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MODERN OPTOMETRY

BEST PRACTICES AND FUTURE DEVELOPMENTS IN THE MANAGEMENT OF DIABETIC RETINOPATHY

A CE activity administered by Evolve Medical Education LLC.

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Best Practices and Future Developments in the Management of Diabetic Retinopathy

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CONTENT SOURCE

This continuing education (CE) activity captures content from a virtual roundtable discussion.

ACTIVITY DESCRIPTION

The overwhelming majority (85%) of comprehensive eye exams are conducted by optometrists. Diabetic retinopathy (DR) is the most common ocular complication of diabetes and is currently responsible for more than 10,000 new cases of blindness each year in the United States alone. This supplement highlights discussion topics among experts in the field and provides important education on caring for this patient demographic.

TARGET AUDIENCE

This certified CE activity is designed for optometrists who care for patients with diabetic eye conditions.

LEARNING OBJECTIVES

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

- **Summarize** the rise of diabetes and DR in the US population and the related impact on ocular health.
- **Understand** effective screening strategies and imaging tools for diagnosing DR and diabetic macular edema (DME).
- **Identify** which patients need early referral to a retina specialist based on their behavioral patterns, disease state, and/or other risk factors.
- **Identify and discuss** how imaging devices may be able to provide earlier diagnosis of disease or disease progression.
- **Explain** the latest treatment approaches to DR/DME.
- **Describe** novel developments in DR screening.

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PRETEST QUESTIONS

PLEASE COMPLETE PRIOR TO ACCESSING THE MATERIAL AND SUBMIT WITH POSTTEST/ ACTIVITY EVALUATION/SATISFACTION MEASURES FOR CE CREDIT.

1. Please rate your confidence in your ability to identify which patients need early referral to a retina specialist based on their behavioral patterns, disease state, and/or other risk factors (based on a scale of 1 to 5, with 1 = "Not at all confident" and 5= "Very confident").

a. 1
b. 2
c. 3
d. 4
e. 5

2. A 65-year-old patient with type 2 diabetes returns for annual follow up. The patient's last HbA1c was 9.1%, blood pressure was 140/93, and the patient had dyslipidemia. The patient's visual acuity on presentation was 20/20 and their intraocular pressure was 14 mm Hg OU. The anterior segment examination was nonsignificant except for bilateral cataracts. The posterior segment examination was significant for severe nonproliferative diabetic retinopathy (NPDR). There is no sign of diabetic macular edema (DME) in either eye.

Action	Consistent	Nonconsistent
Widefield fundus photography		
ERG/EOG measurements		
Repeated exam in 3-6 months		
Referral to endocrinology for better glucose control		
Early cataract extraction		
Anti-VEGF treatment for severe nonproliferative disease		
Intravenous fluorescein angiography (FA)		
Indocyanine green (ICG)-angiography		
Optical coherence tomography (OCT) angiography		
Relaxed control of blood pressure		
Control of lipids		

3. What are the color photograph/ophthalmoscopy features of severe NPDR?

a. Hemorrhages in 4 quadrants, arteriovenous (AV) nicking in 2 quadrants, prominent intraretinal microvascular abnormalities (IRMA) in 1 quadrant
b. Hemorrhages in 4 quadrants, venous beading in 2 quadrants, prominent IRMA in 1 quadrant
c. Hemorrhages in 4 quadrants, AV nicking in 2 quadrants, prominent IRMA in 1 quadrant
d. Hemorrhages in 2 quadrants, venous beading in 2 quadrants, prominent IRMA in 1 quadrant

4. Which one of these sets of features describe DRSS-defined high-risk PDR?

a. Neovascularization of the disc (NVD) greater than 1/3 disc area with vitreous hemorrhage
b. Neovascularization elsewhere (NVE) less than 1/2 disc area with vitreous hemorrhage
c. Isolated vitreous hemorrhage
d. NVE greater than 1/2 disc area without vitreous hemorrhage

5. Per the Diabetic Retinopathy Study, 50% of patients with high-risk PDR develop severe vision loss (<5/200) without treatment. What is the most common cause of this vision loss?

a. Tractional retinal detachment
b. Rhegmatogenous retinal detachment
c. Neovascular glaucoma
d. Vitreous hemorrhage

PRETEST QUESTIONS CONTINUED

PLEASE COMPLETE PRIOR TO ACCESSING THE MATERIAL AND SUBMIT WITH POSTTEST/ ACTIVITY EVALUATION/SATISFACTION MEASURES FOR CE CREDIT.

6. You have a 37-year-old patient who has had type 1 diabetes for 20 years. She has well-controlled diabetes (insulin pump) and her last HbA1c was 7.0%. She has newly diagnosed PDR in both eyes with vitreous hemorrhage and an area of superotemporal traction. All of the following options would be reasonable next steps in the management of this patient EXCEPT:

a. Observation
b. Anti-VEGF
c. Panretinal photocoagulation (PRP)
d. Pars plana vitrectomy (PPV)

7. In the control (sham) group of PANORAMA, what proportion of patients progressed to vision-threatening retinopathy complications in the first year?

a. 10%
b. 20%
c. 30%
d. 40%

8. Based on the ETDRS Research Group, what is the approximate risk for progression to PDR from severe NPDR in just 1 year?

a. 20%
b. 30%
c. 40%
d. 50%
e. 60%

9. How much greater relative risk is there for a 36-year-old to develop DR having been diagnosed with diabetes 12 years ago versus 7 years ago?

a. 0.5x
b. 1x
c. 1.5x
d. 2x
e. 2.5x

10. In a 46-year-old male, obese patient who smokes, has an HbA1c of 11.2% and a 10-year history of type 2 diabetes and hypertension, all of the following are appropriate multimodal imaging modalities to evaluate for DR EXCEPT:

a. Widefield color fundus photography
b. Widefield FA
c. OCT
d. ICG-angiography
e. OCT-angiography

11. Which of this patient's comorbidities increase his risk of developing DR and its progression to more severe stages?

a. Hypertension
b. Hyperlipidemia
c. Patient age
d. Smoking
e. All of the above

12. All of the following are considered risks for the development of PDR EXCEPT:

a. Duration of diabetes
b. Level of baseline retinopathy
c. Morbid obesity
d. Level of glycemic control or HbA1c level

Best Practices and Future Developments in the Management of Diabetic Retinopathy

As the prevalence of diabetes mellitus increases in the United States, so does the incidence of diabetic eye disease.[1] Despite all our progress—treatment is up to 90% effective in preventing severe vision loss when caught early—diabetic retinopathy (DR) and diabetic macular edema (DME) remain the most frequent cause of blindness among adults aged 20 to 74 in the United States.[1,2] But it doesn't have to be this way. A critical component of diabetic eye care is knowing who and when to refer to a retina specialist. With proper patient education, interdisciplinary collaboration, consistent examinations and early treatment, diabetic patients can achieve long-term stability and excellent vision.[3] Thought leaders in diabetic care, including retina specialists and optometrists, discuss optimal patient management, complicated cases, and treatments in the pipeline in the following roundtable discussion on DR in 2021.

