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CME Activity

From Trials to Treatment: A Roundtable Discussion in Medical Retina

Part 2 of 3

Charles C. Wykoff, MD, PhD, Moderator | David S. Boyer, MD | Rahul N. Khurana, MD | Lisa C. Olmos de Koo, MD, MBA | Jonathan L. Prenner, MD | Nathan C. Steinle, MD

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From Trials to Treatment: A Roundtable Discussion in Medical Retina

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FACULTY

Charles C. Wykoff, MD, PhD – moderator
Retina Consultants of Houston,
Blanton Eye Institute, Houston Methodist Hospital
Houston, Texas

David S. Boyer, MD
Retina-Vitreous Associates Medical Group
Los Angeles, California

Rahul N. Khurana, MD
Northern California Retina-Vitreous Associates
Mountain View, California

Lisa C. Olmos de Koo, MD, MBA
University of Washington Eye Institute
Seattle, Washington

Jonathan L. Prenner, MD
New Jersey Retina
New Brunswick, New Jersey

Nathan C. Steinle, MD
California Retina Consultants
Santa Barbara, California

CONTENT SOURCE

This continuing medical education (CME) activity captures content from a roundtable discussion held in August 2017.

ACTIVITY DESCRIPTION

Retina specialists will continue to see an increasing number of patients in the future, as both society ages and as more people develop sight-threatening retina diseases. The need to be fully educated on the various treatment options remains crucial to delivering the best patient care. This need should be expanded beyond exposure to multiple clinical trial data and into real-world outcomes. In order for retina physicians to continue to deliver superior patient care, they will need to increase their awareness about the more sophisticated imaging devices being used in clinics to confirm retina disease diagnoses, along with newer surgical devices. Retina physicians will also need to increase their interest in developing pharmacologic treatments with longer duration of action or novel mechanisms of action. With the ongoing interest in treatments for retina disorders, it is imperative retina specialists remain educated on the latest developments.

TARGET AUDIENCE

This certified CME activity is designed for retina specialists and general ophthalmologists involved in the management of patients with retinal disorders.

LEARNING OBJECTIVES

Upon completion of this activity, the participant should be able to:

- Recognize the importance of early diagnosis and treatment of age-related macular degeneration (AMD) and diabetic macular edema (DME).
- Assess the response of anti-vascular endothelial growth factor (VEGF) intravitreal injections and define "suboptimal responders."
- Understand the most recent monotherapy and combination therapy clinical study evidence using available therapies for AMD, DME, and retinal vein occlusion (RVO).
- Discuss the outcomes of pivotal studies in AMD, DME, and RVO and how study results may differ from real-world dosing methods.
- Develop individualized treatment plans for patients with retina disorders that use a combination of imaging, treat and extend, or treat and observe.
- Discuss the ocular and systemic effects of anti-VEGF therapies and how to educate patients on appropriate expectations.

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From Trials to Treatment: A Roundtable Discussion in Medical Retina

PART 2 OF 3

Keeping patients engaged in their treatment regimens is beneficial for both the patient and the clinician. Some patients may want to be more involved in their treatments and ask about relevant clinical trials (including whether or not they can participate), while others just want to get in and get out. For clinicians, our challenges include not only managing patient health and expectations, but also maximizing patient flow through busy medical retina clinics. Evolve Medical Education LLC convened a panel of retina specialists to discuss their tips and tricks for optimizing patient care, including how they incorporate trial data into clinical practice, and to debate management of specific cases. — Charles C. Wykoff, MD, PhD, moderator

Charles C. Wykoff, MD, PhD: How do you communicate the chronic nature of wet age-related macular degeneration (AMD) management to a new patient?

David S. Boyer, MD: It is very important for the patient to understand that this is an ongoing disease. I try to explain that there will be a series of injections, not just a single injection. I liken this to hypertension, where some patients may get a wonderful response in the beginning, but once they stop taking their medication, their blood pressure will rise. In AMD, if a patient stops the injections, the neovascularization exudation will come back. We are not curing AMD; we are trying to reduce any visual loss. Most of the time, the new patient is already somewhat symptomatic. I try to explain the natural history of the disease is to lose more vision without any treatment.

Nathan C. Steinle, MD: When I counsel patients, I like to show them their fluorescein angiography (FA) and optical coherence tomography (OCT). Most new patients probably have not thought about their eyesight in decades — their eyes have just 'worked' until suddenly they stopped. It is because their eyes 'stopped working' that they are motivated to visit our clinics. They do not yet understand the nuances and pathophysiology of the disease. Thus, I have found showing both the FA and OCT helps strengthen the buy-in process. We need to motivate these patients to continually return for clinic visits.

Lisa C. Olmos de Koo, MD, MBA: I find that patients can get frustrated and overwhelmed when they are faced with a lifetime of regular intravitreal injections. I try to concentrate first on the partnership that we are going to develop to manage this disease together. We will tailor the treatment regimen to their individual response, their needs, and their lifestyle. This may involve monthly injections, treat and extend, and/or PRN therapy as needed. These patients have different living situations, different transportation abilities, so I try to emphasize that we will work together to come up with an effective yet manageable solution to allow them to get the appropriate treatment.

Jonathan L. Prenner, MD: One thing I have learned is to never mention the concept of three injections to my patients. Patients focus on that number and stop listening afterwards. They are often surprised and disappointed when, after the third injection, you want to continue therapy.

Early in my career, I wanted to perform Grand Rounds about anti-vascular endothelial growth factor (VEGF) therapy for each patient. I still have some patients who prefer that kind of detailed information. But for others, I feel like I may scare them by overloading them with details. I now attempt to personalize my approach and try to introduce more details about AMD over time.

Dr. Boyer: We all have different treatment paradigms. You have to explain your paradigm to the patient so they are clear about what they are going to receive. Some retina specialists use PRN, others treat monthly. I use treat and extend. It is important for patients to understand what treat and extend means and how I am going to implement it. It is very rewarding for patients when they start coming in and are doing really well; they often start asking if they can extend another week or another 2 weeks. It is at that point when I think they buy into the treatment. If they are not cooperative and do not commit to a treatment plan, we will lose the visual gains we initially saw.

TAKE-HOME MATERIALS FOR PATIENTS

Dr. Wykoff: Do you give patients hand-outs? Do you print their OCT for them? What do you do to help them remember what you say?

Rahul N. Khurana, MD: I wish we gave out more things. The one thing that I emphasize is being very positive as they go forward.

This is a chronic disease, and after the first treatments, patients are very happy, but they get a little fatigued after a while. We need to continually emphasize that we are maintaining their vision as best we can and that the patient is having a great response. This helps ensure compliance.

I also emphasize the unpredictability of the disease and stress the importance of regular treatments and follow-up during this time. I try to get those three concepts — chronicity, individualized disease, and unpredictability — across during that first visit. For a patient that has been treated for 2 years, I emphasize the importance of regular treatments and maintaining the early visual acuity gains.

Dr. Prenner: I try to remind myself also to be cognizant of the fact that, for the patient, this is brand new. This is their first experience, and many are worried they will become blind. I try to remind myself to reinforce to patients that they will not go blind; without treatment they will lose central vision, but they will not lose all vision.[1] This tends to lower anxiety levels dramatically. It can be embarrassing when patients ask about their potential of going blind after their sixth injection, and you realize the patient has been stressing about this unlikely scenario for months.

Dr. Wykoff: That is a great point. We need to define blindness for our patients. The lay community believes that blindness means eyes closed, darkness. Even in the context of severe AMD when central vision is largely lost, that does not mean patients have no functional vision.[2,3]

Dr. Olmos: Upon initial diagnosis, I try to provide enduring materials about AMD from the American Academy of Ophthalmology or American Society of Retina Specialists. I offer it to them repeatedly. Now with improvements in electronic medical records (EMR), we can also give them a summary at the end of their visit.

Dr. Boyer: AMD has become so prevalent that most of my patients have friends receiving injections. They know a lot more about the disease than when the anti-VEGFs were first introduced, and part of that has reduced the stigma associated with these injections, including the fear of pain. We really need to emphasize that this is not a painful procedure, even though they believe it is.

Dr. Steinle: One of my practice tips is to always have the baseline photos up for every single patient when they walk in the room. If the patient had severe edema, a large pigment epithelial detachment (PED), or hemorrhage, that baseline image gives them something to refer to and realize they have improved. It becomes a motivating factor. The patient with ischemic central retinal vein occlusion? Same thing. They can see all the hemorrhages and the dilated tortuous vessels at baseline. It keeps patients motivated to continue going forward even though their visual improvements may be less robust.

