
Because rod deterioration happens in the earliest stages of AMD, dark adaptation becomes affected much earlier than visual acuity declines.[21] That's because drusen (whether big or small) are not early stage markers for AMD. They are visible structural evidence of a pathological process that has been underway for quite some time.

Dark adaptation does not test the number or severity of drusen present, but rather is an indirect measure of the amount of impedance to RPE transport of vitamin A and nutrients by a cholesterol barrier that is present in true AMD.

In fact, cholesterol deposits exist beneath the surface long before they form drusen or you can see them using current structure-based methods of detection.[22]

Drusen are just the tip of an iceberg of cholesterol deposition that is locally produced by the RPE and deposited in Bruch's membrane. As disease progresses, the cholesterol layer continues to build, eventually thickening to a stage where the tell-tale drusen can be clinically visualized. Yet all along the way as this process unfolds, the cholesterol accumulation is causing inflammation, oxidative stress, and disruption of oxygen and nutrients to the outer retina.[23]

Of course none of this damage is visible to us using structural tests since drusen and subretinal drusenoid deposits become clinically visible at 30µm while changes in RPE cells are substantially smaller.[24] However, we



Drusen are just the visible tip of an iceberg of underlying cholesterol deposits that are locally produced by RPE cells along Bruch's membrane.

can detect damage using functional tools. Because this early cholesterol accumulation impairs normal transport of vitamin A across Bruch's membrane and creates a localized vitamin A deficiency, poor night vision results, which can now be easily measured in the office setting using automated dark adaptometry.

Until the commercialization of the AdaptDx, the best we could hope for was to identify small drusen. But even then, we didn't know whether they were harbingers of AMD. Now we do. Several peer-reviewed studies have shown that dark adaptation function is impaired from the earliest stages of AMD, with increasing impairment as the disease progresses.[25,26]

How Dark Adaptometry Works

Dark adaptometry measures how long it takes for the eye to adapt from bright light to darkness. Automated dark adaptation assessments with the AdaptDx proved to be highly sensitive (90.6%) and highly specific (90.5%) to the presence of AMD.[27]

The AdaptDx measures a patient's Rod Intercept (RI) time. RI is the number of minutes it takes for the eye to adapt from bright light to darkness at a standard threshold stimulus level. RI, as measured by the AdaptDx, provides a clear and objective measurement of retinal function. An RI of less than 6.5 minutes indicates normal dark adaptation consistent with healthy photoreceptor function. An RI greater than 6.5 minutes indicates impaired dark adaptation, most often due to AMD in patients over age 50, unless there is a pre-existing hereditary retinal degeneration or significant vitamin A deficiency, which is rare in the United States.

To be clear, impaired dark adaptation is not an indication of risk—it is a functional biomarker of true subclinical disease.[21] In fact, the updated preferred practice patterns of the American Academy of Ophthalmology[6] indicate that an initial history should consider difficulties in dark adaptation.

Before we had access to the AdaptDx, we had no idea whether or not a few small drusen were clinically significant. All we could do was wait and hope.

The AdaptDx automated dark adaptometer from MacuLogix is patient friendly and easy for technicians to administer.

Clinical Implications

Before we had access to the AdaptDx, we had no idea whether or not a few small drusen were clinically significant. All we could do was wait and hope. And if you consider how many patients developed irreversible vision loss prior to treatment,[1,2] one might conclude that we waited too long 78% of the time in the first eye.

Today, we don't have to wait—we can know for sure whether or not a patient has AMD based on the results of their dark adaptation test. Once AMD is diagnosed, we can take action to slow disease progression and closely monitor for early signs of CNV.

In short, the AdaptDx enables us to definitively diagnose AMD in its earliest stages through functional testing, which gives us a helpful heads-up and gives patients a meaningful head start on approaches to vision-loss prevention. ■

Should I test both eyes?

Since AMD is a bilateral disease and there is a 92% concordance of dark adaptation status between eyes, the AdaptDx can be used unilaterally in both the Rapid Test (for disease detection) and Extended Test (for disease staging and monitoring).

