Diabetic Retinopathy and Treatment

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Objectives:

01

Understand the clinical criteria used to diagnose and determine the severity of non-proliferative and proliferative diabetic retinopathy.

02

Identify common sequalae 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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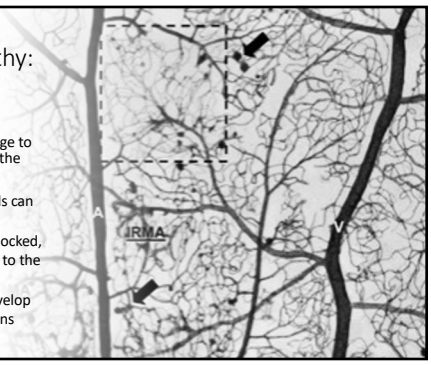
Diabetic retinopathy: overview

- 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



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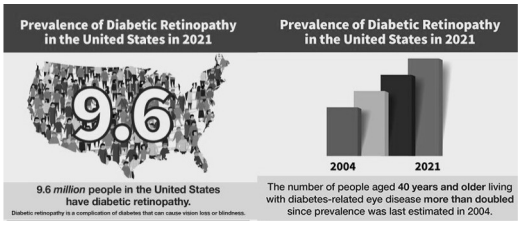
Diabetic retinopathy: why it matters



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

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Diabetic retinopathy: why it matters

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

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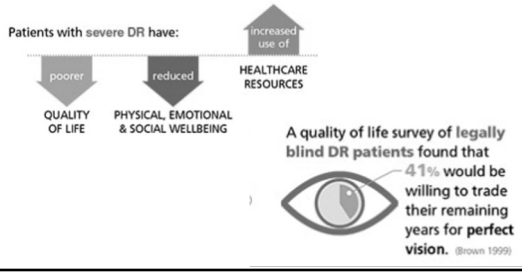
Diabetic retinopathy: why it matters



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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?

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Diabetic retinopathy history

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

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Case #1

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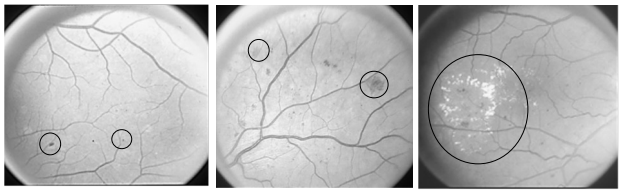
Retinal changes in diabetic retinopathy



Microaneurysms | Dot blot hemorrhages | Hard exudates

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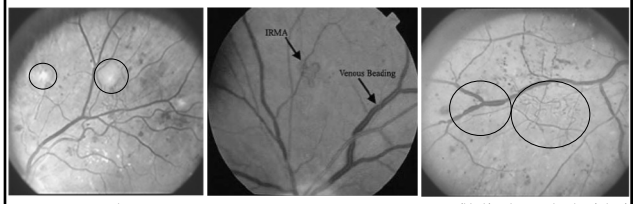
Retinal changes in diabetic retinopathy



Cotton wool spots | Venous beading and IRMA | IRMA (black) and venous beading (white)

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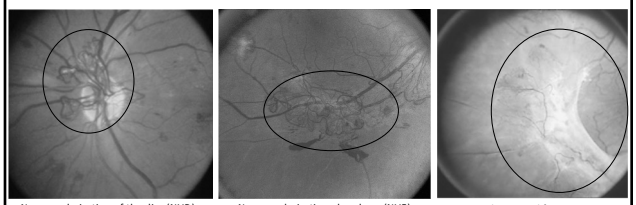
Retinal changes in proliferative diabetic retinopathy



Neovascularization of the disc (NVD) | Neovascularization elsewhere (NVE) | Fibrous proliferations

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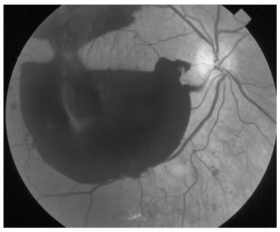
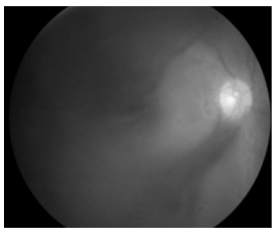
Retinal changes in proliferative diabetic retinopathy



Preretinal hemorrhage



Vitreous hemorrhage

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Grading non-proliferative diabetic retinopathy

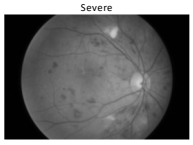
Mild

Microaneurysms only

Moderate

Anything more than microaneurysms but not meeting severe criteria

Severe



4-2-1 rule:

- Intraretinal hemorrhages in 4 quadrants
- Venous beading in 2+ quadrants
- IRMA in 1+ quadrant

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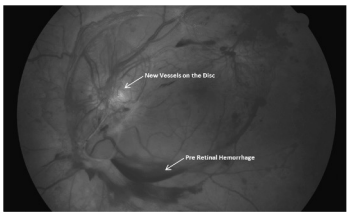
Grading proliferative diabetic retinopathy

- Neovascularization or vitreous hemorrhage
- High-risk PDR:
  - NVD > ¼ to ⅓ the disc area
  - NVD associated with vitreous or preretinal hemorrhage
  - NVE > ½ the disc area with vitreous or preretinal hemorrhage



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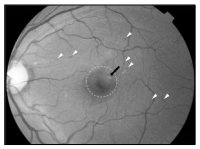
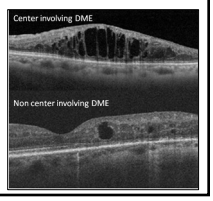
Diabetic macular edema (DME)

- 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 involved DME based on location
- Best evaluated with OCT
- Main cause of visual impairment





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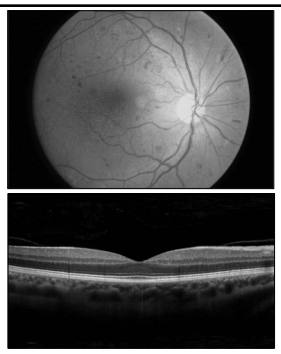
Case #1

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



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Treatment options: mild and moderate NPDR

IMPROVED BLOOD SUGAR CONTROL

IMPROVED BLOOD PRESSURE CONTROL

REGULAR EYE EXAMS

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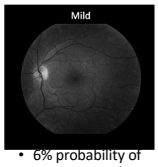
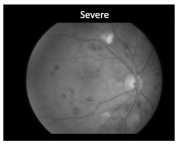
Am I going to go blind?