— Andrew A. Moshfeghi, MD, MBA, Moderator

THE PREVALENCE OF DIABETES AND DIABETIC RETINOPATHY IN 2021

Andrew A. Moshfeghi, MD, MBA: I'd like to start our discussion with the regional variations in DR prevalence and incidence. I practice in two locations: Pasadena, CA, and Los Angeles. They are only 10 minutes from each other, but the demographics are very different. I have a lot of age-related macular degeneration (AMD) in the Pasadena office and hardly any DR. My downtown Los Angeles office is the opposite, with a substantial amount of DR and DME but not as much AMD.

Q | How much DR and DME are you seeing in your practices?

A. Paul Chous, MA, OD, FAAO: My practice is near an endocrine specialty clinic, so nearly all of the patients I see either have diabetes or prediabetes and I frequently see DR and DME. Most of my patients have very good metabolic control, so the vast majority with DR have mild disease, though that has changed somewhat during the COVID-19 pandemic, because some patients have been hesitant to come in for an office visit, and glycemic control has worsened for many patients.

Caroline Baumal, MD: I work in multiple locations in Massachusetts, including the city of Boston and outside of the city. There may be more elderly patients with AMD in the suburbs. However, I see a substantial number of diabetic patients in all of our office locations. I see two different populations: younger patients with type 1 diabetes who are referred to me for surgical evaluation because they have advanced proliferative diabetic retinopathy (PDR), and older adults with DME and type 2 diabetes. Some of the older patients do not even know they are diabetic. This lack of awareness of the diagnosis of underlying diabetes fits with what we know about diabetes—there's 30 million diabetics in the United States and 7 million are undiagnosed.[1]

The first group typically hasn't had an eye examination for some time. The second group is usually referred to me because they are experiencing reduced vision. They may have cataracts, posterior subcapsular changes from diabetes, retinal hemorrhages, or DME.

Q | **Dr. Moshfeghi:** Where are your referrals coming from?

Dr. Baumal: I receive referrals from primary care physicians, internists, endocrinologists, and other eye care providers. Many of my referrals are from optometrists who screen with ultra-widefield (UWF) imaging and optical coherence tomography (OCT). We know that UWF imaging is superior in detecting DR than OCT alone.[4,5] Typically, eye care providers will send patients who have DME, moderate nonproliferative DR (NPDR) and higher severity, tractional diabetic retinal detachment, or vision loss.

Dr. Moshfeghi: Dr. Koetting, you are based in Norfolk, VA. What are the demographics of DR like in your area?

Cecelia Koetting, OD, FAAO: I see many patients who have diabetes, but I tend to see more DR in the rural areas among patients who don't have well-controlled disease. I see less of that in the suburban-area offices.

Joseph J. Pizzimenti, OD, FAAO: I am based in San Antonio, and see patients with both type 1 and type 2 diabetes. I see a lot of veterans as well because our clinic has an agreement with the San Antonio Veterans Affairs Medical Center. My patients are typically middle-aged and older. San Antonio has an obesity epidemic. I'm seeing type 2 diabetes in teens and young adults. Like Dr. Koetting, I receive many referrals from community optometrists who don't have access to some of the newer

technologies. Sometimes we'll perform the testing and send the patient and the results back to the referring doctor for monitoring. Other times we initiate the early referral to our local retinal specialists for consideration of treatment.

REFERRING PATIENTS AND MANAGING COORDINATED CARE

Q | Dr. Moshfeghi: When you see patients with DR, do you refer them to a retina specialist, or do you follow them?

Dr. Koetting: I have a referral threshold for severe NPDR and PDR, but it depends if there is DME. If the patients have DME at any level of NPDR, I refer them to our practice's retina specialist for possible treatment. Those who have severe NPDR have a higher likelihood that they will progress to PDR and then need treatment, so I will usually have them evaluated by our retina specialist. Luckily, within my practice I have easy access to OCT, UWF imaging, fluorescein, and OCT angiography (OCTA), which are all recommended screenings for diabetic patients.[6,7]

Dr. Chous: I refer patients to retinal specialists when they either require treatment or are approaching the threshold for requiring treatment, so their first meeting with the retina specialist is not necessarily the same day they need intravitreal injections. Studies are showing–PANORAMA for instance–that even retina specialists undergrade NPDR severity in a significant percentage of patients, so I think it makes sense to refer patients when they have moderate or worse NPDR or DME involving any of the OCT subfields. I also often recommend that patients with poor glycemic control should talk with the primary care providers (PCP) about acquiring a referral to an endocrinologist specializing in diabetes, or I will make the referral myself.

Q | Dr. Moshfeghi: If you have a patient with clear nonfoveal exudates and thickening, how do you proceed? Do you refer or monitor the patient?

Dr. Pizzimenti: That depends on a few things. Typically, I will monitor the patient accordingly, but I have started to refer more patients with severe and very severe NPDR, regardless of whether there's any macular edema. Rather than wait to refer when something bad happens, I'm providing proactive care. I'll get those patients into the retinal office a bit earlier based on some of the newer studies and protocols.[2,8-10] In addition to traditional fundus examination techniques, I use OCT, OCTA, and UWF imaging to make those referral decisions.

Lloyd Clark, MD: In my practice, most of my patients with diabetes come from optometric referrals. In our community, diabetic primary eye care is largely delivered by optometrists. I still see a fairly significant number of patients with very advanced proliferative disease. On the other hand, I also see patients at a very appropriate level with retinopathy that's approaching the threshold for some of the modern therapies.

Dr. Moshfeghi: One thing that strikes me from our discussion so far is that everyone has OCT, OCTA, and UWF imaging. That is impressive. These technologies make diagnosing and monitoring these types of patients much easier.[5]

Dr. Koetting: Optometrists in our offices are the gatekeeper. If a patient has been referred from the community, unless it is for known retinopathy or they specifically need to see a retinal specialist, the patient will see myself or another optometrist for a general evaluation. If we find something significant, then we'll coordinate the follow-up care for when the retinal specialist is available.

If we see a patient who needs a retinal specialist that day, we'll have the patient seen immediately if one is in the office or have them travel to another location if needed. We'll comanage the patient from there, depending on their needs. For example, I may see the patient for a 3-month follow-up exam, followed by a retina appointment 3 months later.

Q | Dr. Moshfeghi: Do you share an electronic medical record (EMR) system? How do you communicate with the referring physicians?

Dr. Koetting: Our offices all share the same EMR and have access to charts. For the referring physicians, we always send electronic notes but also often make telephone calls, send texts, emails—anything needed to maintain communication. Every time we see a patient, from the referral to the fifth follow-up exam, we send notes to the patient's PCP, referring doctor, and endocrinologist through electronic fax. Our EMR will generate chart notes detailing the findings, assessment, and plan. This is especially important for our patients with diabetes.

Dr. Chous: My practice focuses on diabetes education and preventing or mitigating complications to the greatest extent possible, and I have a lot of endocrinologists, PCPs, and other diabetes care providers referring patients to me because they know that's my niche. As optometrists, it's imperative we send timely communication about eye exam findings and pertinent recommendations to both PCPs and retinal specialists, and when patients are referred, those appointments are kept. We know a lot of patients referred to retinal specialists do not follow through, so I always try to get high-risk patients scheduled while they're in my office and send eye examination reports to patients as well.