Supplementation in Patients with Subclinical-Stage and Early-Stage AMD

By Steven Ferrucci, OD, FAAO

Based on AREDS2 research,[28] most doctors advocate supplementation in patients who have intermediate-stage or worse AMD. However, controversy abounds with regard to the use of supplements in patients who have early or subclinical stage AMD. That's because, in patients with early disease, no definitive guidelines exist defining precisely which vitamins and nutrients doctors should recommend.

Despite this unfortunate lack of consensus, one thing is certain: Evidence strongly suggests that patients with AMD should be prescribed some form of nutritional supplement because, on average, treated patients have better outcomes than untreated patients.[11-13] In the pages that follow, we will explain why this is true and share a range of strategies, with insights into clinicians' varied decision-making processes regarding supplementation.

Subclinical AMD = AMD

The reason supplements are so important in patients with early AMD is because, at a cellular level, the only difference between subclinical and advanced disease is severity. From a pathophysiological standpoint AMD is AMD—regardless of stage or of how long the disease has progressed.

To clarify, drusen can be described as extracellular deposits of lipids and proteins under the RPE.[29] Specifically, the deposition of cholesterol in the RPE/Bruch's choriocapillaris complex is the forerunner to drusen.[29] What's more, the cholesterol in a druse acts in the same way as cholesterol found in carotid arteries of patients with atherosclerosis, as both involve lipoprotein retention.[29] From this perspective, it is clear why even early disease is cause for immediate action.

Histopathological studies have shown that the RPE cells deposit locally generated cholesterol beneath the RPE cell layer (basal laminar deposits) and in Bruch's membrane (basal linear deposits) before drusen are formed.[22,26] This cholesterol accumulation impairs normal transport of vital nutrients, including vitamin A, across Bruch's membrane and causes oxidative stress, inflammation, and a localized vitamin A deficiency.[29] Although these deposits may not become visible drusen for several years after their formation, this is where they begin.[29] In other words, when cholesterol becomes sufficiently deposited, damage is well underway.[29] Why would we wait to manage these patients until the cholesterol builds to such a point that it becomes a visible druse and no longer a subclinical disease?

In subclinical disease, a condition has no (or only minimally recognizable) clinical findings and may remain latent or not progress until some future time.[30] However, subclinical disease status does not imply lack of disease—it simply means the disease may not yet be structurally apparent. Fortunately, in AMD, subclinical disease is detectable using functional tests.[21,22] This allows us to definitively diagnose the disease at the subclinical stage, which allows us to confidently initiate treatment with supplements.

In short, based on everything we know about AMD pathogenesis, the stages of subclinical, early, and intermediate AMD all represent different clinical manifestations of the same underlying disease process. Thus, supplements should be prescribed as soon as the AMD diagnosis is confirmed.

AREDS2 Is Not Applicable

Contrary to what you may have heard, the AREDS2 authors never stated that supplements are useless in patients with early disease because that was outside the scope of the study and could not possibly be extrapolated from the data based on the study's inclusion criteria. Patients with early disease were not included in AREDS2 to begin with. To directly quote the paper, "Enrollment

was restricted to people between the ages of 50 and 85 years at high risk of progression to advanced AMD with either bilateral large drusen or large drusen in one eye and advanced AMD in the fellow eye."[28] That means both eyes had to be at the intermediate stage, or one eye at the intermediate stage and one eye at the advanced stage.

Conversely, the AREDS1 research did investigate early disease and found no statistically significant benefit to supplementation with the original formula.[31] But, as you know, the AREDS1 formula, containing beta-carotene and devoid of lutein and zeaxanthin, is no longer recommended. Since publication in 2001, and following the many years of research that went into AREDS2, we have discovered so much more about AMD pathogenesis and about the role of carotenoids and antioxidants.

The last two decades have taught us that, clinically speaking, the only difference between early and intermediate AMD is the size of the drusen—the underlying biology of the two stages are identical. This leaves us with an important choice about what to do for our patients who present with early disease. Do we wait to prescribe supplements until the patient's AMD progresses to a worse disease state simply because AREDS1 supplements were not found to be of significant benefit? Or do we consider the risk-benefit ratio and prescribe a supplement that we know is inexpensive and safe at an earlier stage? Although practitioners favor certain formulas and brands, at the early stage, a carotenoid-based supplement seems to be an obvious choice.

