BrienHoldenVisionInstitute

DIABETIC RETINOPATHY

THINK

Diabetes is one of the biggest causes of blindness, and is becoming more common in most countries.
People with diabetes will usually develop diabetic retinopathy.
By knowing how diabetes causes blindness you can help prevent people from going blind from diabetes.

WHAT YOU WILL LEARN

When you have worked through this unit you should be able to:

- Explain what diabetes is
- Explain what diabetic retinopathy is
- Describe how diabetes causes blindness
- Explain how to prevent blindness due to diabetes.

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WHAT IS DIABETES?

- Our bodies need to convert glucose (sugar) from the food we eat into energy
- Insulin is a special chemical in our blood which controls this conversion of glucose into energy
- Diabetes mellitus (or simply 'diabetes') is a disease where the body either does not make enough insulin, or doesn't respond well to insulin
- When people with diabetes eat food containing glucose (such as pasta, bread and fruit), their bodies cannot convert the glucose into energy, and the glucose remains in their blood
- People with diabetes (sometimes called 'diabetics') therefore have high blood sugar levels – especially if they don't follow a special diet of foods low in glucose
- High blood sugar levels can lead to various complications in the body.

TYPES OF DIABETES?

Type 1

- The person's body cannot produce insulin
- Usually treated with insulin injections
- This type of diabetes often occurs in children and teenagers
- Only about 5–10% of diabetics have this type

Type 2

- The person's body doesn't respond well to insulin (their bodies are insulin resistant)
- Sometimes their bodies also does not produce enough insulin
- Treated with insulin injections or other medications to control the blood sugar levels
- Diet and exercise are also very important treatments – to reduce the amount of sugar in the blood
- This type of diabetes is more common among the elderly, but younger people can develop it also

Gestational Diabetes

- Sometimes a woman who has never had diabetes before can develop diabetes during pregnancy
- During pregnancy, her body may not produce enough insulin, or it may not respond well to insulin
- The condition may damage the health of both mother and unborn baby, and needs to be monitored carefully by a health care practitioner
- Gestational diabetes may improve after the baby's birth
- A large percentage of women who have gestational diabetes will develop Type 2 diabetes later in life.

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RISK FACTORS FOR DIABETES

- Age (older people are more likely to develop diabetes)
- Family history of diabetes
- History of gestational diabetes
- History of cardiovascular disease
- Overweight and obesity – especially if excess weight is around the waist
- Physical inactivity
- Not following a healthy diet, especially if eating too much sugary foods.

COMPLICATIONS OF DIABETES?

- Diabetes is a complex chronic disease, and it can affect the entire body
- People with diabetes can develop complications such as:
  - heart attack
  - stroke
  - kidney disease
  - loss of feeling in hands and feet
  - vision disorders (e.g. retinopathy, glaucoma, cataract and corneal disease).

THINK ABOUT DIABETES IN YOUR LOCAL POPULATION

Do you know the prevalence of diabetes in your community? ☐ Yes ☐ No

Is it more common in any sectors of the population? ☐ Yes ☐ No

Who is most at risk? _____

It is more common in people over a certain age? ☐ Yes ☐ No

Which age group is most affected? _____

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DIABETIC RETINOPATHY

WHAT IS IT?	• An eye disease caused by the complications of diabetes
	• Diabetes causes damage to the retinal blood vessels
	• The retinal vessels may bleed and/or swell and leak fluid
	• Sometimes there may also be a growth of new blood vessels on the surface of the retina
	• These new blood vessels are fragile and can often leak blood into the eye
	• Diabetic retinopathy usually affects both eyes
	• Everybody who has diabetes will eventually develop get diabetic retinopathy
	• If not treated, diabetic retinopathy can lead to vision loss and blindness
	• Timely treatment and follow-up care can help prevent vision loss and blindness
	• All diabetics should have regular eye examinations
	  ○ At least once a year for all diabetics
	  ○ More often for diabetics with diabetic retinopathy or other ocular complications
	• Diabetics are more likely to develop diabetic retinopathy earlier if:
	  ○ They have had diabetes for a long time
	  ○ Their blood sugar is not well controlled
	• People with diabetic retinopathy can also develop:
	  ○ Cataracts
	  ○ Retinal detachments
	  ○ Glaucoma
	• Diabetics are about 25 times more likely to lose their eyesight than people without diabetes.

