

1

Objectives:

01 Understand the clinical criteria used to diagnose and determine the severity of non-proliferative and proliferative diabetic retinopathy.	02 Identify common sequelae of diabetic retinopathy that can cause vision loss.	03 Explain the different treatment options available for diabetic retinopathy and its complications.
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2

Diabetic retinopathy: overview

- Diabetes causes damage to small blood vessels in the retina
- Damaged blood vessels can swell and leak
- Vessels can become blocked, decreasing blood flow to the retina
- New blood vessels develop and cause complications

A microscopic image of retinal vessels stained with a purple dye. The image shows a network of vessels. A dashed box highlights a region labeled 'IRMA' (Intraretinal Microvascular Anomalous Proliferation). Two black arrows point to specific areas of vessel abnormality within the network.

3

Diabetic retinopathy: why it matters

Prevalence of Diabetic Retinopathy in the United States in 2021

9.6

9.6 million people in the United States have diabetic retinopathy.

Diabetic retinopathy is a complication of diabetes that can cause vision loss or blindness.

Prevalence of Diabetic Retinopathy in the United States in 2021

2004 2021

The number of people aged 40 years and older living with diabetes-related eye disease more than doubled since prevalence was last estimated in 2004.

Diabetic retinopathy is the leading cause of blindness in adults ages 20-74

4

Diabetic retinopathy: why it matters

Diabetic retinopathy is the 5th most common cause of blindness globally

5

Diabetic retinopathy: why it matters

Patients with severe DR have:

poorer QUALITY OF LIFE

reduced PHYSICAL, EMOTIONAL & SOCIAL WELLBEING

increased use of HEALTHCARE RESOURCES

A quality of life survey of legally blind DR patients found that **41%** would be willing to trade their remaining years for perfect vision. (Brown 1999)

6

Case #1

- A 54-year-old woman presents to clinic to establish care
- She has a history of diabetes, but it has been many years since her last eye exam
- What are some important questions you want to ask her?

7

Diabetic retinopathy history

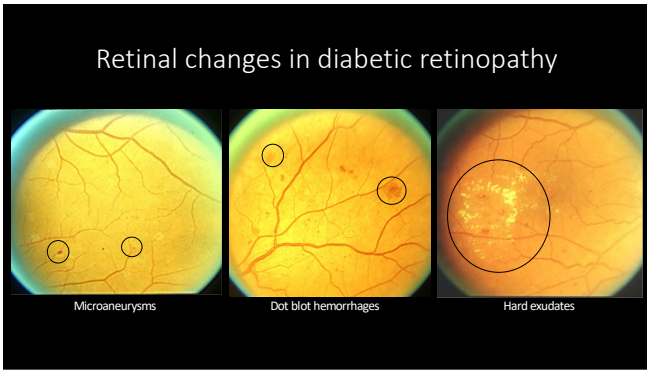
Duration of diabetes	Last A1c	Insulin or other diabetes medications	Other medical conditions
Recent health changes	Pregnancy	Retinopathy history	Symptoms