MANAGING COMPLEX PATIENTS

Q | Dr. Moshfeghi: Patients with diabetes are up to 5 times more likely to develop cataract, in particular at an early age.[11,12] Dr. Baumal, in your retina practice, when you see an unaffiliated patient with diabetic eye disease and then uncover cataract, how do you proceed? Do you follow the patient yourself or involve another ophthalmologist in your practice?

Dr. Baumal: Patients with diabetes do have a higher incidence of earlier and complex cataract, as well as glaucoma.[13] I refer them when they are ready for cataract surgery. I try to send

them to a cataract surgeon close to their home because diabetic patients may be overwhelmed with medical appointments, whether it's with their PCP, endocrinologist, cardiologist, kidney doctor—the list continues.[14,15]

Dr. Moshfeghi: Given the health care burden of patients with diabetes, do you try to consolidate eye appointments and have them see multiple specialists during one appointment?

Dr. Clark: In my practice, we don't perform a lot of combined surgery, and we don't perform any cataract surgery. I'm in a multiphysician, retina-only practice, and we don't have optometrists in our group. In terms of managing patients with DR on a broad level, we try to compartmentalize and clearly define our role, which is to manage and/or treat their diabetic eye disease. We do not provide primary eye care as a rule. That care needs to be provided by a clinician who specializes in that area.

Dr. Baumal: I agree with Dr. Clark. Retinal care is so specialized that it is important for us to focus on the retina. When I approach cataract combined with diabetic eye disease, it is critical to attempt to control the retinopathy as much as possible before undertaking surgery. I ask a cataract surgeon to give a course of prolonged antiinflammatory eye drops after cataract surgery, especially if they've had a history of DME. It's important for retinal physicians to work as a team with the cataract surgeon to ensure they are familiar with the studies on antiinflammatories in diabetics and that cataract surgery can exacerbate DME.[16-21] We have to be extra cautious in managing these patients.

Dr. Pizzimenti: I quite frequently comanage diabetes patients with cataract surgeons. Most patients who undergo cataract surgery have excellent visual outcomes postoperatively. However, various studies suggest that both eyes with DR and DME may worsen in severity after cataract surgery. Therefore, for my patients with center-involved DME (CI-DME) who are about to undergo cataract surgery, I refer them to the retina office to receive an anti-VEGF injection preoperatively. In addition, control of systemic factors should be optimized as much as possible prior to surgery.

Some of our retinal physicians will pretreat the patient with one injection of anti-VEGF and then prescribe a postoperative steroid because of the higher prevalence of DME and Irvine–Gass Syndrome after cataract surgery.[22] If you look at Protocol P from the Diabetic Retinopathy Clinical Research Network, there's some literature to support this strategy.[23]

For a patient with cataract and DR who doesn't need treatment, I recommend having the patient's regular optometrist monitor the DR and initiate the cataract surgical consult.

Q | Dr. Moshfeghi: Dr. Clark, when you have a patient with stable but chronic DME being treated with anti-VEGF therapy, do you counsel the cataract surgeon on the timing of the surgery vis-à-vis your injection schedule?

Dr. Clark: I don't worry too much about where the cataract surgery falls within the treatment interval. If a patient is receiving therapy every 6 to 8 weeks, I feel confident with he or she having the cataract surgery at some point within that time frame. I agree with Dr. Baumal that we need to be pretty aggressive with antiinflammatory treatment with topical steroids around the time of surgery, particularly afterward.

Dr. Baumal: I try to give a series of anti-VEGF injections before surgery to stabilize or improve the DME. However, there are circumstances when it may not be possible to resolve DME and cataract surgery is indicated in order to improve vision. Diabetics may have a history of regressed iris neovascularization related to PDR and this may hinder pupil dilation pre- and postoperatively. As for anti-VEGF administration in the perioperative cataract period, there are many ways to administer it but I prefer to give prior to or during surgery with close follow-up postoperatively.

I have taught some cataract surgeons in my practice how to give an anti-VEGF injection at the time as the surgery. Before we had anti-VEGF therapy, it was even harder to manage these DME patients with the tools we had, which were laser or intraocular corticosteroids. Management has improved because it is possible to give a series of anti-VEGF injections preoperatively, which has much reduced potential for complications when compared with corticosteroids. There's also less inflammation with phacoemulsification compared with extracapsular cataract extraction.[24] It is key to recognize postoperative inflammation when it happens. This may present as persistent postoperative anterior chamber cellular reaction, pupillary miosis and/or macular edema.

Going back to imaging, OCT can be helpful to image through a dense cataract to inform whether DME is present before surgery, allowing one to treat DME in advance of cataract surgery.

Dr. Moshfeghi: One of the frustrations I have with cataract surgeons is sometimes they will refer a patient with Irvine–Gass and tell me to consider intraocular corticosteroids or other therapies. But they'll send me the patient 3 days after making the diagnosis and after they started on a stronger topical therapy. This frustrates me because it's better to have that newer intervention work for a couple of weeks before I see the patient. Dr. Koetting, what frustrations do you have with your fellow eye care providers when treating patients with diabetes?

Dr. Koetting: I've definitely questioned the timing of some referrals when it isn't clear why a patient was sent to me immediately or why they weren't seen earlier. Without the aid of testing, such as OCT, it is difficult to determine if a patient who has decreased BCVA has presence of macular edema. This can be more difficult if the patient has other possible causes of decreased BCVA such as scarring or ocular surface disease. It's a matter of helping my colleagues understand the difference between an emergency and urgency, as well as when the patient must be referred to a specialist for treatment.

Dr. Chous: It goes back to the basics of good primary eye care. If patients with diabetes have vision loss that is due to retinal disease and is of recent onset, particularly if there is objective worsening, I try to get that patient seen in a timely fashion–within 2 to 4 weeks with DME and within 48 hours if the patient has high-risk PDR and/or vitreous hemorrhage. There are data showing that many patients with treatable disease, both DME and severe NPDR/PDR, are not seeing the retinal specialist for up to 10 weeks after the referral is made, so we have to be careful we don't drag our feet too long when patients need treatment. All this said, we have to be respectful of the retinal specialist's time and not insist on immediate consultation when patients don't have disease severity that warrants it. Calling the specialist to talk through the urgency of referral is a useful strategy, if possible.

Dr. Moshfeghi: When there's a new finding, the referring doctor often feels it needs to be completely dealt with that day, and they won't take no for answer. How can we redirect those expectations?

Dr. Clark: I see it as a situation in which the doctor was uncomfortable. For whatever reason, they wanted that patient out of their hands, either because they didn't feel comfortable managing the patient or because they needed reassurance from the referring physician, thereby providing reassurance to the patient. The patient can sense some discomfort as well. I approach it as an opportunity to make the patient comfortable. You don't want to be in a situation where your provider is, for whatever reason, uncomfortable. I think that's one reason for many of these referrals.

Q | **Dr. Moshfeghi:** Dr. Pizzimenti, when you see a patient with either very severe NPDR or early or high-risk PDR, do you begin to educate them on some of the newer PDR management approaches or do you let the retina specialist discuss their options?

Dr. Pizzimenti: I give them a summary of the options and what to expect during their retina consultation. We discuss pharmacotherapies as the mainstay treatment for CI-DME and NPDR.[25-27] That leads to a question I have for the retinal specialists on the panel. When anti-VEGF treatment is used on patients with severe and very severe NPDR without macular edema, is it actually helping with perfusion?

