

How Do We Best Care for the Eyes of People With Diabetes?

Kim A. Carmichael, MD—*Series Editor*

Q. How common is diabetic retinopathy in patients with diabetes, and when does it occur?

A. Diabetic retinopathy is the most common cause of blindness among persons aged 20 to 74 years in developed countries.^{1,2} The prevalence is greatest among Hispanic adults overall, between 8% and 19% among those aged 75 years or older.³ Retinopathy is present in 5.4% of Black individuals and 5.1% among White individuals with diabetes.³ There is no significant difference between men and women with diabetes. The total number of persons with diabetic retinopathy is projected to double between 2010 and 2050 from 7.7 million to 14.6 million.³ A pooled worldwide meta-analysis of data from 1980 to 2008 indicated a prevalence of 35.4% of all persons with diabetes, with 7.5% having proliferative retinopathy.²

Q. What are the most likely eye disorders among persons with diabetes?

A. Cataracts are 2 to 5 times more likely to occur in adults with diabetes and occur at an earlier age.³ In a recent study, 34.6% of persons undergoing cataract

surgery had diabetes, 7.5% of whom had developed postoperative complications.⁴ Among those individuals, hemoglobin A1c was not a risk factor, but there was a small increased risk associated with renal function decline.

Glaucoma is the leading cause of irreversible blindness worldwide, and a recent systematic review with meta-analysis showed that diabetes also increases the risk of primary open-angle glaucoma by 36%.⁵ Neovascular glaucoma, a more severe complication, is also more common among persons with diabetes.³

More than 50% of persons with diabetes will eventually develop some degree of diabetic retinopathy,³ and about 1 in 15 persons will develop a more serious complication, macular edema.³

Q. What are the risk factors for progressive eye disease in persons with diabetes?

A. Duration of diabetes is a major risk factor in persons with both type 1 and type 2 diabetes, with an odds ratio of 13% to 16% increase per year of diabetes.² Hyperglycemia, nephropathy, hypertension, and hyperlipidemia are also

factors that increase the risk.^{1,2}

A 1995 trial showed that for patients with type 1 diabetes, intensive glucose management diminished overall progression by 34% to 76%, with a 43% reduction for each percentage point decrease in hemoglobin A1c.⁶ Similarly, a 1998 trial showed that for patients with type 2 diabetes, each percentage point decrease in hemoglobin A1c was associated with a 35% reduction in the risk of overall microvascular complications, including retinopathy.⁷

Pregnancy may also accelerate progression¹⁻³ and women should have a dilated eye examination in advance of planned pregnancy or within the first trimester.⁴ However, women with gestational diabetes are not at increased risk for retinopathy.⁴

Q. How is eye disease detected in persons with diabetes?

A. Cataracts, glaucoma, and retinopathy frequently advance significantly before becoming symptomatic.³ A comprehensive eye examination includes visual acuity testing, tonometry, dilated visualization of the lens and retina, and optical coherence tomography. If diabetic macular edema or severe retinopathy is suspected, one may consider fluorescein angiography. Prompt referral to a specialist is recommended for persons with macular edema, neovascular glaucoma, severe nonproliferative diabetic retinopathy, or proliferative retinopathy.^{1,2}

Q. What should be done to screen for eye disorders in persons with diabetes?

A. Persons with diabetes should have a dilated eye examination at the time of diagnosis of type 2 diabetes or within 5

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years from the onset of type 1 diabetes.¹ Up to 20% of all patients with type 2 diabetes have some degree of retinopathy at initial diagnosis.² If there is no evidence of retinopathy, consider examination every 1 to 2 years but more often if there is evidence of progression or sight-threatening disease.¹ Retinal photography is not a substitute for comprehensive eye examination. Yearly examination is recommended for all persons with diagnosed retinopathy of any stage and possibly more frequently depending on clinical circumstances.

An eye examination should also be performed before anticipated pregnancy or during the first trimester in the setting of either type 1 or type 2 diabetes.¹

Q. What can be done to help prevent vision loss in persons with diabetes?

A. Hypertension is associated with an increased risk of progression of retinopathy, but no additional benefit is associated with reducing the target systolic blood pressure from 140 to 120 mm Hg.^{1,2} Fenofibrate may be useful as potential adjunctive therapy.^{1,2,8}

Clinically significant diabetic macular edema may require focal or panretinal laser photocoagulation and/or intravitreal injections of anti-vascular endothelial growth factor (VEGF) agents or corticosteroids.^{1,2} Anti-VEGF agents are not to be used during pregnancy.¹ Additional options also include newer injection medications, aflibercept and ranibizumab.¹ Panretinal laser photocoagulation and intravitreal anti-VEGF therapy may also be indicated for management of proliferative diabetic retinopathy.^{1,2} Vitrectomy may be needed when there is severe bleeding into the vitreous space.^{2,3} Aspirin therapy does not increase the risk of retinal hemorrhage, so it is not contraindicated in persons with diabetic macular edema or proliferative diabetic retinopathy.¹

Health care providers may also benefit from using the Diabetes and Healthy Eyes Toolkit provided by the National Eye Institute.⁹

REFERENCES

1. American Diabetes Association Professional Practice Committee, Draznin B, Aroda VR, et al. 12. Retinopathy, neuropathy, and foot care: standards of medical care in diabetes—2022. *Diabetes Care*. 2022;45(Suppl. 1):S185-S194. doi:10.2337/dc22-S012
2. Solomon SD, Chew E, Duh EJ, et al. Diabetic retinopathy: a position statement by the American Diabetes Association. *Diabetes Care*. 2017;40(3):412-418. doi:10.2337/dc16-2641
3. National Eye Institute. *Diabetic Retinopathy*. Updated July 8, 2022. Accessed April 2022. <https://www.nei.nih.gov/learn-about-eye-health/eye-conditions-and-diseases/diabetic-retinopathy>
4. Boroojehy AB, Nunney I, Dhataria KK. The association between glycaemic control, renal function and post-operative ophthalmic complications in people with diabetes undergoing cataract surgery—a single-centre retrospective analysis. *Diabetes Ther*. 2022;13(4):723-732. doi:10.1007/s13300-022-01241-z
5. Zhao YX, Chen XW. Diabetes and risk of glaucoma: systematic review and a meta-analysis of prospective cohort studies. *Int J Ophthalmol*. 2017;10(9):1430-1435. doi:10.18240/ijo.2017.09.16
6. Diabetes control and complications trial research group. progression of retinopathy with intensive versus conventional treatment in the diabetes control and complications trial. *Ophthalmology*. 1995;102(4):647-661. doi:10.1016/s0161-6420(95)30973-6
7. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). UK Prospective Diabetes Study (UKPDS) Group. *Lancet*. 1998;352(9131):837-853. doi:10.1016/S0140-6736(98)07019-6
8. Knickerbein JE, Abbott AB, Chew EY. Fenofibrate and diabetic retinopathy. *Curr Diab Rep*. 2016;16(10):90. doi:10.1007/s11892-016-0786-7
9. National Eye Institute: Diabetes and Healthy Eyes Toolkit. Updated July 10, 2019. Accessed July 20, 2022. <https://www.nei.nih.gov/learn-about-eye-health/>

[outreach-campaigns-and-resources/diabetic-eye-disease-resources/diabetes-and-healthy-eyes-toolkit](#)