CAUSES	• Diabetic retinopathy is caused by changes in the blood vessels of the retina as a result of the high blood sugar levels in diabetes • The longer a person has diabetes, the more likely the person is to develop diabetic retinopathy • Diabetic retinopathy will be present in about 80% of people who have had diabetes for 10 years or more.
WHAT DO I ASK?	• Do you have a family history of diabetes? • Are you a diabetic or taking medication for your blood sugar? If the person is diabetic, you should ask them: • How do you control your diabetes? • Have you noticed any changes in your vision?
SYMPTOMS	• Diabetic retinopathy usually affects both eyes • There are often no symptoms, especially in the early stages • Although the eye may bleed, there is no pain • The person might not be aware they are developing diabetic retinopathy – that is why all diabetics should have regular eye examinations • Vision may not change until the disease is well advanced • Vision will be blurred if the macula swells from leaking fluid – this is called macular oedema • Abnormal new blood vessels growing on the surface of the retina may bleed into the eye and block vision • The person may notice a few spots or 'floaters' in their vision

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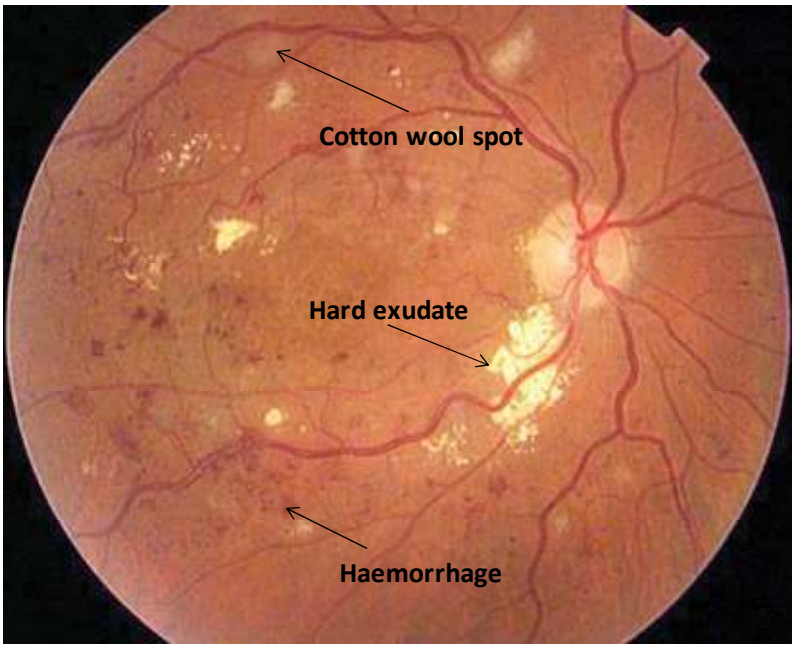
	• Diabetics may have fluctuating vision and fluctuations in their spectacle prescription, especially if their blood sugar levels are poorly controlled.

SIGNS	• Diabetic retinopathy can only be seen by looking inside the eye
	• The outside of the eye will look normal
	• When examining the retina with a direct ophthalmoscope, you may see:
	  ○ Dot and blot haemorrhages on the retina
	  ○ Patches of white/yellow colour (cotton wool spots) – these occur because the affected area is starved of oxygen
	  ○ Discolouration of the macula (e.g. green, red, yellow)
	  ○ New blood vessels (neovascularisation) on the optic nerve, iris or retina
	  ○ these new blood vessels grow because there is a lack of oxygen where the retinal vessels leak
	  ○ the new vessels will look much smaller and more tortuous than the normal retinal blood vessels
	  ○ they are very fragile and often leak
	  ○ these haemorrhages can then cause retinal tears and scars
	  ○ this will lead to vision loss and may even cause blindness
	• You might also see a clouding of the lens inside the eye – which could indicate the start of a cataract.