Dr. Clark: I am an author on the pending PANORAMA paper, which is the clinical trial attempting to establish anti-VEGF therapy for patients with moderately severe to severe NPDR without DME. Early data from PANORAMA found that the proportion of patients who developed vision-threatening complications was significantly lower with aflibercept every 8 weeks following five monthly doses (2q8) and aflibercept every 16 weeks following three monthly doses and one 8-week interval (2q16) compared with sham (3% and 4% vs 20%, $P < .001$ for both). The incidence of CI-DME was also significantly lower with aflibercept 2q8 and 2q16 compared with sham (8% and 7% versus 26%, $P < .001$ for both).[28]

Your question is important. What's clinically relevant and what is likely to make treatment worthwhile in these patients is the reduction in vision-threatening complications, which was not the primary outcome of the PANORAMA study. The primary outcome was actually a 2-step regression of retinopathy as defined by the reading center, which is not a clinically relevant endpoint.

To me, the clinically relevant endpoint is reducing the rates of severe vision-threatening complications, such as neovascular disease and CI-DME. If you treat patients as infrequently as every 4 months, you reduce the rate of these vision-threatening complications by 80%. That's the value proposition for the patient and for the clinician, but it's going to take some time for that to filter into clinical practice.

Dr. Chous: I discuss anti-VEGF therapy with patients with CI-DME and/or moderately severe NPDR, severe NPDR, or PDR before referring them to set the stage for possible treatment. Given the evidence from PANORAMA, and despite the fact that development of vision threatening complications was a secondary outcome of the study, I feel comfortable telling patients that anti-VEGF therapy can pull them back from the edge of the cliff.

Dr. Baumal: From the findings of the PANORAMA study and from my clinical experience, I do think there is a benefit to preventing progression from severe NPDR to PDR, because when patients develop tractional retinal detachment, especially if they present late, the chance for vision loss can be very high.[29] That said, it is not clear whether anti-VEGF injections can improve perfusion. Imaging study results have been equivocal, but many have shown that anti-VEGF injections do not uniformly improve retinal perfusion, although they do reduce DR severity, thus preventing some of the severe complications from PDR.[30-32]

Dr. Moshfeghi: Dr. Pizzimenti brings up an excellent question. We often use the waxing and waning of the peripheral level of DR to help guide our interval in between injections in these patients. If you see a reduction in the amount of peripheral hemorrhaging when you're injecting every 2 to 3 months, and you see a multiplication of these hemorrhages and cotton wool spots after extending to 4 or 5 months, then you may need to shorten your injection frequency. Does that mean that I'm necessarily changing the patient's visual function? No, but you're controlling their risk.

Dr. Baumal: Sustained-release anti-VEGF delivery devices like the port delivery system (PDS) with ranibizumab may change the treatment paradigm. Genentech recently launched PAVILION (NCT04503551), a phase 3 trial for the PDS in DR.[33] The ARCHWAY trial, which evaluated the safety and efficacy of the PDS in wet AMD, found that 98% of patients were able to go 6 months without retreatment, showing the PDS has potential to reduce the treatment burden of frequent anti-VEGF injections.[34,35] In DR, the effect of sustained-release ranibizumab from

the PDS on reducing retinal nonperfusion and reducing DR progression remains to be elucidated.

Q | **Dr. Moshfeghi:** Sustained-release devices may give us a greater likelihood of being able to prevent capillary nonperfusion or retinal ischemia than reversing it. The future may be to treat patients before they develop these severe complications affecting their vision. Are there any additional novel therapy concepts that may change our treatment paradigm in the future?

Dr. Clark: We currently have a drug that's been shown in clinical trials to be effective for all but the elimination of vision-threatening complications with treatment three times a year. If we combine that with a longer lasting drug for DME given every 16 weeks, then you're only seeing the patient every 6 to 9 months. The question is how far are we from having a once-yearly medication or a gene therapy available to us? I think we're closer to that paradigm than many clinicians realize.

CASE 1: A CAUTIONARY TALE OF UNCONTROLLED DIABETES AND INADEQUATE SCREENING

Dr. Baumal: Our first case is a 42-year-old male with type 2 diabetes. His visual acuity is hand motion in his right eye and counting fingers in his left eye. He is a teacher with a family, and he needs to drive to work. He has never been evaluated or seen by a retinal specialist. He presented because he noticed reduced vision in his left eye upon covering his right eye. Figure 1A shows his images upon his presentation and there is clearly a recent vitreous hemorrhage and diabetic-tractional retinal detachment in his left eye. His right eye has a more severe tractional detachment involving the fovea.

For patients presenting with bilateral active PDR and tractional retinal detachments, I used to operate on the worst eye first, but in this case when both eyes are severely affected, I operated on the better eye first. Often in this situation, there may be associated neovascularization of the angle or iris. The intraocular pressure can increase postoperatively from angle damage secondary to neovascularization, and then the patient may need a tube shunt. Sometimes while waiting for one eye to heal, the other eye can rapidly progress, so it is important to evaluate both eyes carefully in the postoperative period.

This case illustrates the importance of comanagement with PCPs or any other physician who sees a diabetic. It is unfortunate to see a patient with diabetes and PDR who has never had an eye exam, and a cross-disciplinary approach can address this.

Dr. Clark: Unfortunately, I still see a number of these cases. It's a very difficult situation. Based on the imaging, the left eye looks like it has a decent chance with surgery. It's heartbreaking though, because these patients go blind. It doesn't have to be this way. If they were followed appropriately and treated in a reasonable time frame, their sight could have been saved. It's not usually the fault of the providers; it's the patient not coming in for exams and not complying with treatment.

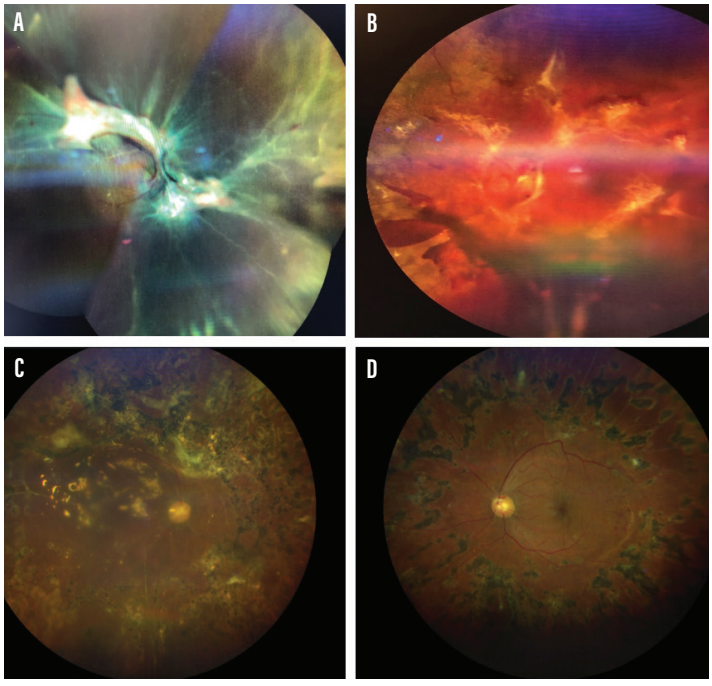

Figure 1. Case 1: Tractional complex bilateral diabetic retinal detachments at presentation in a type 2 diabetic (A right eye), combined with vitreous hemorrhage (B left eye) in the baseline fundus images. Visual acuity improved after vitrectomy and extensive membrane peeling and the retina is attached with silicone oil (C right eye) and after silicone oil removal (D left eye).