PATIENT DISCUSSIONS ABOUT SAFETY

Dr. Wykoff: Do you have a safety discussion with patients before you start intravitreal injections?

Dr. Olmos: I definitely talk about endophthalmitis. I let patients know it is rare, but that it does happen. Even with the best precautions in place, we need to be prepared that endophthalmitis may happen. Patients need to know the symptoms and who to call; I do remind them on each visit to call the office if they have pain after an injection.

Dr. Prenner: I tell them the risk is 1 in 2,000-3,000 that they will develop an infection from the injection, but for those that do develop an infection, marked vision loss is a definite possibility.[4-8]

Dr. Prenner: Endophthalmitis does occur,[4-8] and it unfortunately happens to all of us as clinicians. We have to prepare our patients. They cannot hear about endophthalmitis for the first time when they are presenting with an infection.

Dr. Wykoff: Do you discuss systemic safety as well?

Dr. Prenner: Patients may hear about the systemic risks or see the package insert or promotional material so the topic comes up. I do note that, as far as we can tell, there is no increased risk of systemic events compared to other people who are the same age who are not receiving intravitreal anti-VEGF injections.

Dr. Boyer: I do something similar. The most important thing you can tell patients is to recognize the signs and symptoms. Patients may not have pain, or they may not get a lot of the typical symptoms. If they start to see a lot of floaters, even if they believe their vision is good, I tell them to call the office. I explain there is a small but definite risk of endophthalmitis, and that we are trying to protect the patient from that. I used to have an extensive safety talk with patients about the systemic safety, but now I ask if they have had a stroke or myocardial infarction recently.

Dr. Wykoff: Does that change how you manage the patient?

Dr. Boyer: No. If they have, then I go into a safety discussion and explain that some studies have shown an increase in the risk of stroke.[9-18] When we look at the patients who have had a stroke previously, those are the ones who are at the greatest risk of developing stroke. Based on what we know today, there does not seem to be a real signal, but I do express it to patients as they are likely going to hear it from someone else, and that concerns me. I would rather it be me that initiates the discussion. If the patients have not had a stroke or heart attack, I probably do not discuss it at all.

Dr. Prenner: Does anybody change their treatment algorithm based on the fact that somebody had a recent stroke?

Dr. Steinle: I do if it is an at-risk individual with a recent stroke or myocardial infarction. There is a lot of good data that shows that ranibizumab has less systemic absorption, and it is cleared much quicker from the blood stream.[14,19,20] I might lean more towards ranibizumab in at-risk individuals.

Dr. Prenner: Does that reduce the number of doses before initiating a treat and extend or PRN approach?

Dr. Boyer: I will do PRN if they had a stroke a month earlier, but in patients with diabetic macular edema (DME), there are other choices. We can use steroids. We do not have many other choices in AMD. But if you look at Protocol T, there is a suggestion that our 'safe' drug is not as safe.[21,22] But, these are all small numbers.

Dr. Khurana: I do not bring up the topic unless the patient has had a history of previous stroke. Even those patients with a previous stroke, I still recommend treatment. We know that people that had a previous stroke are at a higher risk of having a stroke, regardless of our treatment decision. I also do not change the regimen if they have had a previous stroke. The CATT and IVAN clinical trials showed more adverse events (death and serious adverse events) were in the PRN regimens instead of the monthly arms, which seems counterintuitive when we think of conventional dose-response frameworks.[9,23] More work is needed.

Dr. Prenner: Some experts have talked about moving these patients quickly into a treat and extend paradigm. Perhaps avoiding the loading regimen typically employed or using 0.3 mg ranibizumab as a way of mitigating risk. For now, that is an intellectual exercise without tremendous proof.

Dr. Khurana: If you believe anti-VEGF therapy puts patients at a higher risk of stroke, then you should do everything we have just discussed. But if you do not think anti-VEGF therapy puts patients at a higher risk of stroke — and I do not — then patients who have had a stroke are at risk of having another stroke regardless of treatment. I do what I think is ideal for the eye.

Dr. Boyer: In patients with previous events, I bring up natural history data. The Medicare-aged population has a 1 in 20 risk over the next year of developing heart attack or stroke.[16,24,25] I make sure patients understand that, then I tell them if they have a stroke, it is impossible for me to tell if it is related to the drug or not based on the evidence.

IMAGING IN AMD

Dr. Wykoff: Let us move onto imaging. Who uses dye-based angiography?

Dr. Olmos: I certainly do use dye-based FA, but not in every single case. If I have a new case of wet AMD, and I see intraretinal and/or subretinal fluid, and I have no question about the diagnosis, I do not perform a baseline FA. If there is a question of subtle findings or a gray area, I will use FA.

Dr. Khurana: The old saying from medical school is we should only order a test if it will change your management strategy. If we know we are going to treat the patient, there is no need for FA.

That being said, I do get it on every single patient, because there is a lot of important value that comes out of it. It gives you a good baseline, it helps ensure we have the right diagnosis. This patient will have a lifetime of treatment, and we need to ensure it is AMD.

Obviously, there are some masquerade syndromes, so from a prognostic value I believe in FA. If it is an occult choroidal neovascularization (CNV), the data has shown these patients need more treatment,[26,27] and often these patients will have OCT that look dry, but there is still leakage on FA.

For me, FA will make me watch these patients a little bit closer and makes me more cautious before extending them. So it does affect my management paradigm. I also like to have a baseline to see the size of the CNV lesion. We often keep their baseline images.

Dr. Wykoff: If you have a baseline angiogram, when do you repeat the angiography? And how are you incorporating OCT angiography (OCTA) into your practice?

Dr. Steinle: Maybe yearly, at most, for wet AMD. Regarding FA in general, I have migrated away from it and now rely heavily on OCT and OCTA findings instead.

Dr. Prenner: Previously, I would employ FA prior to changing a drug or dosing interval. I would re-image people when I could as we have all seen cases where there is lesion size growth in the face of absent leakage on OCT. In that scenario, we are not doing these patients any favors by extending the dosing interval. In these scenarios, I now use OCTA in place of FA as it is non-invasive. I find OCTA helpful in monitoring for lesion growth and responsiveness; I show patients their CNV to continue their treatments.

For new patients, I remind myself that there is a differential diagnosis for neovascular AMD and perform extensive testing, including OCT, FA, and OCTA. I also still classify CNV lesions by type (1, 2, or 3). It helps me keep my antennas up for other potential issues down the road and helps to personalize my approach to each patient.

Dr. Boyer: I use OCTA in the beginning to document the size of the lesion. On that rare instance where patients go out 3.5 months or longer without leaking, and I am thinking of stopping the injections, I use OCTA again to see what the lesion looks like. There are times that you look back and do not see blood vessels. You still need to watch these patients carefully.

We all know that you can treat a patient and the next day, the patient can bleed. But if I stop treatment, and the patient later has a massive hemorrhage, I feel very guilty. I also find myself using repeat FA more on my diabetic patients to see if the patient requires additional treatment.

Dr. Prenner: I get an OCTA on my AMD patients at every visit. OCTA takes the technicians a few seconds to acquire and is not billed to the patient. I may not review it at all visits, but I have it available and have the data available subsequently. OCTA is a bit of an acquired taste. I find the more I use it, the more valuable it is.

Dr. Steinle: I still think OCTA is a luxury at this point, but I think in the near future it might become a necessity. Like Dr. Prenner, I

obtain an OCTA on every single patient right now. It takes 6 seconds in our protocol to obtain the image. What I am looking forward to is the next wave of segmentation software. Right now, it may only take 6 seconds to acquire the OCTA image, but it takes me a long time to flip through all those images as the current segmentation software is not very precise. Also, with the current OCTA machines, there are a lot of projection artifacts in those images. I can talk myself into believing (or not believing) that there is choroidal neovascular membrane (CNVM) present. Thus, I hope the next wave of segmentation software will be able to more rapidly and clearly delineate the presence or absence of CNVM.

Dr. Prenner: There are not a lot of false positives on OCTA. There are, however, some false negative findings.

Dr. Boyer: I disagree. If there is an area of geographic atrophy, you can see the choroidal vessels, which can be misinterpreted as neovascularization, and that can create a false positive. You need that baseline, en face image to know what you are really seeing.