WHAT SHOULD I DO?	• Measure visual acuity • Examine the eye with an ophthalmoscope, and look very carefully at the retina • Photograph the retina if you are able to.
WHAT DOES IT LOOK LIKE?	 ***Figure 14-1: Dot and blot haemorrhages, cotton wool spots and hard exudates in diabetic retinopathy*** ***[photo courtesy of David Yorston: ICEH]***

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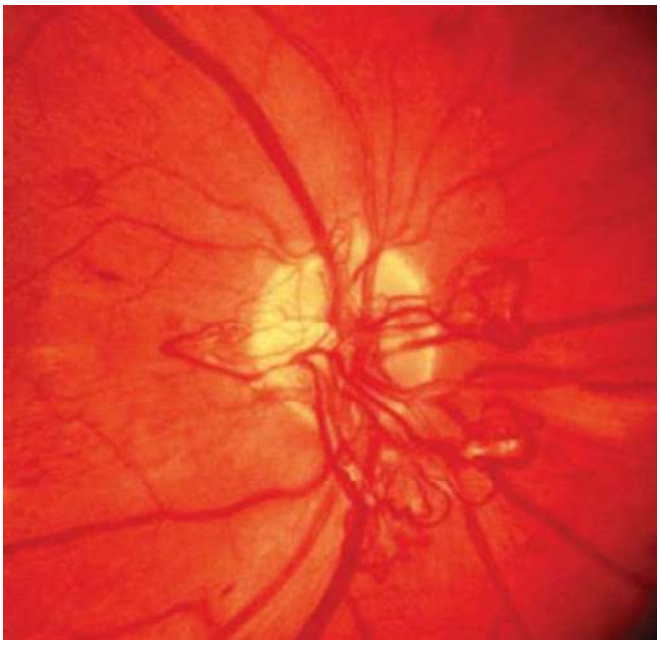

Figure 14-2: New vessels (neovascularisation) due to diabetes [photo courtesy of ICEH]

Figure 14-3: Scarring on the retina due to diabetic retinopathy [photo courtesy of Richard Leung/Kings College Hospital: ICEH]

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	 Figure 14-4: Large haemorrhage due to diabetic retinopathy. [photo courtesy of ICEH]
HOW IS IT TREATED?	• To prevent progression of diabetic retinopathy, it is important that the person controls their blood sugar levels as well as their blood pressure • Laser treatment can help to shrink or destroy abnormal retinal blood vessels – to help preserve the person's sight • Laser treatment cannot restore any vision that has already been lost • People with severe bleeding inside the eye may require surgery • If left untreated, diabetic retinopathy can cause severe vision loss and even blindness. • Also, treatment is more likely to be effective if it is done early • If not treated, diabetic retinopathy can also cause a type of glaucoma • All diabetics should have their eyes examined at least once a year, and more regularly once changes are noticed on the retina.

REFERRAL CRITERIA	• Refer all diabetics with poor vision or visual symptoms
	• Refer if you see:
	  ○ Blood (haemorrhages)
	  ○ Cotton wool spots
	  ○ Neovascularisation on the optic nerve, iris and/or retina
	  ○ Any macula changes (colour, oedema)
	• Refer all newly diagnosed diabetics to a medical practitioner.
	• Recommend annual eye health checks for all diabetics.

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PREVENTING BLINDNESS OR VISION LOSS CAUSED BY DIABETES

- **Annual eye examinations**
  - When diabetic retinopathy first starts the person will not know because their vision will be the same
  - This is why we should look for diabetic retinopathy every year
  - At these check ups vision should be measured and retinal health should be monitored.

- **Healthy lifestyle and diabetes control**
  - Diabetics need to maintain healthy blood sugar levels by following a healthy diet
  - They may also need insulin injections and/or other medication to control their blood sugar levels
  - Regular physical exercise is important
  - Diabetics should check their blood sugar at least once a day.