We're No Longer in the Dark

We must rethink our clinical practice protocols. Consider how much better second eye outcomes are compared to first eye outcomes.[8] This is not a happy accident. When we know a patient has AMD, we proceed differently and we take steps to prevent disease progression in the fellow eye—a strategy that appears to work based on these second eye outcomes.[8]

The Practical Guidelines for the Treatment of AMD identify three primary options for appropriate nutritional supplementation.[32] The first option is to prescribe a macular pigment supplement (the carotenoids: lutein, zeaxanthin, meso-zeaxanthin). The second option is to prescribe a supplement containing both carotenoids and antioxidants, including zinc and vitamins C and E (e.g., an AREDS2 supplement). The third option is to prescribe a carotenoid supplement to patients with subclinical and early AMD, and a carotenoid-antioxidant combination supplement to patients with intermediate AMD or patients that progress to intermediate AMD.

It is beyond the scope of this report to dictate which of these is best for your patients. However, as stated at the beginning of this paper, one fact is clear: Patients should be prescribed some form of nutritional supplement because, on average, treated patients have better outcomes than untreated patients.[11-13]

Doing more for our AMD patients begins with early detection, but it doesn't end there. For the first time in history, we have a tool that can objectively identify early and subclinical disease, but it's up to us to use that information to safeguard our patients' vision as they proceed through the many remaining years of their lives. Supplements can help us do that. ■

Key Takeaways

- Evidence strongly suggests that patients with AMD should be prescribed some form of nutritional supplement because, on average, treated patients have better outcomes than untreated patients.[11-13]
- At a cellular level, the only difference between subclinical and advanced disease is severity.
- Subclinical disease status does not imply lack of disease—it simply means the disease may not yet be structurally apparent.
- AREDS2 authors did not state that supplements are useless in patients with early disease because that was outside the scope of the study and could not possibly be extrapolated from the data based on the study's inclusion criteria.
- Although practitioners favor certain formulas and brands, at the early stage, a carotenoid-based supplement seems to be an obvious choice.

How to Support Your AMD Patient


By Damon Dierker, OD, FAAO and Laurie Sorrenson, OD, FAAO

We are tremendously fortunate to be able to help our patients preserve vision and potentially avoid the harsh realities that can come with AMD. Using the AdaptDx in conjunction with clinical examination and structural imaging enables us to detect disease in its earliest stages and monitor it more carefully. But, no matter how advanced technology becomes, the doctor's patient management skills are key drivers of successful outcomes and happy patients. In AMD care especially, proper support must be provided at every touch-point.

Here's how to help patients benefit most from the information dark adaptation testing provides.

Inform

When you start using the AdaptDx, one of the biggest adjustments is the increased need to deliver life-changing diagnoses. To be successful, you'll need to keep your appreciation for the value of earlier AMD diagnosis top-of-mind so you can translate it into a dialogue that patients can likewise appreciate.

Perhaps, in the past, you may have refrained from discussing the presence of small drusen, but impaired dark adaptation cannot be minimized and brushed aside. Patients need to know when functional testing confirms AMD. They also desire information. Our challenge lies in sharing without scaring. The key to nailing this is to walk in prepared. Don't just wing it. Have an organized message and plan before you enter the room. Some doctors find it helpful to use a prepared worksheet and circle items as they discuss them.

If space allows, sit alongside your patient (not across), and deliver the information clearly. Be very matter-of-fact when delivering the details of the testing and diagnosis and use language that the patient can understand. In other words, avoid medical or scientific jargon. You don't need to explain all of the science behind dark adaptation and AMD, nor should you get in the weeds about how or why AMD progresses. Instead, explain that the AdaptDx reveals the very first signs and can help you recognize or delay the development of additional signs of disease down the road.

Beyond the information, your delivery can make a significant difference in a patient's perception and response, so consider your tone. You shouldn't sound like you're delivering bad news. Be serious yet upbeat and focus on the benefits of the early diagnosis and your power to monitor the patient more closely. As unnatural as this may feel, it's helpful to recognize that conversation is the best part of the exam from the patient's perspective. Use this to your benefit and make good use of the time.

