

WATCH OUT



Patients with Diabetes at Risk for Eye Conditions

By Pamela Schumacher, MS, CCMP

Diabetes is the leading cause of new cases of blindness in adults aged 18 to 64 years.¹ In fact, among U.S. adults aged 18 years or older with diagnosed diabetes, 10% report severe vision difficulty or blindness.¹ Understanding diabetes and

educating patients on prevention and management is critical to helping them maintain their eye health and prevent complications.

“Diabetes is a widespread problem, and both type 1 and type 2 diabetes affect the eye,” says Lloyd Paul Aiello, MD, PhD, FARVO, a professor of ophthalmology at Harvard Medical School in Boston, Massachusetts. “They do so in very similar ways and can cause changes that range from either very mild to

very severe, sight-threatening damage.”

Diabetic retinopathy is the most common cause of vision loss in people with diabetes. About one-third of people with diabetes who are older than age 40 already have some signs of diabetic retinopathy. Patient outcomes depend on receiving regular care, because finding and treating diabetic retinopathy early can reduce the risk of blindness by 95%.²

“A big part of the problem is that patients often don’t have any symptoms, and vision can remain unchanged well beyond the time when intervention is most effective,” says Dr. Aiello. “We have many treatments that are effective against the vision-threatening complications of diabetes, but preventing vision loss comes down to the patient being aware that they have the disease and making sure they receive appropriate eye care, follow-up, and treatment.”

A Peek Behind the Scenes

“Diabetes is a disease that affects the body’s ability to produce or use insulin effectively to control blood sugar—[or] glucose—levels,” explains Ninel Gregori, MD, a spokesperson for the American Academy of Ophthalmology. “Too much glucose in the blood for a long time can cause damage in many parts of the body, including the eye.”

For someone without diabetes, the body breaks down most food into glucose and releases it into the bloodstream. When blood sugar goes up, the pancreas releases insulin, which lets the blood sugar into the body’s cells for use as energy.³ When someone has diabetes, however, the body does not make enough insulin or cannot use it as well as it should. With insufficient insulin, the body’s cells stop responding to insulin, and too much blood sugar stays in the bloodstream. Too much glucose in the blood for a long time damages the heart, kidneys, and blood vessels, including the small blood vessels in the eye. Even if diabetes is well-controlled, the eye can be damaged without the patient realizing it.⁴

Three main types of diabetes exist: type 1, type 2, and gestational diabetes.³ Anyone with these diseases is at risk for diabetes-related eye diseases:

- **Type 1 diabetes** is thought to be caused by an autoimmune reaction that stops the body from making insulin. People with type 1 diabetes must take insulin every day to survive. Type 1 diabetes can be diagnosed at any age, and symptoms often develop quickly. It is most often diagnosed in children and young adults.³
- With **type 2 diabetes**, the body does not use insulin well and cannot keep blood sugar at normal levels. It develops over many years and is usually diagnosed in adults (but increasingly in children, teens, and young adults). People may not notice any symptoms, so they must get their blood sugar tested if they have known risk factors.³
- **Gestational diabetes** develops in pregnant people who have never had diabetes. It usually goes away after the baby is born. However, it increases the patient’s risk for type 2 diabetes later in life.³ People who develop gestational diabetes or those with diabetes who become pregnant are at high risk for getting diabetic retinopathy and should have a comprehensive dilated eye examination as soon as possible.⁵

An Overview

Diabetic eye disease represents a group of eye problems that can affect people with diabetes. Over time, diabetes can damage the patient’s eyes, leading to poor vision or even blindness.² The following conditions may be caused by diabetes:

Diabetic retinopathy: The retina—the inner lining at the back of each eye—senses light and turns it into signals that the brain decodes, which creates vision. Early diabetic retinopathy causes blood vessels to weaken, bulge, or leak into the retina. This stage is called *nonproliferative diabetic retinopathy*.²

If the disease worsens, some blood vessels close off, which causes new blood vessels to grow—or proliferate—on the retina’s surface. This stage is called *proliferative diabetic retinopathy*. These abnormal new blood

vessels can break, leading to vitreous hemorrhage and other conditions, possibly leading to serious vision-threatening problems.²

Macular edema: The part of the retina that is needed for central vision—which is used for reading, driving, and seeing faces—is the macula. Diabetes can lead to swelling in the macula, which is called *diabetic macular edema*. Over time, this disease can destroy the sharp vision in this part of the eye, leading to partial vision loss or blindness. Macular edema usually develops in people who already have other signs of diabetic retinopathy.²

Cataracts: The lenses within the eyes are clear structures that focus the light to help provide sharp vision, but they tend to become cloudy with age. People with diabetes can develop cataracts at an earlier age than people without diabetes. Researchers think that high glucose levels cause deposits to build up in the lenses of the eyes.²