Dr. Prenner: Agreed, but that is not a false positive generated by the OCTA — just a misintrerpretation of the image by the reviewer. You definitely can see the deep choroidal vessels, but you should recognize the pattern difference between choroidal vessels and CNV.

Dr. Steinle: Another tip to share is that I like to use OCTA as a tie-breaker, especially in cases where FA shows central hyperfluorescence without a clearly defined neovascular lesion. If you have a patient with adult vitelliform or a PED or severe basal laminar drusen, OCTA is useful to be able to determine if CNVM is hiding underneath.

IMAGING FOR DME

Dr. Wykoff: Let us move onto imaging for diabetic retinopathy (DR) and DME. What do you recommend for baseline images?

Dr. Olmos: I really depend on widefield FA,[28,29] because the amount of ischemia is very predictive of what might happen even if patients do not have neovascularization at the time. I rely heavily on that. For instance, if I see a wide swath of peripheral non-perfusion, I watch that patient a lot more closely. It is only a matter of time before they develop neovascularization. So, I keep a tighter leash.

Dr. Wykoff: Does everyone use widefield angiography?

Dr. Prenner: Outfitting OCTA in 14 offices is much less expensive than outfitting four offices with widefield imaging. We utilize widefield imaging, and we can create a montage.

Dr. Khurana: Unfortunately, we only have the a device in one of our six offices; it is a really nice luxury to have. We can capture impressive peripheral pathology that we may miss on dilated exam. There are cases where patients have been treated with panretinal photocoagulation (PRP), and, on exam, I have thought they look great. But after imaging, there is persistent neovascularization elsewhere (NVE) that is leaking.

Dr. Wykoff: Do you treat patients differently when you find NVE with widefield imaging that was not evident on clinical examination?

Dr. Khurana: I do. I think you can have the discussion. These are not high-risk characteristics. There is some new vessel development (NVD), but I actually do not like new vessels sitting there. I am also a little more aggressive there.

Dr. Boyer: Very similar to what Dr. Olmos said, I use ultra widefield FA, and I am surprised when somebody who did not look bad on the clinical exam actually has multiple changes noted on the FA. The big question is whether anti-VEGF therapy will change the course of the disease? I am not rushing PRP on patients with low risk NVE, but I do watch them more carefully. Widefield FA is one of the parameters I use to see when patients need to come back. As we get more longer-acting anti-VEGF therapies, they will become more of a standard for these pre-proliferative patients, the high-risk patients with larger areas of non-perfusion. We know VEGF alone will cause more non-perfusion.[30-32] It is a vicious cycle that we probably can break with a few injections and then watch. I do not have the paradigm in my mind to know when to re-treat them. That is my biggest problem with using anti-VEGF in this case.

CLINICAL OPERATIONS

Dr. Wykoff: Let us move onto clinical operations. What advice or tips do you have for your colleagues across the country to improve flow? For physicians with a maxed-out clinic who need to bring even more patients into clinic, how can they optimize their flow on a daily basis?

Dr. Steinle: One tip — make sure all of the imaging is done before you see returning patients. You want to examine the patient one time with all of the information in front of you. That is much more efficient than seeing a patient, sending them for imaging, and then talking to them a second time. I go through all my patients' charts at the beginning of clinic and order all of my testing. We also have three schedules for each clinic — an exam schedule, an OCT schedule, and a FA schedule. By having all three of these schedules, you can predict ahead of time where potential bottlenecks could occur with imaging and adjust appointment times so that there are not several patients scheduled for the same imaging machine at the same time.

Dr. Prenner: I am super dependent on my technical staff. They dramatically help my efficiency in terms of entering information from my discussions into our EMR system. My staff has time with the patients that I may not. They will often develop excellent professional relationships with our patients, a really therapeutic relationship, and that greatly helps me. We try to recognize those staff members, thank them, and help them recognize that they are doing something important in terms of patient care.

Dr. Wykoff: How do you train them? On a group practice level, how do you train multiple people to be able to do that?

Dr. Prenner: We have our technical staff train our new employees.

Then we have the new techs follow the experienced techs in a mentoring role for a while. Once the senior techs believe the newer techs are ready, we have them join us for patient consultations, see a couple of patients on their own, do some additional work-ups on their own until we are confident they can handle the whole process.

Dr. Boyer: Dr. Prenner brings up a phenomenal point. Our techs know the patients. They spend more time with them and know about their personal lives and what may be impacting their ability to make appointments. I rely on my techs to bring me up to speed on reasons why Mrs. Jones missed her last appointment — a death in the family, or they were in the hospital, or whatever it may be.

I think that is extremely helpful. It makes you a real doctor, because then you can use that information to help the patient through troubling times.

Dr. Olmos: I probably should not be the one in this group talking about clinical efficiency (being as I am in academic medicine), but if we can really get all the staff working on the same page with a common goal to get these patients through in a timely manner and motivate and reward them properly for efficiency, it usually works. If there is one breakdown in the system, for us, it is imaging. If we are slow there, and we often are, the whole system breaks down.

Dr. Steinle: We have a 'hallway monitor' in our busiest clinics, and it is her job to be the quarterback, to ensure there is a smooth flow from check-in to check-out. The hallway monitor is constantly looking for bottlenecks and then can jump in to assist in expediting a given task, such as OCTs or injection prep if one of these areas falls behind schedule.

Dr. Boyer: That is a great point about knowing where the bottlenecks are in your practice and doing your best to reduce them. The bottleneck for us has always been imaging. Now, all of our techs are trained to do OCTs. We try to have our photographers image the new patients, but if they are busy doing an FA, we will have our techs do it. You need to analyze and review where your bottlenecks are.

Dr. Prenner: That is a great point — cross-training your staff so they fill in multiple roles is key. It also keeps it interesting for the staff. It also eliminates the feeling that someone is irreplaceable and limits anyone from taking advantage of that.

Dr. Khurana: Cross-training is so important. I also think having staff buy into the vision of the practice is also a key point. I emphasize to the whole team that we are here for the patient. We want this to be a pleasant experience. That often starts with minimizing their wait. If I take that lead and room my patients myself when there is a bottleneck elsewhere, it shows the whole staff that no one is above anyone else when it comes to practice flow. That is a hard buy-in, but, from a macro level, that is a very important thing to do.

Dr. Prenner: We have an office manager in each of our offices, and, when we are behind, they will explain this to our patients in the waiting rooms. Most are completely understanding if told why they are waiting. We really apologize and explain that there may have been a complex patient, procedure, or emergency patient that resulted in their delay.

Dr. Wykoff: Do patients get lumped together in your clinics, or do you have different tracks such as a 'fast-track, injection-only' option?

Dr. Steinle: I front-load my clinics with injection patients. My most timely appointments are my first 10 slots in the morning, and the first 10 in the afternoon. If those slots are dedicated to just injection patients, we have treated 20 patients without any of them having to wait because they are moving through the system quickly.

Dr. Prenner: I do perform injection-only visits. We do identify those patients and try to move them ahead to make sure they are treated promptly.

Dr. Wykoff: We try to empower patients to know which group they will be in, the 'fast-track,' in which they know they are getting an injection and can expect to move along quickly, and the other group, in which they expect the appointment to take longer. We explain which group is which, so patients are less likely to get upset if they notice another patient moving through the office more quickly.

Dr. Olmos: I also have injection-only visits, mainly because I try to not inject people on the first day I meet them. I try to give them time to digest what I have told them, and/or seek a second opinion. I do schedule another appointment for the following week for an injection-only visit.

Dr. Wykoff: Do you image your injection-only patients?

Dr. Boyer: It depends on the disease. When we talk about AMD, I do treat and extend, so I image with OCT every time. If the patient is receiving a combination of laser and anti-VEGF treatment (for DME), and the patient shows excellent vision without leaking, then I may forgo treatment.

TELEMEDICINE

Dr. Wykoff: Does anyone use telemedicine?

Dr. Olmos: At the University of Washington Eye Institute, we recently expanded our DR screening program as a service to our internal medicine department and as part of a university-wide initiative. The internal medicine clinic has a non-mydriatic camera on site, and the images are taken by a medical assistant who is part of that clinic. These are not widefield images, but single-field, posterior pole, fundus photography of about 50 degrees.

Dr. Wykoff: Did that start because patients were unable to get into the ophthalmology clinics, or because patients were not following up with appointments? What was the initiating factor?

