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Key Changes

• New information on
  • The effectiveness of local intraocular pharmacological therapies in improving vision and reducing the level of diabetic retinopathy
Retinopathy Checklist

✓ SCREEN regularly

✓ DELAY onset and progression with glycemic and BP control ± fibrate

✓ TREAT established disease with laser photocoagulation, intra-ocular injection of medications or vitreoretinal surgery

BP, blood pressure
# Diabetic Retinopathy Most Common Cause of Blindness Among Working Age

<table>
<thead>
<tr>
<th>Category</th>
<th>Proliferative Retinopathy</th>
<th>Macular Edema</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1 DM</td>
<td>23%</td>
<td>11%</td>
</tr>
<tr>
<td>Type 2 DM on insulin</td>
<td>14%</td>
<td>15%</td>
</tr>
<tr>
<td>Type 2 DM on non-insulin antihyperglycemic agents</td>
<td>3%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Retinopathy Increases Morbidity and Mortality

- Visual loss is associated with:
  - Increased falls
  - More hip fractures
  - 4-fold increase in mortality
  - Early death (in type 1 diabetes)
Forms of Retinopathy

1. Macular Edema

2. Non-proliferative and Proliferative

3. Retinal Capillary Closure
Macular Edema

- Diffuse or focal vascular leakage at the macula
Non-proliferative/Proliferative Retinopathy

- Blood vessel changes

- Non-proliferative
  - Microaneurysms, intraretinal hemorrhage, vascular tortuosity and vascular malformation

- Proliferative
  - Abnormal vessel growth
Retinal Capillary Closure

- Seen with fluorescein angiography
- Potentially blinding complication
- Currently no treatment options
Screening for Retinopathy

When to initiate screening
- Type 1 diabetes: **5 years after diagnosis** in all individuals ≥15 years
- Type 2 diabetes: children, adolescents and adults **at diagnosis**

Screening methods
- 7-standard field, stereoscopic-colour fundus photography with interpretation by a trained reader (gold standard)
- Direct ophthalmoscopy or indirect slit-lamp fundoscopy through dilated pupil
- Digital fundus photography
Retinopathy (cont’d)

If retinopathy is present
- Diagnose retinopathy severity and establish appropriate monitoring intervals (1 year or less)
- Treat sight-threatening retinopathy with laser, pharmacological or surgical therapy
- Review glycemic, BP and lipid control, and adjust therapy to reach targets as per guidelines*
- Screen for other diabetes complications

If retinopathy is not present
- Type 1 diabetes: rescreen annually
- Type 2 diabetes: rescreen every 1 to 2 years
- Review glycemic, BP and lipid control, and adjust therapy to reach targets as per guidelines*
- Screen for other diabetes complications
Risk Factors for Progression

• Longer duration of diabetes
• Elevated A1C
• Hypertension
• Dyslipidemia
• Low hemoglobin level
• Pregnancy (with type 1 diabetes)
• Proteinuria
• Severe retinopathy itself
Delay of the Disease

1. **Glycemic** control: target A1C ≤7%

2. **Blood pressure** control: target BP <130/80

3. **Lipid-lowering** therapy: Fibrates have been shown to decrease progression and may be considered
DCCT: Reduction in Retinopathy with Intensive Glycemic Control

Primary Prevention

76% RRR

Secondary Intervention

54% RRR

UKPDS38: Reduction in Microvascular Complications with Blood Pressure Control

Microvascular
Reduction in risk with tight control 37%
(95% CI 11% to 56%) (P = 0.0092)

Patients with events (%) vs. Years from randomisation
Less tight control
Tight control

UKPDS. BMJ 1998;317:703-713
UKPDS38: Reduction in Retinopathy with Blood Pressure Control

<table>
<thead>
<tr>
<th>Surrogate end point</th>
<th>No of patients</th>
<th>No of patients with progression</th>
<th>% of patients with progression</th>
<th>P value</th>
<th>Relative risk for tight control (99% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tight control</td>
<td>Less tight control</td>
<td>Tight control</td>
<td>Less tight control</td>
<td></td>
</tr>
<tr>
<td>Progression of retinopathy by ≥2 steps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median 1.5 years</td>
<td>461</td>
<td>243</td>
<td>93</td>
<td>56</td>
<td>20.2</td>
</tr>
<tr>
<td>Median 4.5 years</td>
<td>411</td>
<td>207</td>
<td>113</td>
<td>76</td>
<td>27.5</td>
</tr>
<tr>
<td>Median 7.5 years</td>
<td>300</td>
<td>152</td>
<td>102</td>
<td>78</td>
<td>34.0</td>
</tr>
<tr>
<td>Deterioration in vision by ≥3 ETDRS lines</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Median 1.5 years</td>
<td>575</td>
<td>293</td>
<td>31</td>
<td>20</td>
<td>5.4</td>
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<tr>
<td>Median 4.5 years</td>
<td>523</td>
<td>257</td>
<td>39</td>
<td>23</td>
<td>7.5</td>
</tr>
<tr>
<td>Median 7.5 years</td>
<td>332</td>
<td>180</td>
<td>34</td>
<td>35</td>
<td>10.2</td>
</tr>
</tbody>
</table>

ETDRS = early treatment of diabetic retinopathy study
**ACCORD Eye: Glycemic control and Combo of fenofibrate and simvastatin reduced progression**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycemia</td>
<td>0.67</td>
<td>(0.51 - 0.87)</td>
<td>0.0025</td>
</tr>
<tr>
<td>Lipid</td>
<td>0.60</td>
<td>(0.42 - 0.86)</td>
<td>0.0056</td>
</tr>
<tr>
<td>BP</td>
<td>1.23</td>
<td>(0.84 - 1.79)</td>
<td>0.29</td>
</tr>
</tbody>
</table>

Intensive glycemic control and combination of fenofibrate and simvastatin, but not intensive blood pressure control, reduced the rate of progression of diabetic retinopathy in this older, high-risk population.