Figure 14-5: Following a healthy diet

Figure 14-6: Blood sugar testing

- **Laser treatment (photocoagulation)**
  - Diabetic retinopathy can be treated by laser to help prevent further vision loss
  - Laser treatment will not cure diabetic retinopathy, but can help to control it
  - It is important to have treatment as soon as possible so that blindness can be prevented.

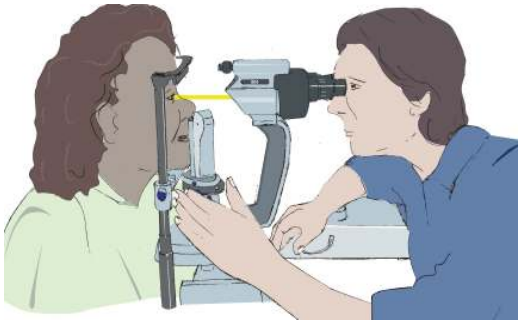

Figure 14-7: Laser treatment for diabetic retinopathy can help prevent further vision loss

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WHAT TO TELL PEOPLE WITH DIABETES

People with diabetes need to:

- Control their blood sugar
- Have an eye examination to check for diabetic retinopathy when they are first diagnosed with diabetes – this should be done by an eye care practitioner who can dilate their pupils to also examine the peripheral retina
- Have an eye examination at least once a year after that
- Have their eyes checked immediately if they notice any changes in their vision
- Have treatment for diabetic retinopathy before it is too late.

REMEMBER:

- **Every person with diabetes will eventually develop diabetic retinopathy**
- **Vision loss and blindness can be prevented through early detection and timely treatment**
- **A person with diabetic retinopathy might not have any signs or symptoms**
- **If not caught early it can lead to blindness**
- **It is important for all diabetics to have regular eye examinations**
- **Good control of diabetes and blood sugar levels can help prevent vision loss and other diabetic complications in the body.**

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SUMMARY - DIABETIC RETINOPATHY

DIABETES

- People with diabetes have too much sugar in the blood, due to a lack of insulin
- When you have diabetes for several years you can have trouble with the blood vessels in your body
  - This can lead to several complications, including diabetic retinopathy

DIABETIC RETINOPATHY

- Diabetic retinopathy is a disease of the retina due to diabetes
- People with diabetes are more likely to get retinopathy:
  - the longer they have had diabetes
  - if they do not look after their blood sugar
- Diabetic retinopathy can cause blindness by damaging the blood vessels in the retina
- Diabetic retinopathy can only be seen by looking inside the eye
- In the beginning stages the vision will not change, but it will get worse over time
- If the person has poor vision and is a diabetic, refer to a doctor or a medical professional immediately
- Refer any person whose eye examination shows:
  - Retinal haemorrhages
  - Cotton wool spots
  - Neovascularisation of the nerve, iris and/or retina
  - Discolouration of the macula
  - Retinal tear

HOW TO PREVENT BLINDNESS CAUSED BY DIABETES

- Annual eye checks for all diabetics
- Encourage people to maintain healthy blood sugar levels
- Prompt laser treatment for diabetic retinopathy
- It is important to have treatment as soon as possible so that blindness can be prevented

WHAT TO TELL A PERSON WITH DIABETES

- Good blood sugar control is very important
- Have checks for diabetic retinopathy at diagnosis and then every year
- Have treatment for diabetic retinopathy as soon as it is detected.

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TEST YOURSELF QUESTIONS

1. **Name some of the complications that people with diabetes can develop:**

   _____
   _____
   _____

2. **What are some of the risk factors for diabetes?**

   _____
   _____

3. **What is diabetic retinopathy? How can diabetic retinopathy lead to blindness?**

   _____
   _____
   _____

4. **What are the symptoms of diabetic retinopathy?**

   _____
   _____

5. **Laser surgery can cure diabetes:** ☐ **True** ☐ **False**

6. **Prevention is the key in avoiding blindness due to diabetic retinopathy.**
   List three things a person with diabetes should do to help prevent vision loss from diabetic retinopathy:

   _____
   _____
   _____

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