Dr. Olmos: Both. In order to get higher benchmarks from payors

that lead to better reimbursement, primary care doctors must ensure that all their diabetic patients have had yearly dilated eye exams. In the past, they had been unable to do that for a variety of reasons, among them a large number of tertiary care patients and essentially normal diabetic patients in our eye institute clinics that crowded out the DR screening exams. We are rolling this out with a CMS grant, buying 20 more cameras and dispersing them all over the Puget Sound. It is a very new program, so I cannot yet comment on efficacy, but we are very excited about the benefits for our patients and for the university health system as a whole.

Dr. Wykoff: Who does the readings?

Dr. Olmos: Generally, our fellows are the primary readers. I also do a fair amount of screening myself. I will screen a 10% sample to keep oversight, and we adhere to the American Academy of Ophthalmology best practices.[33] The Department of Veteran Affairs has a very robust DR screening program as well.

Dr. Prenner: It surprises me, given where we are from a technology standpoint, that we are still without an artificial intelligence-based screening tool. Watson, Deep Mind, and Google all have ophthalmology programs, so I am surprised that it is taking this long to have something clinically viable.

Dr. Olmos: Actually, you bring up a great point. We are working with a United Kingdom-based company (Eyenuk) to validate their software by comparison to our human graders. If we can validate it here in the United States, we can successfully employ this technology and save many hours of labor.

Dr. Boyer: We get a lot of referrals. We are getting a lot more of those as the optometrists and some of the general ophthalmologists look at an OCT, and they are not quite sure if what they see needs a referral. There are some really inexpensive cameras coming out (under $3,000) that are pretty unbelievable. These are non-mydriatic cameras, and they are great. I think one of the barriers to entry has been the cost of the cameras in each office and ease of use.

FINAL COMMENTS

Dr. Wykoff: Can you all please share a final thought on any aspect of your practice that you would like your colleagues to hear?

Dr. Prenner: While I have now been practicing for 15 years, I continue to use my senior partners as mentors. They have decades of experience and a ton to teach. I try to use them as a resource whenever possible.

Dr. Olmos: Communication with colleagues is key. Try to make sure your referral letters are going out. Try and give your cell phone out to the physicians in the community. Never, ever say anything that could be construed as negative about any of your fellow physicians.

Dr. Boyer: Manage your expectations. What we consider a great result may not be what a patient thinks is a great result. They want to drive, to read. For us, 20/70 and dry after presenting at 20/100 is a good outcome, but it is not enough for the patient.

Dr. Steinle: I will share a practice tip. We all use EMR systems, and most EMR systems are onerous and bleak, so I keep one box for personal notes about the patient — names of pets or children, or how they obtained their nickname, or upcoming travels the patient is looking forward to. Over time, I have found that my little personal notes are the most important part of my record keeping.

Dr. Khurana: With each patient, I try to connect on something. That adds a lot of value. Not just for the patient, but for you. Our days are really busy. We see lots of patients. The last thing you want to do is just get in a situation where you are just trying to get through the day. Find some connection with the patient — it will add a lot of value and satisfaction to you and the patient.

CASE STUDIES: WHAT WOULD YOU DO?

CASE 1: DIABETES AND FLOATERS

Dr. Wykoff: The first patient is a 54-year-old female with floaters. Dr. Khurana, this is your case — would you please summarize?

Dr. Khurana: This patient has a history of diabetes for 8 or 9 years, seeing floaters, is 20/30 in both eyes (Figure 1). There are large areas of non-perfusion in the periphery noted on FA. There are areas of neovascularization. The left eye shows pre-retinal hemorrhage, and she had had a vitreous hemorrhage in both eyes. Her A1c was reasonable at 7.8. Her diabetes was under control on oral agents.

Dr. Wykoff: Who would use PRP as the first line on this patient?

Dr. Steinle: It depends on how compliant I think the patient is going to be. PRP will offer a lifetime of protection at the cost of losing some peripheral functionality. Anti-VEGF injections will preserve some peripheral vision and reduce any macular edema at the risk of the patient disappearing due to non-compliance or

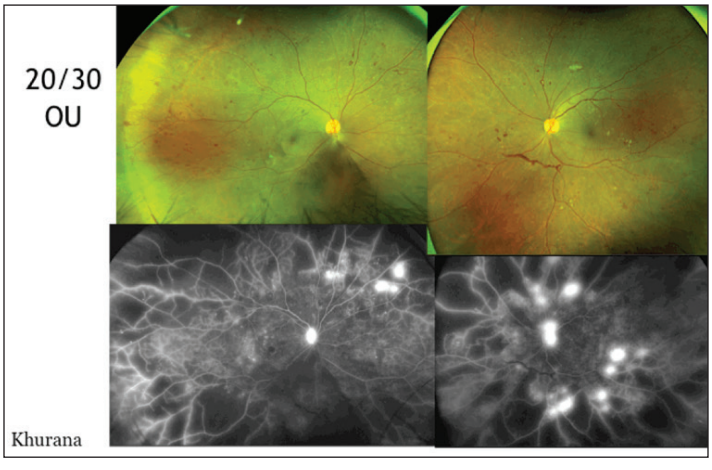

Figure 1. A 54-year-old woman presents with floaters.

re-emerging months or years later with advanced pathology, such as a tractional detachment or neovascular glaucoma.

Dr. Prenner: Based on this history, I would treat her with PRP.

Dr. Boyer: I would treat her with anti-VEGF first, and then I would do PRP. You may be surprised that the right eye improves a lot. The left eye looks so ischemic that you are definitely going to need PRP.

Dr. Olmos: If it were my eye, I would want some PRP on board.

Dr. Prenner: I would not. If it was my eye, I would treat myself with anti-VEGF. But, here is the issue: how do you develop proliferative diabetic retinopathy (PDR)? By not taking care of yourself; once you have PDR, you have most likely defined yourself as an unreliable patient. I just do not trust this population to follow-up enough to be managed with anti-VEGF monotherapy at this point.

Dr. Olmos: Diabetes is a different disease depending on the genetic and ethnic makeup.[34] In Los Angeles, California, we have seen people of Native American and Hispanic heritage who go blind but have the same A1c as their upper-crust Caucasian neighbors. They may not have the resources to take care of themselves either. We must take all that into consideration when treating a particular patient.

Dr. Boyer: You bring up some good points — it is not only blood sugar control, but also blood pressure control. Some of my patients come in with good blood sugar numbers, but they have sleep apnea. There is something else that has precipitated the progression. But, if they say they have not seen their primary care physician for 6 or 9 months, that patient is getting a PRP. They are not compliant, they are not seeing their doctor, and long term, I am concerned they will stop coming to see me as well.

Dr. Steinle: The right eye appears to have borderline macular edema on the FA. So, I would start anti-VEGF injections in the right eye, but PRP in the left. I use the presence of macular edema as a tiebreaker — if a patient has peripheral ischemia with NVE, but also has a degree of macular edema, anti-VEGF nicely treats both the peripheral NVE and the central edema.

Dr. Wykoff: I prefer combination therapy. I would put in an anteriorly-oriented PRP towards the ischemic zones in both eyes after treating her with anti-VEGF injections to stabilize the eyes. Patient compliance is a real issue, and I agree that doing our best to gauge likely patient compliance is important to guide management.

Dr. Khurana: We all have those diabetic patients who do not show up and have compliance issues. That is concerning. But writing them off as being potentially non-compliant with us is perhaps doing a disservice. We know the anti-VEGF load can work. We all know the downsides of PRP and that anti-VEGF is equally effective from Protocol S.[35] By immediately categorizing these patients as non-compliant, are we doing them disservice by not even offering anti-VEGF and jumping right to PRP?

Dr. Wykoff: What if we opt not to do any PRP in these two eyes, and use anti-VEGF montherapy? Then after 6 months, we see the patient is completely compliant and comes in every month. Now the eyes are largely normalized, with resolution of all neovascular fronds by examination and reduction in all intraretinal hemorrhages. What would be your management plan?

Dr. Boyer: You have to follow them.

Dr. Khurana: The disease has been modified, but you still need to closely monitor them. We only have 2 year follow-up from Protocol S (with the 5-year results pending).

Dr. Wykoff: Be more specific. Treat and extend? PRN? Continue monthly forever?

Dr. Khurana: I would perform widefield angiography, quarterly.

Dr. Olmos: I would perform PRN treatment.

Dr. Prenner: I tell patients that their disease has regressed and we will now watch them closely. If there is recurrence, we will reinstitute therapy. I do not employ a prophylactic injection or a maintenance injection at this point.