I agree with Dr. Baumal on her approach to start with the better eye first to try to interrupt that deterioration process. I know it flies in the face of conventional teaching, but the better-seeing eye will often deteriorate in front of you while you're focused on the worse-seeing eye. The worse eye is often so bad that it's not going to worsen any time soon, therefore you have some time to address it.

Dr. Koetting: Thankfully, I don't often see patients in this state. By the time their disease has progressed to this point, they've been referred to a retinal specialist. It's a testament to reminding ourselves that it's critical to have discussions with patients about what can happen if they don't have regular eye exams and if their diabetes goes uncontrolled. My colleagues and I do talk with PCPs and give lectures about diabetes and the importance of eye exams. We need to continue to have these discussions to drive home the point that patients must get their eyes checked. It's just as important as an organ damage with neuropathy in the fingers and the toes. They should see an eye care professional at least once a year.

Dr. Chous: This is a catastrophe. It is highly likely that this patient has significant cardiovascular and renal disease as well, so we need to think outside the box and get this patient to other providers outside of eye care. It's also important for all of us to interface with vision rehabilitation specialists. The most important message to give patients with diabetes is that good vision on an eye chart or in the real world has little do with having healthy eyes, and that many patients with sight-threatening disease have "good vision" until the day they don't.

Dr. Pizzimenti: It's critical for primary eye care providers to promptly refer a patient with high-risk PDR for treatment. I like to have the patient visit the retina office within 48 hours if possible. Because we have a case like this, I'd also like to discuss, as Dr. Chous indicated, that optometrists are well positioned to provide low-vision rehabilitation care after surgery and treatment. Many optometrists are residency trained in low-vision rehabilitation and sometimes double trained in ocular disease. Optometrists understand the condition, they understand the rehabilitation, and they understand the optics of low vision devices. Finally, patients with DR, no matter the stage, should see an endocrinologist at least once during their care for the proactive management of lifestyle and medications for optimal glycemic control.

Dr. Clark: Seeing an endocrinologist sounds very reasonable and is a nice way of staying on top of managing their systemic disease. Unfortunately, it's not feasible for many patients. I, for one, don't think there's any way our endocrinology community could see all these patients even once.

Dr. Chous: We should also utilize services provided by diabetes education specialists to help patients achieve good glucose control. They are plentiful and remove much of the volume burden from endocrinologists.

Dr. Baumal: With the wider availability of telemedicine as a result of the pandemic, it may be easier for these patients if the endocrinologist consult was virtual.

Going back to our case, there are a lot of nuances that go into managing a patient with complex bilateral diabetic tractional retinal detachments. It is important to consider the timing of preoperative anti-VEGF injections to prevent intraoperative hemorrhage that may preclude visualization and hinder the repair. My optimal timing is to give a preoperative anti-VEGF injection 1 to 5 days before vitrectomy and I make sure that patients understand the critical nature of this timing. I also try to place preoperative PRP if there are any attached regions devoid of hemorrhage in the periphery. The detached retina in the patient's right eye was so fibrotic that some surgeons might not operate on it. Fortunately, this patient did very well a week after surgery (Figure 1b). Three months postoperatively, his VA improved to 20/40. During that time, I operated on his other eye and the VA improved to 20/100. Although this was a successful outcome, it would have been better to prevent the DR from reaching this level of severity in the first place.

CASE 2: THE IMPORTANCE OF OCTA FOR AN ACCURATE DIAGNOSIS

Dr. Baumal: The second case is a 45-year-old female with type 1 diabetes. Her VA is 20/25 in both eyes. She has no complaints; she simply came in for a regular eye exam. Her initial images are shown in Figure 2. Dr. Pizzimenti, what can you tell from these images?

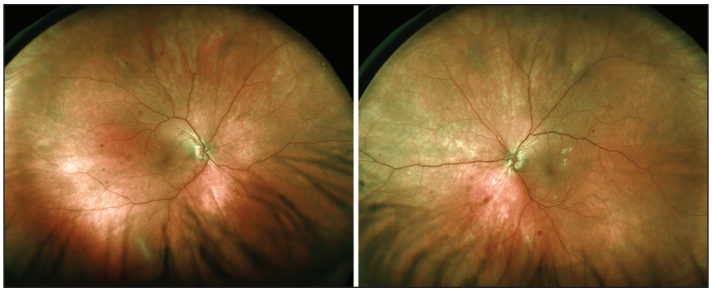

Figure 2. Case 2: Baseline imaging.

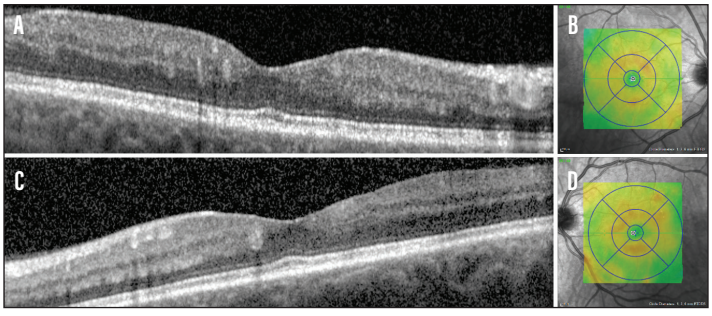

Figure 3. Case 2: OCT imaging at presentation of the right eye (structural OCT A, cube OCT B) and left eye (structure OCT C, cube OCT D) does not reveal CI-DME.

Dr. Pizzimenti: It looks like we have moderate dot and blot hemorrhages spreading out into the midperiphery. Certainly, there's some activity in the posterior pole of each eye, including the macula and probably the fovea. We see hard exudates within the macula of the left eye. I don't see intraretinal microvascular abnormalities (IRMA) or neovascularization. Angiography would be important here.

Dr. Baumal: Figure 3a shows the patient's OCT. I often tell my trainees to order a red-free photograph, because it may show the retinal hemorrhages better than the color image. I do a lot of computer manipulation on my clinical images. I enlarge them on the screen and look closely along the vascular arcades for abnormal retinal vessels such as IRMA or neovascularization. I agree on preliminary viewing, this may look like moderate NPDR. Figure 3b shows the view. There is some hyperreflectivity around the fovea in the left eye. Fortunately, there's no CI-DME. Some of that hyperreflectivity in the left eye may correspond to the microaneurysms or hard exudate. Dr. Koetting, what do you see from these images?

Dr. Koetting: There are hyperintense areas showing some leakage and possibly some late-stage leakage around some of the arcades in both eyes.

Dr. Chous: The fundus image shows some modest vein beading which, in my mind elevates the patient to moderately severe NPDR at first blush. In addition to leakage, the OCTA reveals areas of nonperfusion, justifying referral to a retina specialist, even in the

absence of observed neovascularization for FA. I agree totally that manipulating images is very helpful, using red-free and magnification to help ascertain clinically important findings.