8

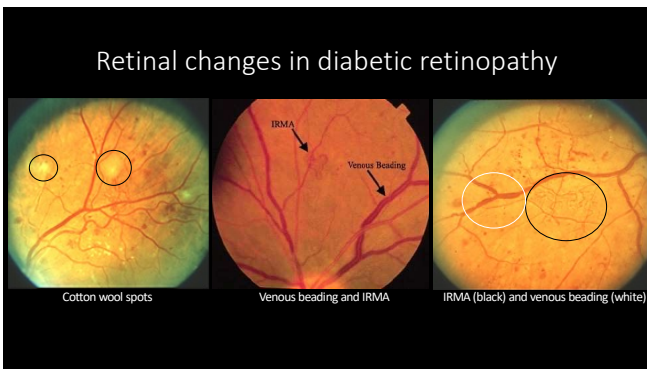
Case #1



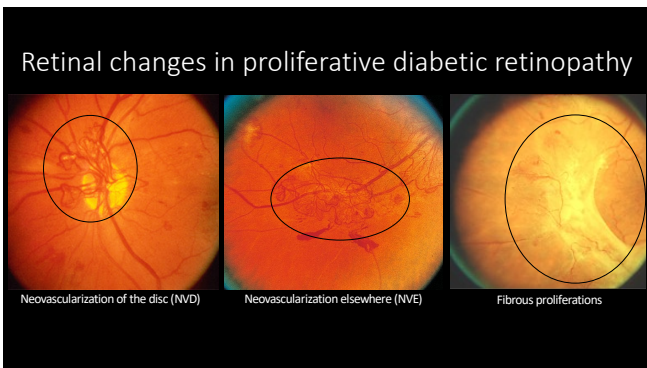
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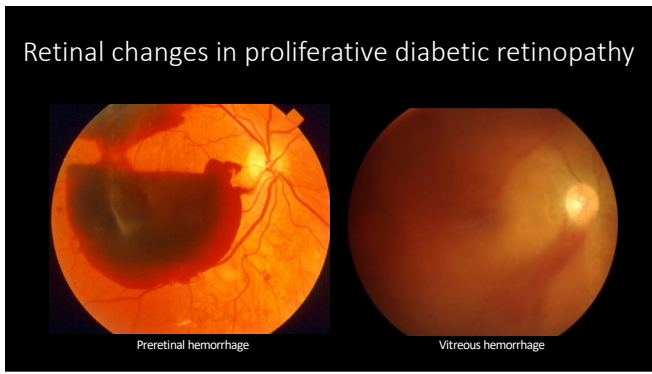
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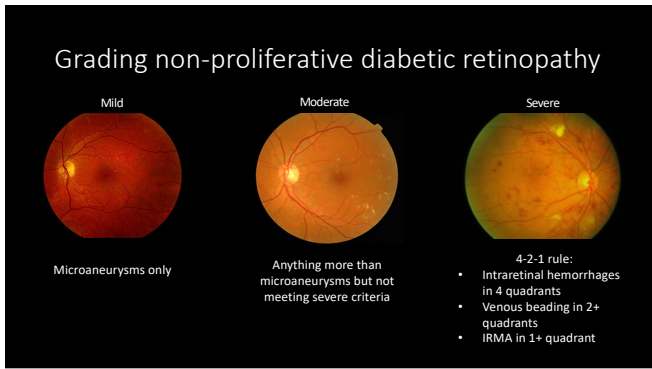
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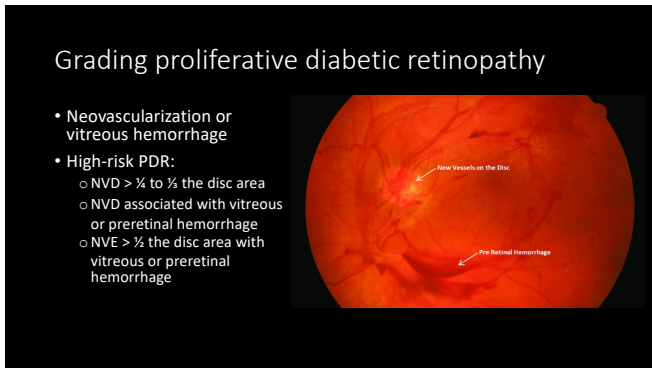
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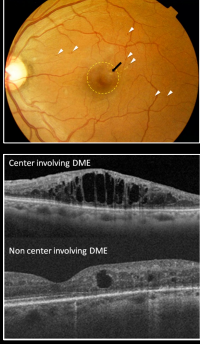
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15

Diabetic macular edema (DME)


- Damage to blood vessels caused by diabetic changes causes them to leak
- Can occur in both NPDR and PDR
- Divided into center-involving DME and non-center involving DME based on location
- Best evaluated with OCT
- Main cause of visual impairment



16

Case #1

- What category does this patient fall into?
- What should be done next?



17




Treatment options: mild and moderate NPDR



- IMPROVED BLOOD SUGAR CONTROL
- IMPROVED BLOOD PRESSURE CONTROL
- REGULAR EYE EXAMS

18

Am I going to go blind?

 <p>Mild</p>	 <p>Moderate</p>	 <p>Severe</p>
<ul style="list-style-type: none"> • 6% probability of severe NPDR/PDR in 5 years • 16% probability of DME in 5 years 	<ul style="list-style-type: none"> • 18% probability of severe NPDR/PDR in 5 years • 45% probability of DME in 5 years 	<ul style="list-style-type: none"> • 52% probability of PDR in 1 year • 63% probability of DME in 5 years

19

Case #2

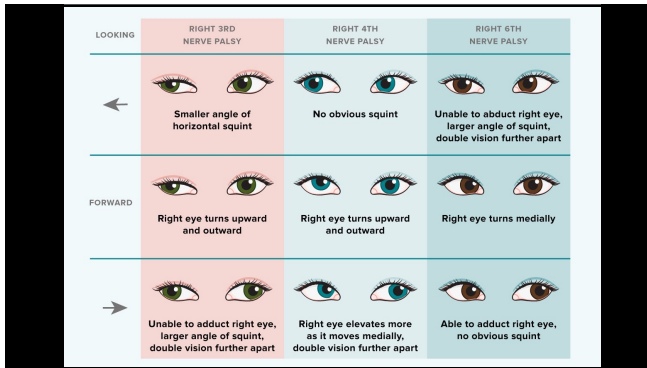
- A 64-year-old man presents for a new patient appointment with 3 weeks of blurred vision in the left eye.
- Was told many years ago that he had "diabetes in the eye"
- Last A1c is 10.1%, recently started insulin
- History of high blood pressure, high cholesterol, and obesity
- Is this from his diabetic retinopathy? What other parts of the eye can be affected in diabetes?