Dr. Wykoff: Anyone use quarterly dosing in attempt to maintain stability and avoid progression? In eyes like this, I often do.

Dr. Khurana: No. If there was a study showing that a shot every 3 or 4 months was beneficial or decreased the rates of progression, that would be great. In Protocol S, though, the recurrence rate was almost 55%.[35] So PRP is not a 'one and done' idea. The CLARITY study looked at aflibercept in PDR only, no DME, 65% needed follow-up PRP.[36,37]

Dr. Boyer: Aside from the compliance issues with anti-VEGF, we do not know what the endpoint is. Is disc neovascularization your big endpoint? You can follow that pretty easily. You can follow the macular edema. In this other eye, there is a considerable amount of leakage. I would feel much more comfortable putting a PRP to the non-perfused areas and watching them carefully at that point.

Dr. Wykoff: Would the eye in Figure 2 change things? An eye with more advanced PDR with visible and substantial fibrovascular tissue associated with a moderately-sized preretinal hemorrhage. How would you manage this differently than the less advanced PDR case in Figure 1?

Dr. Prenner: I would be very careful about the sub-hyaloid component as those are the cases that need early surgical intervention. Otherwise, my management would not change.

Dr. Boyer: We have all seen crunch after giving an anti-VEGF. That is a risk when there is any form of traction. I might be inclined to avoid the crunch and do PRP.

Figure 2. PDR with fibrovascular proliferation and retinal traction nasal to the optic nerve head with associated sub-hyaloid hemorrhage and non-center involving DME.

Dr. Prenner: This is likely a younger patient with an attached hyaloid, and I am most worried about contraction in these patients.

Dr. Wykoff: Would anyone use anti-VEGF monotherapy here? No one, from a show of hands. All of us are going to use PRP in this eye.

CASE 2: DME WITH MINIMAL RESPONSE ON OCT TO MULTIPLE TREATMENTS

Dr. Steinle: Figure 3 shows the case of a 65-year-old male with significant DME in the left eye. There was no response to bevacizumab, aflibercept, or triamcinolone. There is a large amount of central DME, and nothing seems to work. The FA reveals several central microaneurysms (MAs) within the foveal avascular zone (FAZ). Based on the poor response to anti-VEGF and steroid therapies and considering the vision is 20/25, would you just stop and monitor this patient — or what tips can you share regarding the treatment of refractory DME?

Dr. Olmos: What does the patient think about the situation? Is he symptomatic with his 20/25? How is the fellow eye?

Dr. Steinle: The patient has 20/25 vision in both eyes with minimal complaints.

Dr. Khurana: Where did the patient start with vision?

Dr. Steinle: He started with 20/30. But, the OCT reveals significant macular edema with no response to therapy. My concern is while the patient is 20/25 today, what will his vision be in a year? In 2 years?

Dr. Prenner: The location of the pathology is a bit less concerning as there is an inner retinal cyst, but relatively well preserved outer retina. I think that this kind of fluid is much better tolerated as the photoreceptors are less involved. The patient is not responding to

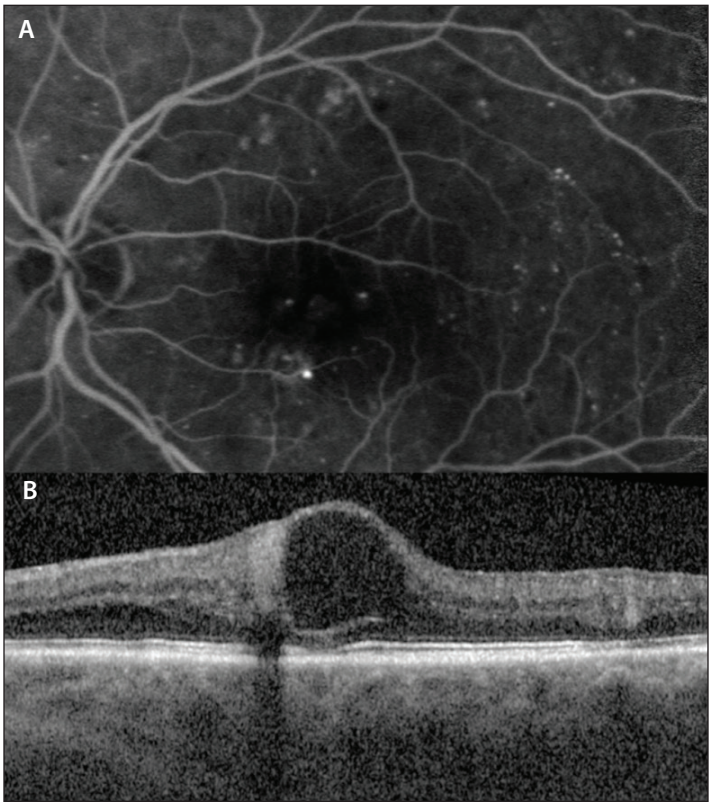

Figure 3. Significant DME shown on FA (A). Minimal response shown on OCT following multiple injections (B).

anti-VEGF therapy, nor to the initial steroid. You might consider changing the regional depot steroid with dexamethasone or adding laser.

Dr. Khurana: What about focal laser? There is that extrafoveal macular atrophy present that is leaking.

Dr. Steinle: Do you feel comfortable venturing inside the FAZ with your focal laser treatments?

Dr. Prenner: Generally not, but if that is required, I will use Micropulse laser first.

Dr. Olmos: Does it work in your hands?

Dr. Prenner: I do think Micropulse laser works in some cases, but know that I have some observer bias as I want the treatment to work for my patients. However, in the absence of prospective, randomized trial data, the jury is certainly still out.

Dr. Boyer: In this eye, just because triamcinolone did not work does not mean dexamethasone would not work. For me to say a patient is not responding means I want to see him in 2 weeks. That may show some sort of anti-VEGF response. I would try dexamethasone. The problem is you cannot use a steroid frequently in a phakic patient. But, I do think it is worth trying to see if there is any response.

Dr. Steinle: If you see an OCT improvement with dexamethasone without significant intraocular pressure elevation, you could consider a long-term implant such as the fluocinolone implant for continuous low dose therapy.

Dr. Olmos: We use very little focal laser nowadays. But recently, I did have a pregnant patient, a type 1 diabetic, with macula threatening edema, who was planning on breast-feeding. I did not want to give her anti-VEGF, so I discussed the risk of the macular edema affecting the central vision and whether she wanted laser as a preventive method, which she opted to have. That was probably the most recent time I have used focal laser.

Dr. Khurana: I use focal laser, but I will manage DME following the Diabetic Retinopathy Clinical Research Network (DRCR.net) Protocol I. I start an anti-VEGF. For those who persist, I will add laser 6 months after initiation of anti-VEGF therapy.[38] I have tried micropulse and a variety of low threshold lasers, and they have not been impressive. There is a tendency to want everything flat immediately, but these patients can do very well over long periods to time even when there is fluid present.

CASE 3: DR ASSOCIATED ISCHEMIA WITHOUT DME

Dr. Wykoff: Figure 4 shows an eye similar to the previous case, but it is now symptomatic, with 20/50 vision. The FAZ is extensively enlarged, with no significant DME. The patient is unhappy. What are you going to do? The other eye is normal.

Dr. Boyer: You might be surprised that using anti-VEGF alone can cause an improvement of vision even if the edema does not improve. In this case, I think the patient would improve, and you would even treat that small tuft of neovascularization.

Dr. Steinle: And Protocol S showed us regarding the area under the curve, vision improved with anti-VEGF.[35] This is a patient in which I would actually consider it.

Figure 4. Symptomatic patient with 20/50 vision with no clinically relevant DME and an enlarged FAZ. Approximate size of normal FAZ outlined with red circle. NVE is also visible inferior to the arcade vasculature.

Dr. Khurana: That has been truly fascinating. Patients who did not have DME in Protocol S actually had vision improvement with anti-VEGF, and I do not know if anyone has a real anatomic reason.

Dr. Prenner: I agree with the approach, but I suspect that there will be little clinical improvement as the source of this visual compromise is largely macular ischemia. Patients will want something done often times, even when the treatment rationale may be limited.

Dr. Khurana: Dr. Prenner makes a good point that we often treat to manage patient expectations. They sometimes expect treatment, but it can be more important, at times, to manage their expectations.

Dr. Boyer: If you explain it just like that — we do not know if these injections will help, but we have nothing else to offer. So we are going to treat you three times in a row, and then re-evaluate the situation. You would be surprised how many improve.