Dr. Baumal: This patient had foci of neovascularization along the arcade and early PDR. There is no neovascularization of the disc. The findings of early PDR may not be obvious on the color fundus photography. Magnification and close examination of the images can help. There are some retinal hemorrhages and lacy vessels, but it is very subtle. There is a whole range of ways that patients can present, and it is helpful to use imaging so PDR is not missed when it's not obvious on clinical examination.

Dr. Pizzimenti: Dr. Baumal, what would you advise the optometrist do when they see these areas of neovascularization? How soon should they be seen by a retinal specialist?

Dr. Baumal: In this particular case, I would say within 1 to 2 weeks. If there's someone who has neovascularization of the disc, mild vitreous hemorrhage or neovascularization of the iris, I like to evaluate them quickly—within 1 to 3 days.

Dr. Clark: We can get these patients in within a few days. You don't want to minimize the importance of proliferative disease, but these patients with small areas of isolated neovascularization elsewhere can remain stable for a long time. That's comforting to know in this particular case, because the optometrist and retinal specialist may miss the PDR. If you don't use widefield OCTA as a fellowship-trained retina specialist, this is an easy case to miss.

Dr. Baumal: I agree; this would be a hard case to see the findings without widefield OCTA or without a very cooperative patient and a good clinical exam. This case is a reminder that neovascularization of the retina can be very subtle, and we must have a heightened awareness.

Dr. Clark: Many of us didn't have widefield OCTA until very recently. If I saw this patient prior to widefield OCTA availability, I may have missed the vascularization. This case underscores the importance of utilizing this modality in a DR evaluation. It's absolutely critical to use widefield OCTA; it has transformed our ability to diagnose these patients, particularly early in their disease course.

Dr. Baumal: I treated this patient with peripheral panretinal laser. The options for PDR before it reaches high-risk characteristics are panretinal laser, anti-VEGF, or a combination of both. To determine my treatment course, I'll have a discussion with the patient about anti-VEGF compliance, how often they can come in for treatments, and then explain the treatment options. This patient eventually had some anti-VEGF injections after the laser treatment. The disease has stabilized, and they've done well. Dr. Clark, what do you do in a patient like this?

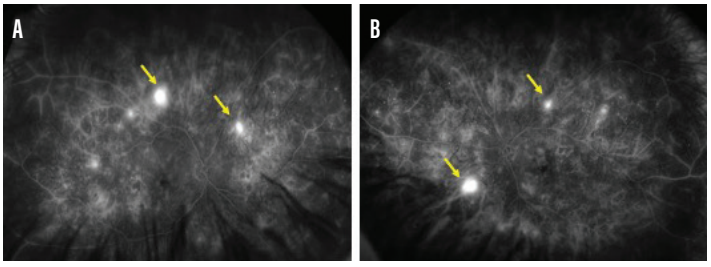

Figure 4. Case 2. Widefield FA at presentation reveals foci of dye leakage (yellow arrows) consistent with neovascularization of the retina along the arcades (right eye A, left eye B) confirming PDR.

Dr. Clark: It depends on how compliant the patient is with their diabetes care. I consider many PDR cases to be a disease of noncompliance, but this case could have been a person with well-controlled diabetes for 25 to 30 years who is compliant with their treatment regimen. In those cases, I do discuss anti-VEGF because it offers them the opportunity for less destructive management of their PDR. If I think the patient will be compliant with therapy and follow-up, I'm more inclined to offer anti-VEGF therapy and avoid laser.

CASE 3: MANAGING PDR WITH ANTI-VEGF THERAPY

Dr. Moshfeghi: Our next case is a 51-year-old Asian male with type 2 insulin-dependent diabetes. He is on dialysis. He had a traumatic brain injury at the age of 20, which caused some cognitive deficits. He has gout and hypertension. His VA is 20/40 in each eye, but he does complain of new floaters in the left eye. His intraocular pressure was normal (14 mm Hg OD and 15 mm Hg OS). Figures 4a and 4b show his fundus photos and widefield images, respectively.

The widefield fundus is a bit murky, but if you look outside the infratemporal arcade of the right eye, you'll see what looks like vitreous opacities. That's consistent with the vitreous hemorrhage I saw on clinical exam. There are also some intraocular hemorrhages in the supratemporal arcade. In the left eye, you can see the blocking effect of that inferior vitreous hemorrhage. To the left of that, you'll see big areas of black retina with capillary nonperfusion and microaneurysms in the posterior pole. You can also see more leakage coming off the optic nerve; there's staining of the retinal vessels next to those areas of capillary nonperfusion. It's interesting how you're seeing it more on the nasal aspect of the retina than on the temporal side, in terms of the capillary nonperfusion.

Figure 5 shows an OCT image on the color-coded thickness map of his left eye. There's some center-threatening edema, depicted in red and orange. If you look above the fovea on the cross-sectional image, there are white specs in the vitreous cavity, which is fairly characteristic of vitreous hemorrhage. I always look for this when I see a patient with an acute posterior vitreous detachment. Sometimes you can't see the actual vitreous hemorrhage on clinical exam, but the OCT will pick it up. Although there's a little bit of thickening, it's not very significant. Remember, his VA is 20/40 VA in each eye.

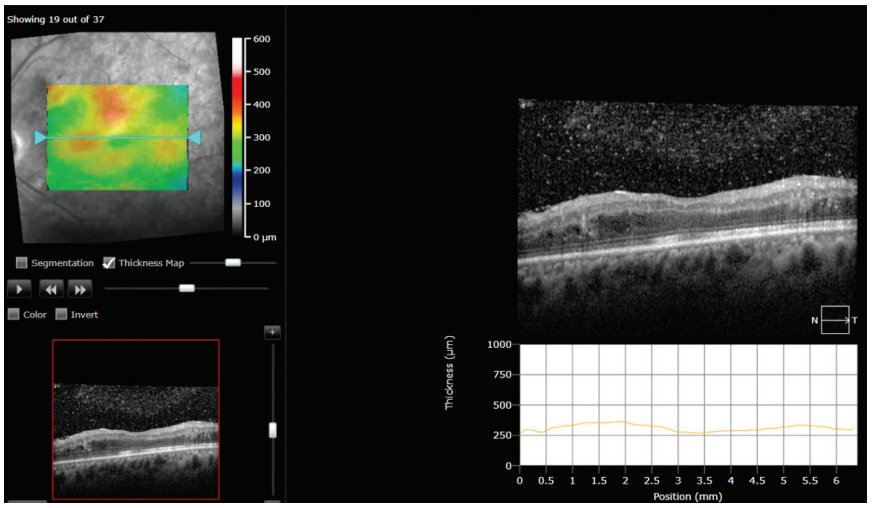

Figure 5. Case 3: OCT imaging of the left eye revealing hyperreflective vitreous opacities consistent with vitreous hemorrhage along with eccentric DME.

Moving on to his right eye, Figure 6 shows the fundus and the angiogram at 1 and 6 minutes into the imaging. There are some hemorrhages visible at first, but it doesn't look too bad. At 1 minute you see something near the 12 o'clock location by the equator and some fairly significant nonperfusion, again nasally, with some DR. At 6 minutes we see a similar pattern. The level of DR isn't as bad as it was in the left eye.