Glaucoma: Glaucoma is a group of eye diseases that can damage the optic nerve—the bundle of nerves connecting the eye to the brain. Diabetes doubles the chances of having glaucoma, which can lead to vision loss and blindness if not treated early. Symptoms depend on which type of glaucoma the patient has.²

Vitreous hemorrhages: Vitreous hemorrhages can be due to proliferative diabetic retinopathy or other conditions such as branch retinal vein occlusion or central retinal vein occlusion. These conditions occur when retinal veins become blocked and blood and fluid spill into the retina. In either case, the macula can also swell and affect central vision. Eventually, without blood circulation, nerve cells in the eye can die, and the patient can lose portions or all their vision.⁶

Look Sharp

Often, no early symptoms of diabetic eye disease present themselves. Patients may have no pain and no change in their vision as damage begins to grow inside their eyes. When symptoms do occur, they may include the following²:

- Blurry or wavy vision
- Frequently changing vision

- Dark areas or vision loss
- Poor color vision
- Spots or dark strings (also called *floaters*)
- Flashes of light

“It’s important to recognize these symptoms, because sometimes patients will think they’re not significant,” says Dr. Aiello, who is also director of the Beetham Eye Institute at the Joslin Diabetes Center in Boston. “Medical assistants should ask patients the following questions: ‘Do you have new spots, lines, cobwebs, or hairs in your vision? Do you see flashing lights or fireworks going off? Are straight lines distorted? So, for example, if you look at a door frame, is it curved and not straight?’ Patients may also say it looks like black pepper has been sprinkled everywhere. If any of these problems occur, it

can signal they have [a] severe disease [that] needs prompt eye care. This is true whether a person has diabetes or not, but one should have a higher index of suspicion in a patient who already has diabetes.”

James C. Major Jr., MD, PhD, FACS, FASRS, a spokesperson for the American Society of Retina Specialists, agrees: “A main determinant of vision loss is that the patient has diabetes, particularly if they’ve had it for a while. Secondly, I would make sure that the patient has had a baseline evaluation with a dilated eye [examination] and not just a routine vision check. We have patients that come in with twenty-twenty vision saying, ‘I’m not sure why I’m here, but my eye care specialist told me specifically to see a retina specialist.’ It turns out they have advanced diabetic retinopathy with broken and damaged blood vessels that are leaking and ready to bleed. They’re potentially close to needing surgery, but they haven’t even noticed yet. It’s important to get a baseline [examination] for any adult with diabetes.”

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- Fuzzy whitish spots (called *cotton wool spots*)
- Beading veins
- Sclerotic arteries (no blood runs through them)
- Abnormal new blood vessels (neovascularization of the disc or neovascularization elsewhere)
- Vitreous hemorrhage, as well as swelling in the central retina called *macular edema*
- Optic nerve swelling (optic nerve edema or optic neuropathy)

Timing is critical, cautions Dr. Aiello. “The rule is, if you’re diagnosed with type 2 diabetes, you should have a dilated eye examination as soon as you can after being diagnosed,” he says. “However, patients with type 1 diabetes should have a dilated eye examination within five years [after] puberty. The reason for the difference in timing is when you have type 1 diabetes, it becomes severe very rapidly, and you often end up in the hospital and go on insulin control. Thus, you become aware that you have diabetes very soon after you have it. Whereas, with type 2 diabetes, it’s often very insidious. Most people may have had it for five to 10 years before they’re diagnosed, and at the time of diagnosis, a significant number of people with type 2 diabetes already have eye disease.”

If diabetic retinopathy is identified, patients are given a score ranging from 1 (minor) to 10 (major) in terms of severity, notes Dr. Major. “If they’ve controlled their diabetes very well, they may have a low score for many years,” he says. “For example, one patient may have had diabetes for 10 years, and we check them, and they don’t have much damage to the back of the retina, so that’s a 1. Another patient may have a lot of new blood vessel growth secondary to ischemic damage in the back of the eye. We call that neovascularization, and they are an 8, 9, or 10. The score is largely dependent on the hemoglobin A1c and long-term diabetic glycemic control. The retina specialist will determine [the] length of follow-up care based

Sight, Unseen

“Medical assistants and patients should be aware of the risk factors that increase the likelihood of developing diabetes-related complications, particularly those affecting vision,” says Adreanna Buckley, AAS, CMA (AAMA), the medical assisting program chair at Ivy Tech Community College in Goshen, Indiana. “Awareness of these risk factors can help in early detection, prevention, and management.” She provides these key risk factors for diabetic eye disease:

- Long duration of diabetes (the longer the patient has had diabetes, the more likely they will have diabetic eye disease)
- Consistently high blood sugar
- High blood pressure
- High cholesterol
- Kidney disease, such as diabetic nephropathy
- Pregnancy
- Smoking
- Being Black, Hispanic, or Native American