Dr. Wykoff: To Dr. Boyer's point, even without an improvement in Snellen visual acuity, many of these patients subjectively feel like they are seeing better and have improved visual function globally with anti-VEGF therapy. This may be related to the reduction in leakage and other vascular parameters seen with angiography after treatment.

Dr. Steinle: With PDR, even with mild NVE, patients can experience micro-hemorrhages from the neovascular fronds. These 'subclinical' vitreous hemorrhages can significantly impair vision. Sometimes, anti-VEGF injections can clear the vitreous by involuting the leaky NVE and halting these subtle vitreous hemorrhages. After a course of anti-VEGF treatments in PDR patients, it is not only impressive to see significant regression of DR severity on FA, but it is also impressive to see how much clearer the media is on repeat FA.

CASE 4: FLOATERS

Dr. Khurana: A 64-year-old man complains of floaters that did not go away after they had with previous intravitreous injections. He presented 5 days after a bevacizumab injection. Figure 5 shows a very noticeable spot in the field in the vitreous on the retinal surface.

Dr. Wykoff: Does anyone tell patients before using bevacizumab that this is a possibility? Has anyone altered their source of bevacizumab or the type of syringes they are using since we have become more aware of the possibility of silicone oil droplets after the use of repackaged bevacizumab?

Dr. Prenner: We changed our consent to reflect recent recommendations from OMIC.

Dr. Khurana: Syringes were changed that do not use silicone oil lubricant.

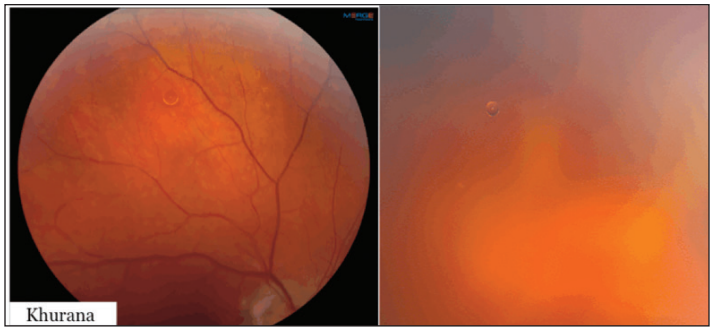

Figure 5. Noticeable spot in the field in the vitreous on the retinal surface.

Dr. Boyer: I have only had this happen once, but my partners have had it multiple times.

Dr. Steinle: We recently published that more than 20 cases showed silicone oil bubbles after bevacizumab injections in our practice, compared to one case in the prior decade.[39] We have experienced a significant uptick in occurrences recently.

Dr. Khurana: We just published on this.[40] We had a 57-fold increase in silicone oil droplets after bevacizumab from May to November 2017 compared to the previous 7-month period. Like Dr. Prenner, we have changed our consent form and believe our incidents were attributed to the insulin syringes. Now, we use non-insulin syringes (Norm-Ject syringes do not use silicone oil), which may minimize the incidence of floaters.

My hypothesis is that there was a change in the manufacturing of the insulin syringes, resulting in increased amounts of silicone. The amount of silicone is within the normal limits for delivering insulin. However, these insulin syringes are being used my multiple compounding pharmacies across the country to prepare bevacizumab and would explain the increased incidence we witnessed last year.

Dr. Prenner: We have heard from the ASRS Therapeutic Surveillance Committee that the incidence of this, fortunately, has dropped in the last 6 months.

CASE 5: HOW TO TREAT DME AFTER PARS PLANA VITRECTOMY

Dr. Steinle: Figure 6 is a 55-year-old man who has a history of vitrectomy for tractional retinal detachment and now presents with diffuse 'spongy' DME. How do you treat vitrectomized eyes that have significant DME?

Dr. Olmos: I use combination/multimodal therapy.

Dr. Boyer: I use dexamethasone.

Dr. Steinle: Do you use dexamethasone first or anti-VEGF first?

Dr. Boyer: I like dexamethasone for these. It lasts longer, and the results are good. You still have some slight epiretinal membrane, but that will flatten down in the center with dexamethasone.

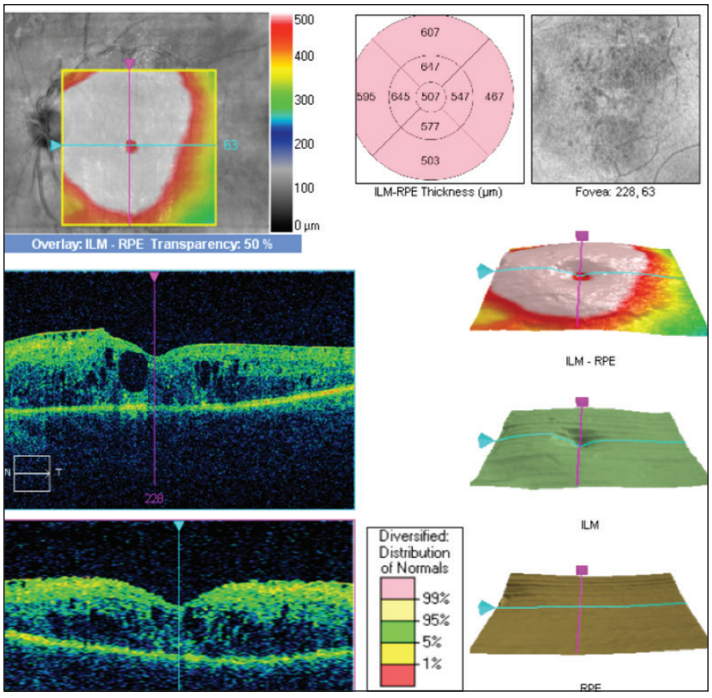

Figure 6. A 55-year-old man with diffuse DME. This patient had a vitrectomy in this eye in the distant past for a tractional detachment.

Dr. Prenner: Fluocinolone acetonide is a nice option for these cases as well. Unlike with Ozurdex, if the implant migrates into the anterior chamber, it will not cause corneal decompensation.

Dr. Khurana: I would urge caution when using the dexamethasone implant in vitrectomized eyes with loss of lens capsule, as anterior chamber migration can occur resulting in permanent corneal decompensation.[40]

Dr. Steinle: There are anecdotal reports that the small fluocinolone implant can be left in the anterior chamber for greater than 6 months without any acute corneal problems. The fluocinolone implant might be a safer option in vitrectomized eyes at risk for anterior implant migration.

Dr. Olmos: In this scenario, I would first give an anti-VEGF.

Dr. Steinle: Do you change your protocol for which anti-VEGF you select and how often you retreat based on the fact that this patient had a previous vitrectomy?

Dr. Wykoff: In a small, post-hoc secondary analysis involving 25 eyes from Protocol I, the DRCR.net has reported that eyes having undergone prior vitrectomy received a similar number of anti-VEGF injections through 3 years compared to eyes not having undergone vitrectomy.[41,42] Is that your experience?

Dr. Prenner: Although initial studies suggested that vitrectomized eyes limit the durability of anti-VEGF therapies, the evolving science seems to suggest there is no difference, as compared to non-vitrectomized eyes.

Dr. Olmos: In my practice, there does seem to be a little difference, where anti-VEGFs are shorter-acting. I like to leave a little vitreous skirt after PPV for the anti-VEGF.

Dr. Boyer: That is my experience, too. Patients may go 4 weeks, but not 5 weeks.

CASE 6: ASYMPTOMATIC SEVERE TRACTIONAL RETINAL DETACHMENT IN TYPE 1 DIABETES

Dr. Steinle: This is a tough case — a new 29-year-old woman is referred with no complaints, 20/20 vision (Figure 7). She is completely asymptomatic and has been told to see us for her first exam. She has had type 1 diabetes for 22 years. How do you approach this patient?

Dr. Olmos: I would approach her with a lot of words, a lot of hand holding, and a lot of explanation.

Dr. Prenner: I would spend my initial time trying to educate her and have her develop an understanding of her disease. Hopefully, we can engage family members and have them buy into the process as well. Quickly after, I would treat her with PRP.

Figure 7. A 29-year-old female with type 1 diabetes presents with a severe TRD and 20/20 vision.

Dr. Khurana: I do not jump to treatment immediately because they need a lot of buy-in on a lot of levels — the family, the doctor, etc. I would do laser, actually do a little lighter and a few sessions. With all that neovascular activity, all the traction, I would be very worried about a crunch thing and whether they need surgery or not. I would love to get PRP in before we ultimately have to do surgery.