We decided to treat the proliferative disease with anti-VEGF monotherapy because he was not a good candidate for PRP. He was an excellent injection patient, and I used monthly bevacizumab for quite a long time. We then transitioned to quarterly injections after we saw he had a favorable response. I never did PRP or a vitrectomy. By the end of 3 years, in 2019, he looked a lot better (Figure 7). In 2019, even though there's still the same amount of nonperfusion overall, it's a tighter image. Now, are we just treating the picture or are we actually helping? He has no CI-DME.

Dr. Baumal: PRP can exacerbate the DME in this case and change it from center-threatening to CI-DME. This was avoided by starting with anti-VEGF therapy to induce regression of PDR.

Dr. Clark: The value here is that, over a 4-year period, you eliminated the likelihood of the patient developing significant PDR. This patient was at extremely high risk for vision-threatening complication back in 2016, and you completely altered the natural history of what would normally occur.

Dr. Chous: Prior to anti-VEGF therapy, there were no good treatment options for this patient other than PRP, for which he was not a good candidate based on his cognitive status. His renal status further increases his ocular risk. Anti-VEGF is not going to reperfuse ischemic retina, but it will keep nonperfusion from worsening, as was already stated. There is pretty compelling evidence linking DR and DME to untreated sleep apnea, a condition that is highly prevalent in both type 1 and type 2 diabetes, so I would also advocate for considering a referral for sleep studies in all of these patients if that hasn't already happened.

Dr. Pizzimenti: We have significant disease modification, as evidenced by less vascular permeability after treatment. I think the key here is the ongoing patient engagement. You educated your patient, let them know the plan, and they were on board for the long haul. You individualized their treatment and maintained stability.

Dr. Moshfeghi: I considered doing PRP in the beginning. It's so easy to pull the trigger to do PRP, but he didn't mind the injections and was extremely compliant. In the beginning, I didn't know how he was going to respond, so I started off with monthly injections. I transitioned to treating him every 4 months. I did notice that he developed more intraretinal hemorrhages in the periphery when I saw him at closer to 4 months, so I knew that going beyond 4 months probably was not viable for him.

Dr. Pizzimenti: Let's say you made the decision to manage the PDR with panretinal photocoagulation. In a patient like this with subclinical DME, would you have utilized anti-VEGF therapy at the outset as well? Would you have done PRP primarily? How would you approach that if you went the other way?

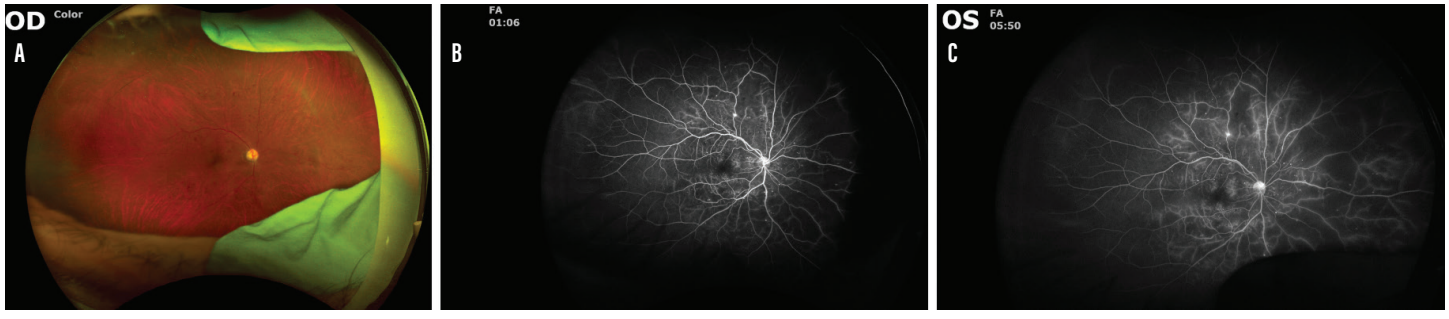

Figure 6. Case 3: Baseline imaging, right eye. (A) Shows fundus imaging. (B) Shows angiogram, 1 minute. (C) Shows angiogram, 6 minutes.

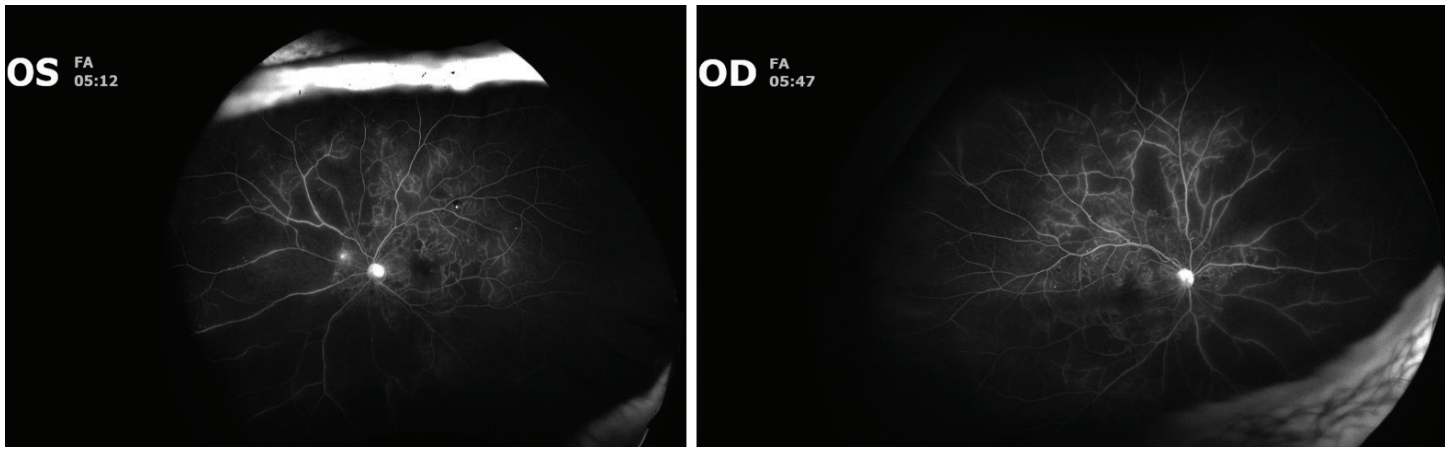

Figure 7. Case 3: Angiogram after 3 years of anti-VEGF treatment.

Dr. Moshfeghi: We all are classically taught that PRP brings on or exacerbates preexisting DME. His hemorrhage wasn't that bad; I could have used PRP if I wanted. For the reasons you mentioned, I would have started with a couple of serial anti-VEGFs to blunt any DME engendering response the PRP may have brought on, and maybe even continued it after I did the PRP. I would have then weaned him off injections once the PRP was in place. I think it's a great approach. I do use it in many of my patients who I think will comply with anti-VEGF therapy, but then miss a couple of appointments. This patient was easy for me to choose as someone to try this with, because he had very reliable ability to show up in the clinic and a strong support system. You have to get to know your patients before you try something like this because they have to be compliant.