Looking for Trouble

A full, dilated eye examination is the best way to check for eye problems from diabetes. The physician places drops in the patient’s eyes to widen their pupils, allowing the physician to examine a larger area at the back of each eye using a special magnifying lens. The physician will also test patients’ vision, measure the pressure in their eyes, and run other tests as needed.²

During this screening, an ophthalmologist looks for such symptoms as blurry vision, new floaters, sudden vision loss that starts with dark streaks in the vision, pain in the eye from high pressure caused by new blood vessels growing over the iris and the angle of the eye where fluid drains from the eye, explains Dr. Gregori, who is also a professor of clinical ophthalmology at the Bascom Palmer Eye Institute and chief of ophthalmology at the Miami Veterans Affairs Medical Center in Miami, Florida. He details warning signs to look for:

- Spots of blood (dot blot hemorrhages and flame hemorrhages)
- Yellow deposits (hard exudates which consist of lipid and proteinaceous

Set Your Sights On Helping Patients

The Centers for Disease Control and Prevention offers recommendations that medical assistants can use to talk with patients⁷:

1. Even though people with diabetes have a higher risk of vision loss and eye diseases, 60% of people with diabetes do not get annual eye examinations. Share motivating facts with patients to improve their awareness, such as that the risk of blindness is 25 times higher in people with diabetes compared to those without diabetes.
2. Talk to patients with diabetes about the signs of eye problems during each visit, so that they are aware of changes in their eyesight right away.
3. Encourage patients to see an eye health specialist.
4. Ask patients about their eye health at each visit:
 - Do you get a comprehensive eye exam with dilated pupils at least once a year?
 - Do you know how diabetes can affect your eyes?
 - Do you know what to do if you suddenly have a change in your vision?
5. Help patients understand how diabetes management can support healthy vision:
 - Promote the ABCs of diabetes (A1c, blood pressure, cholesterol, and smoking cessation) and a healthy lifestyle.
 - Connect patients to health coaches, patient navigators, nutritionists, community health workers, and local community resources when possible.
 - Follow up with patients regularly to track how well they are managing their diabetes and connecting with their health care team.⁷

on disease severity. As the disease progresses, the follow-up needs to be more frequent.”

Eyeing the Future

Treatment can stop the damage from diabetic eye disease from getting worse and can sometimes help regain lost vision. Physicians have several options for treatment⁵:

- **Injections** of anti-vascular endothelial growth factor drugs can slow down or reverse diabetic retinopathy. Corticosteroids can also help.
- **Laser treatments** can reduce swelling in the retina and can make abnormal blood vessels shrink and stop leaking.
- **Eye surgery** called *vitrectomy* can be used if the retina is bleeding or there is a lot of scar tissue in the eye.

“The first step in treatment is for the patient to go in for their regular medical and eye care appointments. Patients are greatly helping themselves by doing that,” says Dr. Aiello. “Secondly, medical assistants should help patients get their diabetes under control, which includes blood sugar, blood pressure,

lipids, and cholesterol. That’s going to be primarily with their medical or diabetes physician, but it’s also the best treatment for eye disease. This is why the partnership between the medical care provider and the eye care provider is so important.

“At the more severe stages, the first line of treatment is often drugs that reduce both the number of blood vessels and the leakage,” says Dr. Aiello. “These are administered by injection into the eye, which sounds terrible but is not as bad as it sounds. The patient is given a shot in the office and can go home. It has been done for hundreds of thousands of patients, and people handle it quite well.

“The other major option is laser photocoagulation, [in which] a bright light is focused on the retina in the back of the eye. It destroys some of the retina but also eliminates the extra blood vessels and saves the center part of the retina,” says Dr. Aiello. “This is dramatically effective. It was a huge change when it came about in the 1960s and 70s. When given in a timely and appropriate manner, it can save a huge amount of vision and can be used both for the leakage and for the vessels growing.”

For patients with advanced disease,

an ophthalmologist may recommend vitrectomy, adds Dr. Gregori: “For this, the ophthalmologist removes vitreous gel and blood spilled from bleeding vessels in the back of your eye. This allows light rays to focus properly on the retina again. Scar tissue also might be removed from the retina.”

“We do not have a cure for diabetes or diabetic retinopathy. There is no magic single shot, and then you’re done,” notes Dr. Major. “We have only treatment, which is typically chronic and ongoing. The analogy works like a patient with high blood pressure. They take a pill, and their blood pressure goes down. If they stop taking those pills, their blood pressure goes back up, so patients need to maintain their treatment. If a patient puts off seeing an eye physician for years and years, they can have irreparable damage to their retina that could have been prevented by earlier treatment. Earlier diagnosis and treatment, if needed, is critical.” ♦

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