Empathize

As doctors, we know that detecting AMD as early as possible is beneficial, but despite our best efforts to communicate this, some patients may be worried. Don't dismiss this or make the patient believe that you think his response is ridiculous or unwarranted.

It's very possible that a patient will feel sad, scared or discouraged. Everyone is entitled to personal feelings. Respect every reaction and offer validation and encouragement so you can help direct emotions in a positive direction. You can be upbeat while simultaneously demonstrating sympathy and respect.

Although there is a time for talking, in some cases it's wiser to just listen. Be patient and empathetic, but do not apologize. An apology implies that there's a reason to feel sad. There's not. An early AMD diagnosis puts you and the patient in the position of power.

Most importantly, never let a patient leave your office with a sense of hopelessness. Instead, the patient should leave your office feeling confident that you provided a proactive treatment plan that will help safeguard long-term vision.

Empower

As with most medical diagnoses, patients with AMD will either feel depressed, indifferent or empowered. The first two responses are equally detrimental in this situation, so we need to help lead patients to action by offering them

choices. Gone are the days of paternalistic healthcare, where patients were passive spectators in their own healing processes.[33,34] In today's healthcare environment, the patient is the key player.[33,34]

This is great news when treating diseases like AMD that require patients to take personal responsibility in order to avoid serious consequences, such as vision loss. Patient compliance is always a challenge, and with potentially blinding diseases like AMD, the stakes are especially high.

Patients want partnerships. On the plus side, research shows that increasing patient participation in care improves patient safety.[33] So present your recommendation and ask for feedback. Discuss the options together and settle on a treatment plan that is realistic for the patient's budget and lifestyle.

The goal is to make sure patients feel good about the road ahead by the time they leave your office. This may take a bit of time on that first visit, but it will be well spent. To avoid phone calls and patients feeling that they should have mentioned a thousand other things during the visit, encourage questions while the patient is still in your chair.

Ensure

Failing to act on a subclinical AMD diagnosis is, at best, a missed opportunity to preserve vision. For patients with more advanced disease, the consequences could be far worse. Indeed, no matter how advanced diagnostic technology becomes, it's only beneficial if we use it to improve the prognosis. In our AMD patients, this begins with development of a treatment plan.

It's much easier for patients to accept a diagnosis if you have a clear plan for how to address it. Likewise, an action-oriented plan helps overshadow the gravity of AMD and put patients in control of their own destiny, by showing up for follow-up appointments, taking their supplements, minimizing UV exposure and living a healthier lifestyle.

Make sure the patient understands everything you've said before they head home. Don't simply ask if they understand and accept "yes" as an answer. If a patient seems even a little confused, ask them to describe what they think they heard in their own words so you can clear up any areas of misunderstanding.

To make your message stick, provide take-home information including handouts, pamphlets, and reliable website addresses that provide accurate, straightforward information.

No one wants to be told that they have AMD, but we can affect how patients perceive the diagnosis and how they act on it. We can arm them with the power to take charge of their disease—in many cases before it has a chance to diminish quality of life.

One of the most rewarding aspects of optometric care is our opportunity to support our patients in meaningful ways. AMD management is an extremely powerful way to do exactly that. Active management and effective communication can set you apart as a practitioner and have a major impact on your patients' lives. ■

What Patients Want Most

According to a recent paper in the *MIT Technology Review*, more people took genetic ancestry tests in 2017 than in all previous years combined.[35] In fact, one in 25 American adults now have access to personal genetic data.[35] This is just one of many indicators that what patients want most is detailed information about their health so they can feel more in control of maintaining their wellbeing for as long as possible.

This represents a significant cultural shift in the doctor-patient dynamic. No matter how desperately some doctors may cling to outdated models of care, we cannot continue to wait for AMD to progress beyond the earliest stages before sharing the news with patients. Times have changed and we need to change with them in order to meet the needs of today's well-informed patients.

Successful modern doctors embrace the new partnership model of medicine and celebrate the many ways in which technology has enabled us to empower patients by giving them agency in their own welfare. Our ability to inform patients about AMD at the subclinical stage satisfies this need while simultaneously improving care.