Dr. Prenner: Dr. Boyer, what are your thoughts about waiting to let these kinds of eyes mature a little bit after laser versus going in early? How do you decide your window timeframe to operate?

Dr. Boyer: I use traction to the fovea. Right now, this is a 20/20 eye. Even in the best of hands, postop may not be 20/20. We all have seen patients where you can peel that off. If I really document that the traction is increasing to the fovea, I may show the progression to the patients and go in at that point to try to save central vision.

Dr. Prenner: This is also a very good time to bring the endocrinologist and internist heavily on board. Hariprasad et al. had a paper this year that looked at the death rate in people after tractional retinal detachment surgery, and found nearly 50% mortality at 10 years.[43]

CASE 7: AMD

Dr. Olmos: Figure 8 shows a 78-year-old man presenting with 20/20 but complaining of a "gray spot" in his central vision. He has never seen an eye doctor before, as he never had any trouble with his vision. What would you do, and what is the end point of therapy?

Dr. Boyer: With a hemorrhage like this one, it will be difficult to visualize what it is. It may be a macroaneurysm, but, if it is not, it is likely a CNVM. OCTA may be able to image it, but I do not believe that would alter your management strategy. You could also use indocyanine green (ICG). If it is polypoidal choroidal vasculopathy, I would start with aflibercept as that has been successfully used in these cases.[44,45] I would not do a pneumatic displacement as it would result in a poor outcome with that superior hemorrhage. I would not rush to treat. Some of these patients clear; I would explain that it is probably going to get worse before it gets better.

Dr. Olmos: I treated this patient with aflibercept. I gave two monthly injections, after which the OCT was markedly improved, and in fact, dry. Then I gave a treatment holiday.

Dr. Prenner: What was the thought process concerning halting intervention?

Dr. Olmos: He has a CNV that is not subfoveal. It is extra-macular, and that is fortunate for him because, if he does bleed, it will not be subfoveal. What would everyone else have done?

Dr. Prenner: I would treat and extend.

Dr. Boyer: I would treat and extend.

Dr. Steinle: I would treat and extend too. I would try to extend out to where we treat quarterly. I do not want him to be extended

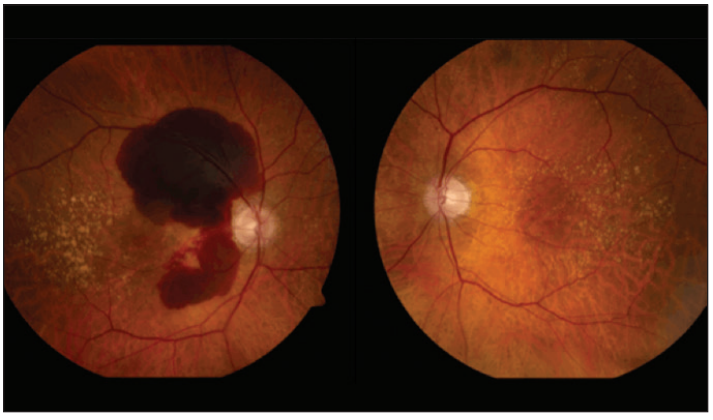

Figure 8. A 78-year-old man presenting with 20/20 but complaining of a "gray spot" in his central vision.

too far beyond quarterly and risk bleeding again — as he has demonstrated a propensity for bleeding in the past.

Dr. Boyer: Some of these patients are so extrafoveal that you can use photodynamic therapy (PDT) on them. These CNV really do go away in that case.

Dr. Wykoff: Would you use full fluence PDT for that location?

Dr. Boyer: Yes, and when they are that far away, full fluence is not a problem. Look at the choroid, which is very thick. That patient is not going to have visual loss. I am surprised that the patient developed CNV.

Dr. Khurana: Would you do PDT over a thermal laser?

Dr. Boyer: I would. I am always wary towards the fovea, and they always recur toward the fovea. I am more likely to cover the whole thing with PDT, and I feel a little bit safer. I can always laser.

CASE 8: AMD WITH A TWIST

Dr. Olmos: Figure 9 shows a 63-year-old East Asian male who has had distortion for about a year in the right eye. He was initially diagnosed with dry AMD and was asked to begin AREDS2 antioxidant multivitamins. Five days prior to these images, he developed acute vision loss in the left eye. The presenting vision is 20/50 OD and 20/100 OS.

Dr. Wykoff: Looks like more than dry AMD at this point.

Dr. Olmos: I thought so, and OCTA showed vascular network in the outer retina choroid complex layer. This patient is a practicing dentist and is distraught because he is now unable to practice. I treated with bilateral bevacizumab, and, although OS responded beautifully, neither his fluid nor his OCTA findings budged after three doses in the OD. What now?

Dr. Khurana: On OCT, the right eye looks like there is a cyst.

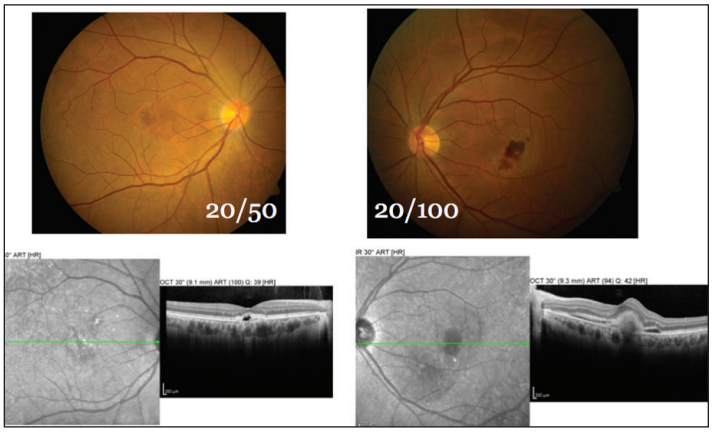

Figure 9. Distortion for 1 year OD and acute vision loss OS, presenting with 20/50 and 20/100, respectively.

Dr. Prenner: This is like pachychoroid, with pachy drusen and central serous chorioretinopathy variant with secondary CNV in the other eye, maybe?

Dr. Olmos: The patient remains symptomatic OD, but he does not want any more treatment in that eye.

Dr. Prenner: Was he less symptomatic after bevacizumab? What happened in the left eye?

Dr. Olmos: The left eye returned to 20/20, so he is happily functioning and does not want more therapy in the right eye. He is on a treat and extend regimen in the left eye.

Dr. Khurana: If I observed more cysts in the outer retina, it might be idiopathic parafoveal telangiectasia (IPTs or macular telangiectasias). CNV can develop after that as well. These cysts are so deep; typically, those are more outer retinal cysts with IPTs that you will see, so that may not be the right diagnosis.

CASE 9: WHEN TO STOP TREATMENT

Dr. Boyer: Figure 10 shows an 85-year-old male pediatrician I started seeing in 2007. He was treated with ranibizumab and PDT at that time. In 2010, he was 20/80 with a central subfield thickness (CST) of 447 µm, still receiving monthly injections of ranibizumab. By 2011, he now has 20/100 vision, and his OCT has not budged. Is this the end game? I brought him back in a couple of weeks instead of monthly and realized he had responded.

After more than 20 injections, his vision fluctuated between 20/60 and 20/200 on ranibizumab. I changed treatment to aflibercept in 2012, and, by the fourth injection, the thickness improved and vision was 20/100 (Figure 11).

Now, in 2017, the patient is basically dry (CST is 233 µm), has 20/80 vision, and is happy. I was ready to give up. So, when do you stop? Here is a patient who went 10 years on treatment, and he was functional.

Dr. Steinle: The first 2 years of the 5-year CATT data showed that exudative AMD patients did really well when they were receiving frequent injections,[46,47] but then when we reduced that treatment burden in years 3 to 5 in the real world, the vision dropped way down and ended below baseline at year 5.

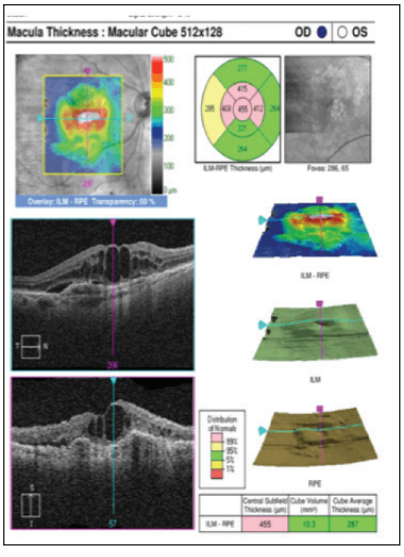

Figure 10. Treatment after 5 years with monthly ranibizumab.