- 6% probability of severe NPDR/PDR in 5 years
- 16% probability of DME in 5 years

- 18% probability of severe NPDR/PDR in 5 years
- 45% probability of DME in 5 years



- 52% probability of PDR in 1 year
- 63% probability of DME in 5 years

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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?

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Diabetes and the eye

Visual acuity		

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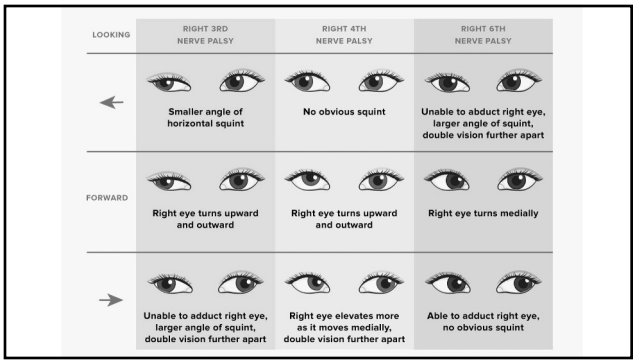

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Diabetes and the eye

Visual acuity	Pupils	Pressure
Motility		

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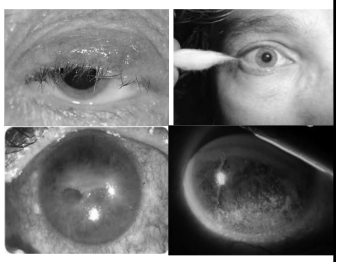
Diabetes and the Eye

- Lids/lashes
  - Blepharitis
- Conjunctiva
  - Increased infection risk
- Cornea:
  - Recurrent erosions
  - Delayed wound healing
  - Ulcers
  - Edema
  - Neuropathy
  - Dry eye
- Iris



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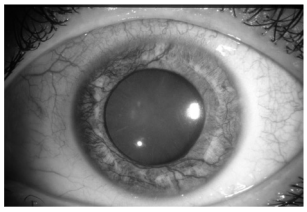
If you are working up a new patient and see this:



What might you not want to do?

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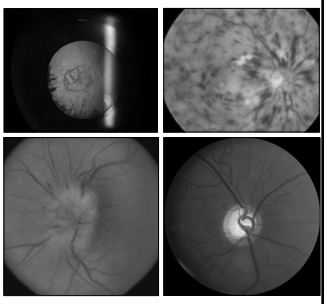
Diabetes and the eye

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



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Case #2

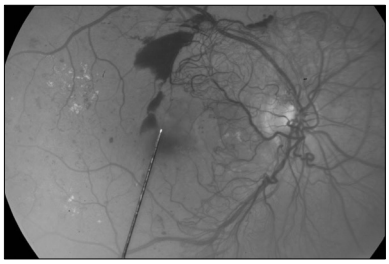

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TABLE 5 Initial Management Recommendations for Patients with Diabetes

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[95,188]
	NCI-DME	2-4	Recommended	Sometimes	Sometimes
	CI-DME†	1*	Recommended	Sometimes	Usually

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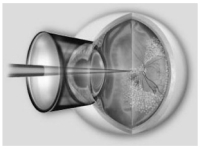
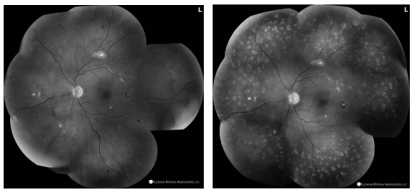
Treatment for PDR



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



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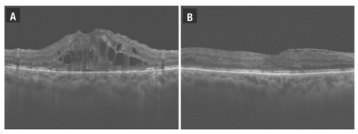
Treatment for DME

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



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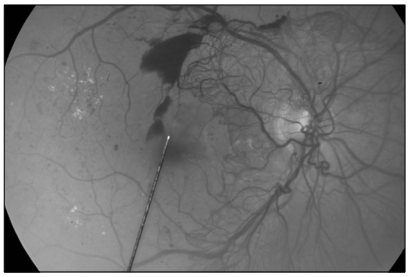
Case #2



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Treatment side effects

Intravitreal injections	
Steroids	
Pan-retinal photocoagulation	
Focal laser	
Vitrectomy	

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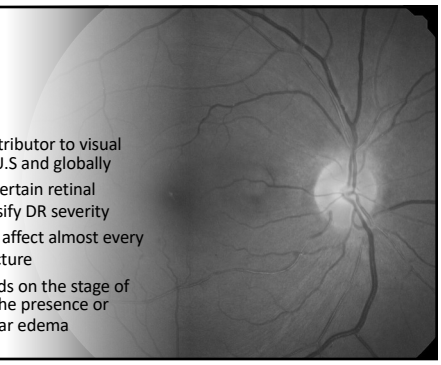
Takeaways

- 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



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Case #3

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Imaging in diabetic retinopathy

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