FIELD: Fenofibrate reduced retinopathy requiring laser

- HR = 0.70
- 95% CI = 0.58–0.85
- p = 0.0003
Diabetic Retinopathy CAN be Treated

1. Pan-retinal photocoagulation → laser therapy
   • Reduces blindness by 90% in severe non-proliferative or proliferative retinopathy

2. Local (intra-ocular) pharmacologic intervention
   → VEGF antagonists
   • Aflibercept, ranibizumab, bevacizumab (off-label use in Canada) improve vision

3. Surgical intervention → vitrectomy
Sight-threatening Retinopathy MUST be

✓ Prevented with good blood glucose and blood pressure control (± fenofibrate)

✓ Detected through screening

✓ Treated with laser therapy, anti-VEGF medications or vitrectomy

to save VISION
Recommendation 1

1. In individuals >15 years of age with type 1 diabetes, screening and evaluation for retinopathy should be performed annually by an experienced vision care professional (optometrist or ophthalmologist) starting 5 years after the onset of diabetes [Grade A, Level 1] (for screening recommendation for children and adolescents <15 years with type 1 diabetes see Type 1 Diabetes in Children and Adolescents chapter; for screening recommendations for pregnant women, see Diabetes and Pregnancy chapter)
Recommendation 2

2. In individuals with **type 2 diabetes**, screening and evaluation for diabetic retinopathy should be performed by an experienced vision care professional (optometrist or ophthalmologist) at the **time of diagnosis** of diabetes [Grade A, Level 1]. The interval for follow-up assessments should be tailored to the severity of the retinopathy [Grade D, Consensus]. In those with **no or minimal retinopathy**, the recommended interval is **1-2 years** [Grade A, Level 1] (for screening recommendations for children and adolescents with type 2 diabetes see Type 2 Diabetes in Children and Adolescents chapter)
Recommendation 3

3. Screening for diabetic retinopathy should be performed by an experienced vision care professional (optometrist or ophthalmologist), either in person or through interpretation of retinal photographs taken through dilated pupils [Grade A, Level 1] or undilated pupils with high-resolution ultra-wide field imaging [Grade D, Consensus]
Recommendation 4

4. Results of eye examinations and the follow-up interval and plan should be **clearly communicated** to all members of the diabetes health-care team to promote optimal care [Grade D, Consensus]
Recommendation 5

5. To prevent the onset and delay the progression of diabetic retinopathy, people with diabetes should be treated to achieve **optimal control of BG** [Grade A, Level 1A for type 1 diabetes; Grade A, Level 1A for type 2 diabetes] and **BP** [Grade A, Level 1A for type 2 diabetes; Grade D, Consensus for type 1 diabetes]
Recommendation 6

6. Though not recommended for CVD prevention or treatment, fenofibrate, in addition to statin therapy, may be used in people with type 2 diabetes to slow the progression of established retinopathy [Grade A, Level 1A]
Recommendation 7

7. Individuals with sight-threatening diabetic retinopathy should be assessed by a qualified ophthalmologist and/or retina specialist [Grade D, Consensus]. Pharmacological intervention [Grade A, Level 1A], laser therapy and/or vitrectomy [Grade A, Level 1A] may be used to manage the diabetic retinopathy.
Recommendation 8

8. Visually disabled people should be referred for low-vision evaluation and rehabilitation [Grade D, Consensus]
Key Messages

- **Regular screening** is important for early detection of treatable diabetic retinopathy. Screening intervals for diabetic retinopathy vary according to the individual’s age and type of diabetes.

- **Optimal glycemic control** reduces the onset and progression of sight-threatening diabetic retinopathy.

- **Local intraocular pharmacological therapies** have the potential to improve vision and reduce the level of retinopathy.
Key Messages for People with Diabetes

• Diabetic retinopathy involves changes to retinal blood vessels that can cause them to bleed or leak fluid, distorting vision.

• With good glycemic control, regular eye exams and early treatment, the risk of vision loss is reduced.

• Diabetic retinopathy often goes unnoticed until vision loss occurs, therefore people with diabetes should get a comprehensive dilated eye exam regularly. Discuss the recommended frequency with your diabetes healthcare team and experienced vision care professionals (optometrists or ophthalmologists).

• Diabetic retinopathy can be treated with several therapies used alone or in combination.
Diabetes Canada is helping you provide patient-centred diabetes care and chronic disease management.

Coming soon! New Guidelines April 2018

Quick Access
Frequently used healthcare provider tools and resources

Physiological Activity Decision Tool
Screening for and Diagnosing Diabetes

Self-Monitoring Blood Glucose
Reducing Vascular Risk

Pharmacotherapy for Type 2 Diabetes
Individualizing Your Patient’s A1C Target

News & Highlights
The Canadian Diabetes Association has changed its name to Diabetes Canada! Find out more

November 2016 Interim Update to the Guidelines
Updated recommendations to the Pharmacologic Management of Type 2 Diabetes