The ODs Role in Diabetes

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Course Description

This course will provide the latest information on diabetes-related retinal disease (DRD). Emphasis will be on the OD's role in early detection using the latest in diagnostic modalities and therapeutic advances for vision-threatening diabetic retinopathy.

Goal

Provide attendees with the latest diagnostic strategies and therapeutic advances for DRD and discuss integration of these innovations into clinical practice.

Learning Objectives

At the conclusion of this course, attendees should be better able to effectively*:*

1) Understand the latest scope of diabetes.
2) Recognize the risk factors, classification, and advancements in early detection and treatment of diabetes-related retinal disease (DRD).
3) Appreciate the latest technologies in diagnosis of hypertensive retinopathy- ultra wide-field imaging, multi-modal imaging with SD-OCT and OCT angiography (OCTA).
4) Describe interprofessional team strategies for improving care coordination and outcomes in patients with diabetes.

Abstract

With nearly half of Americans affected with diabetes— more than 37 million adults and 96 million pre-diabetics at risk, diabetes is a major public health problem. This course will provide the latest information on diabetes-related retinal disease (DRD). Emphasis will be on the OD's role in early detection using the latest in diagnostic modalities and therapeutic advances for vision-threatening diabetic retinopathy.

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COURSE OUTLINE

I. Latest on Diabetes *(National Diabetes Fact Sheet 2022)*

- United States:
  - Total: 37.3 million people have diabetes (1 in 10 people)
  - Diagnosed: 28.7 million people, including 28.5 million adults
  - Undiagnosed: 8.5 million people (1 in 5 people)
  - Prediabetes: 96 million people (1 in 3 people)
- Globally
  - Diabetes globally will increase from 536.6 million (10.5% of the world's population) in 2021 to 783.2 million by 2045.
- Ethnicity, Education and Family Income are strong predictors of diabetes
- Diabetes healthcare impact

II. Diabetes-related retinal disease (DRD)

- Diabetic Retinopathy (DR)- leading cause of preventable blindness in working aged adults (20-74 years of age)
  - Diabetic macular edema (DME)- is the leading cause of vision loss among patients with DR. Centered vs non-centered DME
  - Diabetic macular ischemia (DMI)- Vascular anomalies (loops & dilations) Capillary dropout & FAZ enlargement
    - Macular Ischemia can impact anti-VEGF Treatment
- ~28.5 million have vision threatening DRD
  - Expected to increase to 16 million by 2050
  - Initial sign of underlying disease (33% of type 2 DM) – case presentation
- Risk factors- A (A1C), B (blood pressure), C (cholesterol, and smoking
  - Mean A1C levels of 8.8% for those with type 1 diabetes and 8.6% for those type 2 diabetes
    - A1C is unreliable in patients with anemia, hemoglobinopathies, or iron deficiency. Evidence shows that A1C differs among ethnic groups
  - Time in Range (TIR)- A new parameter to evaluate blood glucose control. Indicates the percentage of time a person's glucose value was within the target range during a defined period
    - Target range: 70–180 mg/dL
    - Recommended TIR for most: >70%
    - The higher the TIR range percentage- the lower the risk of developing complications.

III. Diabetes-related retinal disease (DRD)

- Hyperglycemia induce microvascular damage:
  - Alterations in biochemical pathways- increased flux of advanced glycation end products/receptors (AGE/RAGE), polyol pathway, protein kinase C (PKC) activation, and hexosamine pathway produce oxidative stress
  - Damages the pericytes and weakens capillary walls which causes retinal ischemia — ↑ VEGF — ↑ vascular permeability — neovascularization- fibrovascular tissue causes retinal traction detachment.