Lessons from AdaptDx Veterans and Early Adopters

The AdaptDx was introduced as the first automated dark adaptometer for clinical use in 2014. Since then, hundreds of eye care practices and thousands of eye care professionals have embraced the technology. As a result, the AdaptDx has become a vital tool in helping these doctors diagnose AMD in its earliest stages and manage disease progression to improve outcomes for their patients. These AdaptDx users share some of the lessons they've learned along the way.

Get Staff Buy-in

By Timothy Earley, OD

It cannot be overstated how important it is to have a knowledgeable and supportive eye care team when implementing new technology in an optometric practice. At Medina Vision Centre, successful implementation has always been most efficient and expedient when we involve our highly trained staff. We brought dark adaptation technology into our practice over a year ago. From the first day of team training, we found that appointing one of our experienced technicians as our AdaptDx coordinator to be a very effective approach.

For several years, Medina Vision Centre has had an AMD Center of Excellence. The director of this specialized clinic acts as a liaison between our optometrists, our AMD patients and the vendors with whom we work. Our AMD Center director is responsible for scheduling and performing all diagnostic testing and reviewing treatment protocols. She schedules follow-up testing and manages our patient database and our supplement inventory. Finally, our director provides our patients with the educational information they require in order to make informed decisions about their AMD care. Having our AMD Center director assume the role of AdaptDx coordinator was a logical fit. We have found that having this practice leader in place has been tremendously valuable as we have introduced dark adaptation to our patients.

As important as an engaged staff is to the success of implementation, it is also of equal importance to have all of our optometrists on board. Dark adaptation testing is a doctor- and staff-driven process. Becoming comfortable with the verbiage needed to introduce the test and explain the results, while delivering a consistent message, is vital to optimizing usage of this incredible technology. MacuLogix has a highly skilled support team that assisted our doctors and staff with customizing our protocols to fit the normal flow of our practice. We could not be happier with our AdaptDx or with the support and confidence we received from the team at MacuLogix. ■

What is the difference between AdaptDx and the MPOD?

MPOD (macular pigment optical density) devices measure a risk factor for AMD, not a physiological indicator of the disease. The AdaptDx dark adaptometer measures a biomarker of the disease with 90% specificity and sensitivity. Impaired dark adaptation results from an AdaptDx test signal that AMD is already present. Research has shown that there is no correlation between low MPOD levels and impaired dark adaptation.

Unlike MPOD devices, AdaptDx testing is reimbursable under CPT code 92284 at a national average of $62.71 in 2019.

Test Premium IOL Candidates

By Pamela A. Lowe, OD, FAAO, Dipl. ABO

Structural signs of macular degeneration can be difficult to view or detect through a cloudy crystalline lens, but early disease identification is imperative, especially in patients who are considering a presbyopia-correcting IOL. Loss of contrast sensitivity is present even in mild forms of AMD, making implantation of a multifocal IOL a relative contraindication[36]—or at least a reason to proceed with extreme caution. Since both macular degeneration and multifocal IOLs reduce patients' contrast sensitivity, one would face a compounded reduction in contrast sensitivity and perhaps decreased visual outcomes.[37] And this happens more often than you might suppose.

In a study presented at the XXXIV Congress of the European Society of Cataract and Refractive Surgeons,[38] researchers asserted that screening is needed. Their retrospective chart review identified that 27 patients had both a normal fundus exam and normal corneal topography, making them candidates for multifocal IOLs. Of these 27 eyes, 17 (63%) had normal dark adaptation and 10 (37%) had abnormal dark adaptation. In other words, if all 27 of these patients opted to undergo cataract surgery with a multifocal IOL, more than one-third of them would likely experience problems that could not have been anticipated if dark adaptation had not been measured preoperatively.

As optometrists co-managing cataract procedures, we manage our patients well before cataracts require surgery and we will hopefully manage them well after IOL placement. As a trusted eye care provider, it is our obligation to use all tools possible to ensure the best visual outcomes. ■

Is the AdaptDx testing reimbursable?

Yes. The CPT code for dark adaptation testing is CPT 92284 and reimburses at a national average of $62.71. There are also numerous applicable ICD-10 codes, including H53.62 for acquired night blindness.