I'd like to thank our panel for their comments, contributions, cases, and feedback on cases. You have provided valuable insights on managing DR. ■

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BEST PRACTICES AND FUTURE DEVELOPMENTS IN THE MANAGEMENT OF DIABETIC RETINOPATHY

Release Date: March 19, 2021
COPE Expiration Date: February 28, 2023

INSTRUCTIONS FOR CE/CME CREDIT

To receive credit, you must complete the attached Pretest/Posttest/Activity Evaluation/Satisfaction Measures Form and mail or fax to Evolve Medical Education LLC; 353 West Lancaster Avenue, Second Floor, Wayne, PA 19087; Fax: (215) 933-3950. To answer these questions online and receive real-time results, please go to https://evolvemeded.com/2012-supplement-1. If you experience problems with the online test, please email us at info@evolvemeded.com. Certificates are issued electronically; please be certain to provide your email address below.

Please type or print clearly, or we will be unable to issue your certificate.

Full Name_____ ❑ MD/DO participant ❑ OD ❑ non-MD participant

Phone (required) _____ ❑ Email (required) _____

Address/P.O. Box _____

City _____ State/Country____ Zip/Postal Code _____

License Number _____ OE Tracker Number _____

DEMOGRAPHIC INFORMATION

Profession
___ OD
___ Other

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

Patients Seen Per Week (with the disease targeted in this activity)
___ 0
___ 1-15
___ 16-30
___ 31-50
___ 50+

Region
___ Northeast
___ Northwest
___ Midwest
___ Southeast
___ Southwest

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

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

LEARNING OBJECTIVES

Did the program meet the following educational objectives?	Agree	Neutral	Disagree
Summarize the rise of diabetes and diabetic retinopathy (DR) in the US population and the related impact on ocular health.	_____	_____	_____
Understand effective screening strategies and imaging tools for diagnosing DR and diabetic macular edema (DME).	_____	_____	_____
Identify which patients need early referral to a retina specialist based on their behavioral patterns, disease state, and/or other risk factors.	_____	_____	_____
Identify and discuss how imaging devices may be able to provide earlier diagnosis of disease or disease progression.	_____	_____	_____
Explain the latest treatment approaches to DR/DME.	_____	_____	_____
Describe novel developments in DR screening.	_____	_____	_____

PLEASE COMPLETE AT THE CONCLUSION OF THE PROGRAM.

1. Based on this activity, please rate your confidence in your ability to identify which patients need early referral to a retina specialist based on their behavioral patterns, disease state, and/or other risk factors (based on a scale of 1 to 5, with 1 = "Not at all confident" and 5= "Very confident").

a. 1
b. 2
c. 3
d. 4
e. 5

2. A 65-year-old patient with type 2 diabetes returns for annual follow up. The patient's last HbA1c was 9.1%, blood pressure was 140/93, and the patient had dyslipidemia. The patient's visual acuity on presentation was 20/20 and their intraocular pressure was 14 mm Hg OU. The anterior segment examination was nonsignificant except for bilateral cataracts. The posterior segment examination was significant for severe nonproliferative diabetic retinopathy (NPDR). There is no sign of diabetic macular edema (DME) in either eye.

Action	Consistent	Nonconsistent
Widefield fundus photography		
ERG/EOG measurements		
Repeated exam in 3-6 months		
Referral to endocrinology for better glucose control		
Early cataract extraction		
Anti-VEGF treatment for severe nonproliferative disease		
Intravenous fluorescein angiography (FA)		
Indocyanine green (ICG)-angiography		
Optical coherence tomography (OCT) angiography		
Relaxed control of blood pressure		
Control of lipids		

3. What are the color photograph/ophthalmoscopy features of severe NPDR?

a. Hemorrhages in 4 quadrants, arteriovenous (AV) nicking in 2 quadrants, prominent intraretinal microvascular abnormalities (IRMA) in 1 quadrant
b. Hemorrhages in 4 quadrants, venous beading in 2 quadrants, prominent IRMA in 1 quadrant
c. Hemorrhages in 4 quadrants, AV nicking in 2 quadrants, prominent IRMA in 1 quadrant
d. Hemorrhages in 2 quadrants, venous beading in 2 quadrants, prominent IRMA in 1 quadrant

4. Which one of these sets of features describe DRSS-defined high-risk PDR?

a. Neovascularization of the disc (NVD) greater than 1/3 disc area with vitreous hemorrhage
b. Neovascularization elsewhere (NVE) less than 1/2 disc area with vitreous hemorrhage
c. Isolated vitreous hemorrhage
d. NVE greater than 1/2 disc area without vitreous hemorrhage

5. Per the Diabetic Retinopathy Study, 50% of patients with high-risk PDR develop severe vision loss (<5/200) without treatment. What is the most common cause of this vision loss?

a. Tractional retinal detachment
b. Rhegmatogenous retinal detachment
c. Neovascular glaucoma
d. Vitreous hemorrhage

6. You have a 37-year-old patient who has had type 1 diabetes for 20 years. She has well-controlled diabetes (insulin pump) and her last HbA1c was 7.0%. She has newly diagnosed PDR in both eyes with vitreous hemorrhage and an area of superotemporal traction. All of the following options would be reasonable next steps in the management of this patient EXCEPT:

a. Observation
b. Anti-VEGF
c. Panretinal photocoagulation (PRP)
d. Pars plana vitrectomy (PPV)

7. In the control (sham) group of PANORAMA, what proportion of patients progressed to vision-threatening retinopathy complications in the first year?

a. 10%
b. 20%
c. 30%
d. 40%

8. Based on the ETDRS Research Group, what is the approximate risk for progression to PDR from severe NPDR in just 1 year?

a. 20%
b. 30%
c. 40%
d. 50%
e. 60%

9. How much greater relative risk is there for a 36-year-old to develop DR having been diagnosed with diabetes 12 years ago versus 7 years ago?

a. 0.5x
b. 1x
c. 1.5x
d. 2x
e. 2.5x

10. In a 46-year-old male, obese patient who smokes, has an HbA1c of 11.2% and a 10-year history of type 2 diabetes and hypertension, all of the following are appropriate multimodal imaging modalities to evaluate for DR EXCEPT:

a. Widefield color fundus photography
b. Widefield FA
c. OCT
d. ICG-angiography
e. OCT-angiography

11. Which of this patient's comorbidities increase his risk of developing DR and its progression to more severe stages?

a. Hypertension
b. Hyperlipidemia
c. Patient age
d. Smoking
e. All of the above

12. All of the following are considered risks for the development of PDR EXCEPT:

a. Duration of diabetes
b. Level of baseline retinopathy
c. Morbid obesity
d. Level of glycemic control or HbA1c level

ACTIVITY EVALUATION/SATISFACTION MEASURES

Your responses to the questions below will help us evaluate this CE activity. They will provide us with evidence that improvements were made in patient care as a result of this activity.

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

Probability of changing practice behavior based on this activity: _____ Yes _____ No _____No change needed

If you plan to change your practice behavior, what type of changes do you plan to implement? (check all that apply)

_____ Change in pharmaceutical therapy
_____ Change in diagnostic testing
_____ Change in current practice for referral
_____ My practice has been reinforced
_____ Change in nonpharmaceutical therapy
_____ Choice of treatment/management approach
_____ Change in differential diagnosis
_____ I do not plan to implement any new changes in practice

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: _____
_____

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 CE activity; may we contact you by email in 3 months to see if you have made this change? If so, please provide your email address _____