Diabetic Retinopathy

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Disclosure Statement

• Speakers bureau/Advisory Board for:
  – Allergan
  – Alcon
  – Reichert Technologies
  – VSP
  – Eagle Eye Sciences Inc.
  – Macula Risk
  – Maculogix

Diabetic Retinopathy

• Leading cause of blindness 20-74 year old
• 8-12% of all new cases of legal blindness
• 50,000 Americans legally blind
• Early diagnosis and treatment can decrease vision loss by 50-60%
• Factors which influence development of DR
  – duration of disease
  – control of BS

Diabetic Retinopathy

• Duration of Disease:
  – <10 years 1%
  – 11-13 years 23%
  – > 16 years 60%
• Control of BS (UKPDS)
  – for every 1% decrease in HgbA1C there is a 35% reduction in risk for retinopathy

Diabetic Retinopathy

• Joslin Diabetes Center study
  – Only 60% of DM’s receive “timely eyecare”
  – $624 million and 400,000 patients’ sight saved if annual eye exam and appropriate treatment
• March 2001: Ophthalmology 35% of DM reported no annual DFE

Diabetic Retinopathy

• Non-proliferative Diabetic Retinopathy (NPDR)
  – mild
  – moderate
  – severe
  – very severe
• Proliferative Diabetic Retinopathy (PDR)
  – Including high-risk
### Nonproliferative Diabetic Retinopathy (NPDR)

- Loss of retinal capillary pericytes
- Weakens capillary walls
- Causes non-perfusion in capillary beds and hypoxia
- Divided into mild, moderate, and severe (and very severe)

#### Mild NPDR

- At least one:
  - Microaneurysms (ma)
  - Dot/blot hemorrhages

#### Moderate NPDR

- Marked hemorrhages/ma
  - > standard photo 2
- Cotton wool spots (CWS)
- Venous beading (VB)
- Intra-retinal microvascular abnormalities to mild degree (IRMA’s)

#### Severe/ Very Severe NPDR

- 4-2-1 Rule:
  - Marked hemes/ma in all 4 quadrants
    - > standard photo 2A
  - VB in 2 or more quadrants
  - Marked IRMA’s in one quadrant
    - >standard photo 8A
- Very severe: 2 of the 3 above criteria

### Mild NPDR

- Follow-up: 1 yr
  - 5-10% of pts with no retinopathy will progress to retinopathy within 1 year
  - 5-10% with mild NPDR will also progress within 1 year
- Consult with PCP as needed

### Moderate NPDR

- Follow Up: 6 months
  - as many as 16% of pts with mod NPDR can progress to proliferative disease within 4 years
Severe NPDR

- Follow-up: 3-4 months
  - Between 10-50% of pts with this level progress to PDR within 1 year
- Laser is sometimes recommended
  - Type 2 DM, associated with a 50% reduction in the rate of severe vision loss, vitrectomy and progression to high-risk PDR
- Good time to seek retinal consultation with FA
- PCP as needed

Risk of Progression to PDR

<table>
<thead>
<tr>
<th>Level</th>
<th>1 year</th>
<th>5 years</th>
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</thead>
<tbody>
<tr>
<td>Mild NPDR</td>
<td>5%</td>
<td>14%</td>
</tr>
<tr>
<td>Moderate NPDR</td>
<td>12-26%</td>
<td>30-48%</td>
</tr>
<tr>
<td>Severe NPDR</td>
<td>52%</td>
<td>71%</td>
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Proliferative Diabetic Retinopathy (PDR)

- Hallmark is retinal neovascularization
  - response to ischemia from capillary closure
  - grow onto lattice of vitreous
  - new vessels are fragile and easily rupture
- Neo divided into 2 categories
  - NVD: on or within 1DD of optic disc
  - NVE: neovascularization elsewhere

PDR

- Follow-up: Retinal consult within 2 weeks
- Laser most likely recommended at this stage
  - +/- anti-VEGF
- Consult with PCP as needed

High Risk PDR

- NVD >1/4 to 1/3 disc area
- Any NVD with a PRH or VH
- Moderate to severe NVE with VH or PRH
- Poses very high risk of severe VH and vision loss within 2 years

- Follow-up: Immediate Retinal consult (24-48 hours)

High Risk PDR

- Follow-up: Immediate Retinal consult (24-48 hours)
- Most likely will benefit from PRP +/- anti-VEGF
- Referral PCP as needed to optomoze BS/BP control
Pan-Retinal Photocoagulation (PRP)

- Treatment for proliferative disease
- Laser applied to retina, destroying parts
- Eliminates need for oxygen, thereby decreasing vasoproliferative stimulus
- Elimination of hypoxia causes regression of new vessel growth
- Not without complications:
  - decreased VF
  - decreased night vision
  - CME

ETDRS and DRS

- Proved benefit of immediate PRP
  - Showed an overall reduction rate of severe vision loss (i.e. 5/200) of approximately 50% in treated vs. untreated eyes
    - <4% chance of severe vision loss in 5 years w/ tx
  - Also, slowed progression to HRC
    - 34.6% to HRC without vs 14.3% with treatment

Clinically Significant Macular Edema (CSME)

- Characteristics
  - retinal thickening at or within 500 microns (1/3 DD) of center of macula
  - hard exudates at or within 1/3 DD if associated with thickening of adjacent retina
  - thickening greater than 1 DD in size part of which is within 1 DD of center of macula
  - May occur at any stage of retinopathy

CSME

- Level of Retinopathy
  - mild NPDR 3%
  - moderate to severe NPDR 40%
  - Proliferative 71%

- Type 2: Duration and Insulin
  - no insulin
    - 10 years 5%
    - 20 years 15%
  - on insulin
    - 10 years 10%
    - 20 years 30-35%

- Treatment: retinal consult within 2 weeks
- Focal or Grid Macular Laser
- Consult with PCP as needed
Focal Macular Laser (FML)

- ETDRS: proved benefit of FML in improving vision
- Reduces the risk of moderate vision loss (doubling of the visual angle) from 30% to less than 15%
  - so 50% reduction in MVL after 3 years
- Real goal is to prevent further loss, not to improve vision

Intravitreal Traimcinolone vs FML

- *Ophthalmology* September 2008
- 848 eyes with CSME and VA from 20/40 to 20/320 were evaluated
  - At 2 yrs, laser is more effective and has fewer side effects than either 1 or 4 mg intravitreal triamcinolone
  - Therefore laser should still be considered the benchmark for other treatments of DME

Anti-Vegf

- RISE/RIDE studies
  - Pts with DME received intravitreal Lucentis 0.3 mg or 0.5 mg monthly for 2 years
    - 33.6% of pts receiving 0.3 mg gained > 15 letters
    - 45.7% of pts receiving 0.5 mg gained > 15 letters
    - Only 12.3% in placebo group gained > 15 letters
  - 3-4 fold increases in treated patients

Retinal Care for the diabetic patient

- Dilated retinal exams
- Timely intervention and referral to retinal specialist
- Patient education
  - inform of ocular side effects
  - retinopathy possible even with good vision
  - report ocular symptoms associated with DM
- Optimize BS/BP control with PCP
  - AIC < 7
  - BP < 140/80