DIABETIC RETINOPATHY

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Normal Fundus

- Fovea
- Optic nerve head
- Retinal vein
- Retinal artery
Orientation

B Posterior Pole and Periphery
Layers/Levels of the Retina

**LAYERS**
- Vitreous
- Internal Limiting Membrane
  - Nerve Fiber Layer
  - Ganglion Cell Layer
- Inner Plexiform Layer
- Inner Nuclear Layer
- Outer Plexiform Layer
- Outer Nuclear Layer
- External Limiting Membrane
  - Rods and Cones
  - Pigment Epithelium
  - Bruch’s Membrane
- Choriocapillaris
- Choroidal Vessels

**LEVELS**
- **Vitreous**
- **Inner Retina**
- **Central Retina**
- **Outer Retina**
- **Choroid**
Function

- Rods in retinal periphery for dim light
- Cones concentrated in fovea for color vision and high resolution visual acuity
- 3 different cones: red, green, and blue
Diabetic Retinopathy

- Leading cause of blindness in 20-65 y/o
- Duration of DM correlates with retinopathy
- Classification is based on severity of retinal vascular changes
Epidemiology

- 10.4 million American have DM in 1998 (6% of aged 45 to 64 years and 11% for over 65 years old)
- Duration of DM correlates with retinopathy (84% to 90% have diabetic retinopathy with a duration of 10 to 15 years)
Background Retinopathy

- Mild
- Moderate
- Severe
- Very Severe
Neovascularization of the Disc
Proliferative Diabetic Retinopathy
Tractional Retinal Detachment

- Consequence of NVD/NVE
- Evolves slowly
- TRD involving macula is the main threat to vision
- Requires urgent vitrectomy with membrane peeling
Macular Edema

- Clinical significant ME
- Thickening within 500 um of fovea
- Hard exudates within 500 um of fovea assoc with thickening
- 1 DA of thickening within 1 DD of fovea
Cotton-Wool Spots
Diagnostic Tools and Treatment Strategies in Retina
Fluorescein Angiography

- Fluorescein Angiography is a necessary and important diagnostic aid used in ophthalmology.
- Fluorescein angiography displays the microvascular structures in detail to show the pathological changes located in the eye.
**Dye Injection**

- 5cc of 10% fluorescein is drawn into a 6ml syringe.
- 23g butterfly is attached to syringe.
- Usually an antecubital vein is selected from either arm ( #2 back of hand).
- Dye is injection at rate of 1cc per second.
- Arm to Eye circulation is between 8 – 15 sec.
Background
Diabetic Retinopathy

Venous Phase
Shows cluster of microaneurysms

Early Recirculation Phase
Shows classical appearance of macular edema

Late Phase
Shows Clinically Significant Macular Edema (CSME) - A treatable from of BDR with good vision return
OCT
Cystoid Macular Edema
Focal Laser Photo-Coagulation

- Light burns
- Do not treat fovea
- Stimulates resolution of fluid by RPE
- Directly coagulate MAs
Pan-Retinal Photo-Coagulation

- Large spots
- Medium-hot burns
- Treat peripherally, sparing macula
- Can induce bleeding
Intravitreal Injections
Antiangiogenic Agents

- Kenolog (corticosteroid)
- Macugen (Anti-VEGF Aptamer)
- Avastin (Genentech)
- Lucentis (Genentech)
- Eylea (Regeneron)
- Ozurdex (Allergan)
VEGF is an Important Therapeutic Target in the Eye

- Appears necessary for pathologic neovascularization
- Appears sufficient to trigger neovascularization
- Preferential role for VEGF_{165} suggested in pathologic neovascularization
- Blocking VEGF_{165} inhibits abnormal vessel growth and spares normal vessels
Advanced PDR
Surgical Intervention
Vitreous Surgery for Complications of Diabetic Retinopathy: Traction RD

Before

After
**Follow up Schedule for Diabetic Retinopathy**

**TABLE 72-3**
Recommended Follow-up Schedule

<table>
<thead>
<tr>
<th>Status of retinopathy</th>
<th>Follow-up (mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No retinopathy or microaneurysms only</td>
<td>12</td>
</tr>
<tr>
<td>Mild/moderate NPDR without macular edema</td>
<td>6-12</td>
</tr>
<tr>
<td>Mild/moderate NPDR with macular edema</td>
<td>4-6</td>
</tr>
<tr>
<td>Mild/moderate NPDR with macular edema that is not clinically significant</td>
<td>4-6</td>
</tr>
<tr>
<td>Mild/moderate NPDR with clinically significant macular edema</td>
<td>3-4</td>
</tr>
<tr>
<td>Severe/very severe NPDR</td>
<td>3-4</td>
</tr>
</tbody>
</table>

NPDR, Nonproliferative diabetic retinopathy.
Risk of Diabetic Retinopathy Correlates with HbA1C
Thank You!