IV. Innovation in Diagnosis- Case presentations

- Classification
  - Diabetic Retinopathy Severity Score (DRSS)

TABLE 1 Diabetic Retinopathy Disease Severity Scale and International Clinical Diabetic Retinopathy Disease Severity Scale

Disease Severity Level	Findings Observable upon Dilated Ophthalmoscopy
No apparent retinopathy	No abnormalities
Mild NPDR (see Glossary)	Microaneurysms only
Moderate NPDR (see Glossary)	More than just microaneurysms but less than severe NPDR
Severe NPDR	
U.S. Definition	Any of the following (4-2-1 rule) and no signs of proliferative retinopathy: • Severe intraretinal hemorrhages and microaneurysms in each of **four** quadrants • Definite venous beading in **two** or more quadrants • Moderate IRMA in **one** or more quadrants
International Definition	Any of the following and no signs of proliferative retinopathy: • More than 20 intraretinal hemorrhages in each of **four** quadrants • Definite venous beading in **two** or more quadrants • Prominent IRMA in **one** or more quadrants
PDR	One or both of the following: • Neovascularization • Vitreous/preretinal hemorrhage

IRMA = intraretinal microvascular abnormalities; NPDR = nonproliferative diabetic retinopathy; PDR = proliferative diabetic retinopathy

NOTE:

- Any patient with two or more of the characteristics of severe NPDR is considered to have very severe NPDR.
- PDR may be classified as high-risk and non-high-risk. See Table 6 for more information.

Adapted with permission from Wilkinson CP, Ferris FL III, Klein RE, et al. Proposed international clinical diabetic retinopathy and diabetic macular edema disease severity scales. Ophthalmology 2003;110:1679.

  - ETDRS and modified ETDRS scale
- Multimodal imaging
  - OCT
    - Disorganization of the retinal inner layers (DRIL)
    - Centered involved (CI-DME) vs non-centered DME
  - OCT(A)
    - subclinical microaneurysms (MAs)/ DMI- vascular anomalies (loops and dilations), capillary non-perfusion, neovascularization
  - Ultra-wide field imaging of DR
    - Eyes with predominantly peripheral lesions (defined as outside of ETDRS 7 standard field) had a 4.7- fold increased risk of progression to proliferative diabetic retinopathy (PDR)
  - Fundus autofluorescence (FAF)
    - Lipofuscin accumulation in DR
    - HyperFAF in DME
  - Abnormal visual function (e.g., decreased color perception, contrast sensitivity, and abnormal electrophysiology of the retina)

V. Standard of Care

- PDR: PRP versus Anti-VEGF (Protocol S)
- Anti-VEGF for PDR and CI-DME
  - RIDE/RISE, RESTORE, and VISTA/VIVID
  - FDA Approved therapy. Ranibizumab (Lucentis 0.3 mg) – RIDE/RISE ($1150); Aflibercept (Eylea) – VIVID/VISTA

($2000), Dexamethasone implant (Ozurdex) – MEAD ($1400), Fluocinolone implant (Iluvien) –FAME ($9300)

- Off label therapy
  - Bevacizumab (Avastin) – DRCR.net ($70)
  - Intravitreal Triamcinolone (Triessence) - $150

VI. Latest on Therapeutic Advances:

- Vabysmo ((faricimab-svoa)
  - Bispecific- Angiopoietin 2 & Anti-VEGF
- Susvimo- port delivery system-Ranibizumab
  - Complications
  - Recent Recall
- Protocol V- Anti-VEGF for CI-DME in patients with good vision (20/25 vision or better)
- PANORAMA study: Aflibercept (Eylea) for moderate-to-severe and severe nonproliferative diabetic retinopathy (NPDR) with or without DME.
- Protocol AE: whether photo-biomodulation-PBT (670 nm wavelength) has a beneficial effect in eyes with DME
- Protocol W: Whether anti-VEGF therapy prevents vision-threatening complications in severe non-proliferative DR and whether favorable anatomic outcomes will lead to favorable visual acuity outcomes

VII. American Diabetes Association

- HCPs: Consistent Messages
- Recognition of anti-VEGF agents as the 'gold standard' for diabetic macular edema (DME)
- Retinal photography may serve as a screening tool for retinopathy.
- Diabetic teleretinal screening
- The Multidisciplinary Diabetes Care Team

VIII. Conclusion

- Diabetes and the risk of vision-threatening retinopathy is on the rise.
- Early diagnosis and treatment have significantly improved the patient visual prognosis and outcome.
- Multidisciplinary diabetes care team.
- OD's play a vital role by incorporating the latest in diagnostic modalities and therapeutic advances for vision-threatening diabetic retinopathy (VTDR), proliferative DR and diabetic macular edema (DME).

IX. Q & A

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