Dr. Boyer: The SEVEN-UP study showed the same thing.[48] In their subgroup analysis, those patients

who received more frequent injections did better. Do not give up on these patients, even if they look hopeless.

Dr. Prenner: How do you decide when it is time to change biologics? That might be helpful. Does anyone have patients who require bimonthly injections? I have a couple.

Dr. Khurana: Do you switch agents every 2 weeks?

Dr. Prenner: You really need to use bevacizumab at least every other injection, if not for all injections, from a cost perspective.

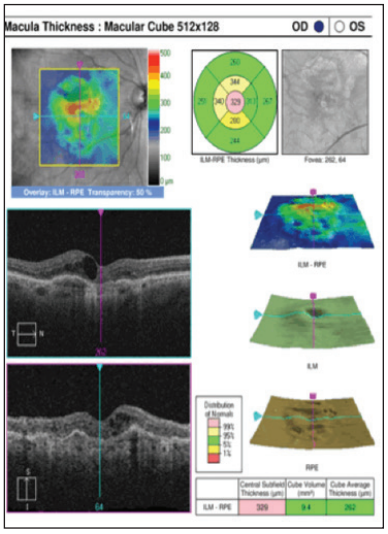

Figure 11. Same eye after changing treatment regimens.

Dr. Wykoff: Thank you all for your insights and comments regarding these retina cases. The field has seen tremendous progress over the last 10 years, and there is certainly more to come. ■

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FROM TRIALS TO TREATMENTS: A ROUNDTABLE DISCUSSION IN MEDICAL RETINA
POST TEST QUESTIONS/ACTIVITY EVALUATION/SATISFACTION MEASURES

Instructions for CME Credit

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Profession
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Years in Practice
___ >20
___ 11-20
___ 6-10
___ 1-5
___ <1

Patients Seen Per Week (with the disease targeted in this educational activity)
___ 0
___ 1-5
___ 6-10
___ 11-15

Region
___ Northeast
___ Northwest
___ Mid-West
___ Southeast
___ Southwest

Setting
___ Solo Practice
___ Community Hospital
___ Government or VA
___ Group Practice
___ Other
___ I do not actively practice

Models of Care
___ Free for Service
___ ACO
___ Patient-Centered Medical Home
___ Capitation
___ Bundled Payments
___ Other

Training of Fellows ___ Yes ___ No

1 *AMA PRA Category 1 Credit™* **CME QUESTIONS** Expires October 31, 2018

1. All but which of the following are acceptable treatment regimens for wet age-related macular degeneration (AMD)?
a. Monthly panretinal photocoagulation.
b. Monthly intravitreal injections.
c. Pro Re Nata for intravitreal injections and/or panretinal photocoagulation.
d. Treat and extend for intravitreal injections.

2. Please rate your confidence in your ability to counsel patients about the likelihood of vision loss, but not blindness, from wet AMD. (Based on a scale of 1 to 5, with 1 being not at all confident and 5 being extremely confident).
a. 1
b. 2
c. 3
d. 4
e. 5

3. The risk of developing endophthalmitis from an intravitreal injection is:
a. 1 in 5000
b. 1 in 2,000-3000
c. 1 in 500-750
d. 1 in 100

4. As part of the differential diagnosis for diabetic macular edema (DME), which imaging modalities are recommended?
a. Fluorescein angiography (FA).
b. Widefield FA.
c. Optical coherence tomography (OCT).
d. OCT-angiography (OCTA).
e. All of the above.
f. None of the above.

5. Please rate how often you intend to apply outcomes of natural history and AMD studies on intravitreal anti-vascular endothelial growth factor (VEGF) systemic safety to patient assessment, treatment, and management in those with previous stroke (based on a scale of 1 to 5, with 1 being never and 5 being always):
a. 1
b. 2
c. 3
d. 4
e. 5

6. Please rate your level of confidence in using OCTA to document lesion size in wet AMD as a means of determining treatment. (Based on a scale of 1 to 5, with 1 being not at all confident and 5 being extremely confident).
a. 1
b. 2
c. 3
d. 4
e. 5

7. Mrs. Jones presents with 20/30 OU and large areas of non-perfusion in the periphery on FA. She is diabetic, but well controlled on oral agents. Her history includes vitreous hemorrhage bilaterally. What would be the most likely treatment regimen?
a. Anti-VEGF injections
b. Panretinal photocoagulation.
c. Anti-VEGF followed by panretinal photocoagulation.
d. Panretinal photocoagulation followed by anti-VEGF injections.

8. What are methods to implement to reduce bottlenecks in the office?
a. Keep training compartmentalized so employees become overly efficient in their one aspect.
b. Image all patients on one day and treat them on a separate day that week.
c. Cross-train staff so any one employee can fill in for another.
d. Intersperse injection patients with longer visit patients.

9. How should you communicate to patients about wet AMD?
a. Concentrate on the first three injections to ensure buy-in.
b. Wait until several visits have gone by before showing images, so as not to confuse patients.
c. Front load all discussions with new patients about all aspects of the disease.
d. Reiterate often that it is an ongoing disease that will need chronic management.

10. According to the Diabetic Retinopathy Clinical Research Network's Protocol I, what is the recommended treatment for someone with DME?
a. Start with anti-VEGF and switch agents after 3 months if suboptimal response.
b. Start with anti-VEGF and add focal laser after 6 months if suboptimal response.
c. Start with anti-VEGF and switch to FA after 6 months if suboptimal response.
d. Start with anti-VEGF and add low threshold laser after 6 months if suboptimal response.

ACTIVITY EVALUATION

Did the program meet the following educational objectives?	Agree	Neutral	Disagree
Recognize the importance of early diagnosis and treatment of age-related macular degeneration (AMD) and diabetic macular edema (DME).	_____	_____	_____
Assess the response of anti-vascular endothelial growth factor (VEGF) intravitreal injections, and define "suboptimal responders."	_____	_____	_____
Understand the most recent monotherapy and combination therapy clinical study evidence using available therapies for AMD, DME, and retinal vein occlusion (RVO).	_____	_____	_____
Discuss the outcomes of pivotal studies in AMD, DME, and RVO and how study results may differ from "real-world" dosing methods.	_____	_____	_____
Develop individualized treatment plans for patients with retina disorders that use a combination of imaging, treat and extend, or treat and observe.	_____	_____	_____
Discuss the ocular and systemic effects of anti-VEGF therapies and how to educate patients on appropriate expectations.	_____	_____	_____

Your responses to the questions below will help us evaluate this CME activity. They will provide us with evidence that improvements were made in patient care as a result of this activity as required by the Accreditation Council for Continuing Medical Education (ACCME).

Rate your knowledge/skill level prior to participating in this course: 5 = High, 1 = Low _____

Rate your knowledge/skill level after participating in this course: 5 = High, 1 = Low _____

This activity improved my competence in managing patients with this disease/condition/symptom. ____ Yes ____ No

I plan to make changes to my practice based on this activity. ____ Yes ____ No

Please identify any barriers to change (check all that apply):

____ Cost
____ Lack of consensus or professional guidelines
____ Lack of administrative support
____ Lack of experience
____ Lack of time to assess/counsel patients
____ Lack of opportunity (patients)
____ Reimbursement/insurance issues
____ Lack of resources (equipment)
____ Patient compliance issues
____ No barriers
____ Other. Please specify: _____
_____
_____

Satisfaction Measures

The design of the program was effective for the content conveyed. ___ Yes ___ No

The content supported the identified learning objectives. ___ Yes ___ No

The content was free of commercial bias. ___ Yes ___ No

The content was relative to your practice. ___ Yes ___ No

The faculty was effective. ___ Yes ___ No

You were satisfied overall with the activity. ___ Yes ___ No

Would you recommend this program to your colleagues? ___ Yes ___ No

Please check the Core Competencies (as defined by the Accreditation Council for Graduate Medical Education) that were enhanced through your participation in this activity:

____ Patient Care
____ Practice-Based Learning and Improvement
____ Professionalism
____ Medical Knowledge
____ Interpersonal and Communication Skills
____ System-Based Practice

Additional comments:

_____

____ I certify that I have participated in this entire activity.

This information will help evaluate this CME activity. May we contact you by e-mail in 3 months to see if you have made this change?
If so, please provide your e-mail address below.

_____


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