Save Both Eyes with Proactive Disease Management

By Amanda S. Legge, OD

Our practice, led by Dr. Glenn Corbin, had the first commercial AdaptDx in the country. From the start, we've exceeded our utilization goal and have been able to more than cover the monthly payment of the instrument, but over time, our usage has changed in ways we never expected. We initially thought of the device as a way to confirm our diagnoses of AMD for patients with small drusen. While we continue to run the AdaptDx every day, multiple times a day to uncover and confirm cases of AMD, the real value we've discovered is in the long-term monitoring of our AMD patients.

Once we've diagnosed an AMD patient—from subclinical to intermediate stages—we get them started on a treatment plan to slow disease progression. More importantly, we start monitoring their disease more frequently. For subclinical and early AMD, we like to see those patients every six months for functional DA testing, medical exam and imaging. If their Rod Intercept (RI) time jumps by more than 3 minutes or we notice major structural changes, we will start seeing them more frequently.

In fact, I have three patients who I was monitoring every two to three months due to continued worsening RI time on AdaptDx. Each of these patients eventually converted to wet AMD. But I caught it—each time—at routine follow-ups when the patient still had 20/20 or 20/25 vision, no subjective vision complaints, and no changes to their Amsler Grid screenings at home. All three received anti-VEGF injections and all remain better than 20/30 today. One patient is still 20/20!

How to Implement AdaptDx Testing in Your Practice

By Jeffry Gerson, OD, FAAO

When I first starting using the AdaptDx four years ago, I was not expecting to diagnose AMD as frequently as I do today. Soon after acquiring the device, I quickly diagnosed AMD in several patients who I would not have worried about before implementing this test. As such, I decided to look at a series of 100 consecutive patients over age 60 with no clinical findings of AMD based on dilated fundus exam and OCT.

For this study, rod-mediated dark adaptation (DA) was assessed in one eye after a photobleach using the AdaptDx. DA speed was characterized by the Rod Intercept (RI) time, with abnormal DA defined as RI ≥6.5 minutes. Demographic characteristics, best-corrected visual acuity, and OCT were also assessed.

At the end of the study, 61 participants had normal DA and 39 participants had impaired DA (consistent with AMD). In other words, almost 40% of my seemingly healthy patients over age 60 had AMD.

As this study reveals, the prevalence of subclinical AMD in a typical private practice setting like mine is likely much higher than most of us assume. Earlier community-based studies revealed abnormal DA in 24% of subjects,[21] whereas 39% were found to have abnormal DA in this sample.

Two Models

In talking to other members of the AMD Speakers Alliance as well as the practice management gurus from MacuLogix, it's become clear that there are basically two implementation models that seem to work best for detecting AMD using the AdaptDx:

1. **A wellness model** in which you screen all patients over a certain age, such as age 50.
2. **A medical model** in which you focus on testing symptomatic patients who present with a night vision complaint or drusen.

Based on the surprising results from my study, I've adopted a wellness screening model to ensure I cast the widest net and find disease even without structural indications. My staff knows that I have a standing order for an AdaptDx Rapid Test on any patient age 60 or older, but many of my colleagues have a standing order for any patient age 50 and older. We offer the initial test at no charge but could easily charge a cash-pay.

By the time I see the patient for their clinical exam, I have their Rod Intercept on file. If it is less than 6.5, I will continue to test them annually for any change. If it is 6.5 or higher, I begin educating the patient about the test and what it means. Then, I schedule them back for a medical office visit in a few weeks to perform an Extended Test to baseline and stage the disease.

My colleagues who follow the medical model focus on testing symptomatic patients on the same day as their exam or they bring them back for a special testing day. These doctors prioritize dark adaptation testing for patients with drusen and/or night vision complaints. This medical necessity also allows them to submit for reimbursement starting with the first test.

Given the rising prevalence of AMD, it is incumbent upon optometrists to test at-risk and symptomatic patients for disease and to take the necessary courses of action to slow disease progression.

Know When to Refer

More frequent visits and auxiliary assessments benefit patients with AMD by increasing the likelihood of detecting CNV before visual acuity loss occurs. At first sign of CNV, we can promptly refer our patients to a retina specialist and save vital lines of vision.

Caring for AMD patients is very different today than it was five years ago. Whether you follow a wellness model or a medical model, one thing is certain if you adhere to it: You will find a lot more AMD than you do now. ■

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