20

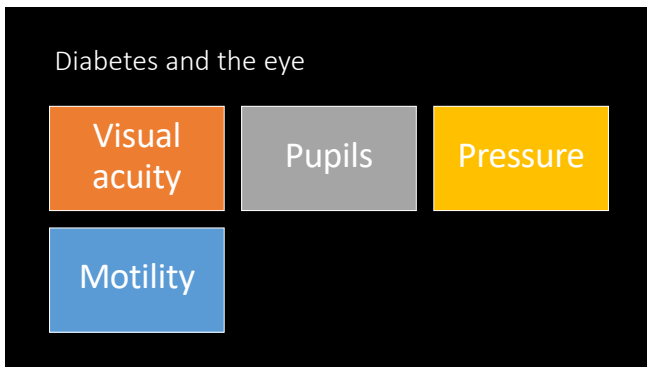
Diabetes and the eye

Visual acuity

21



22



23



24

If you are working up a new patient and see this:

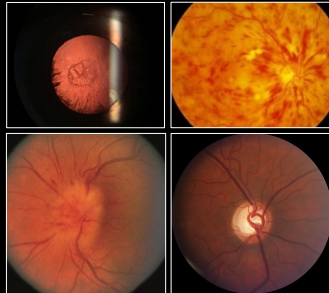


What might you not want to do?

25

Diabetes and the eye

- Lens
 - Refractive changes
 - Cataract
 - Posterior capsule opacification
- Retinal vein occlusion
- Retinal artery occlusion
- Optic nerve
 - Papillopathy
 - NAION
 - Glaucoma
- Diabetic choroidopathy



26

Case #2



27

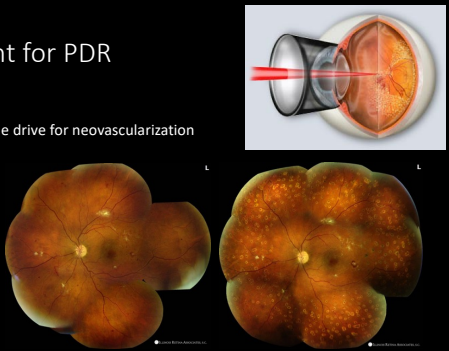
TABLE 5 INITIAL MANAGEMENT RECOMMENDATIONS FOR PATIENTS WITH DIABETES

Severity of Retinopathy	Presence of Macular Edema	Follow-up (Months)	Panretinal Photocoagulation (Scatter) Laser	Focal and/or Grid Laser*	Intravitreal Anti-VEGF Therapy
Normal or minimal NPDR	No	12	No	No	No
Mild NPDR	No	12	No	No	No
	NCI-DME	3-6	No	Sometimes	No
	CI-DME†	1*	No	Rarely	Usually
Moderate NPDR	No	6-12†	No	No	No
	NCI-DME	3-6	No	Sometimes	Rarely
	CI-DME†	1*	No	Rarely	Usually
Severe NPDR	No	3-4	Sometimes	No	Sometimes
	NCI-DME	2-4	Sometimes	Sometimes	Sometimes
	CI-DME†	1*	Sometimes	Rarely	Usually
Non-high-risk PDR	No	3-4	Sometimes	No	Sometimes
	NCI-DME	2-4	Sometimes	Sometimes	Sometimes
	CI-DME†	1*	Sometimes	Sometimes	Usually
High-risk PDR	No	2-4	Recommended	No	Sometimes ^{§§}
	NCI-DME	2-4	Recommended	Sometimes	Sometimes
	CI-DME†	1*	Recommended	Sometimes	Usually

28

Treatment for PDR

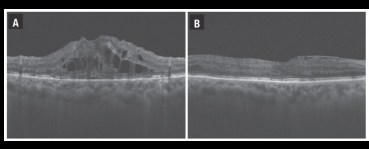
- PRP
 - Reduces the drive for neovascularization
- Anti-VEGF
- Vitrectomy



29

Treatment for DME

- Anti-VEGF for center-involved DME
- Can consider focal laser
- Steroids as second line
- Observation can be appropriate



30

Case #2



31

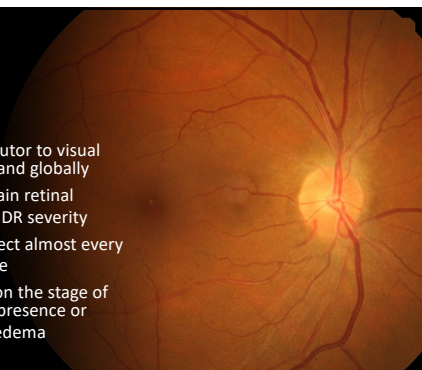
Treatment side effects

Intravitreal injections	
Steroids	
Pan-retinal photocoagulation	
Focal laser	
Vitrectomy	

32

Takeaways

- DR is a major contributor to visual morbidity in the U.S and globally
- The presence of certain retinal findings help classify DR severity
- Diabetes can also affect almost every other ocular structure
- Treatment depends on the stage of retinopathy and the presence or absence of macular edema



33

