



Diabetes case study

Eye series 6

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A 47 year old male patient comes for his regular health check up. He is currently being treated for high cholesterol and has only recently been diagnosed with type 2 diabetes. At present this is controlled through diet only. The patient recently heard that diabetes causes blindness and he is very worried about his eyes and has several questions about his condition.



Figure 1. A diabetic retina note the extensive haemorrhages, fatty deposits and abnormal vessel growth

Answers

Answer 1

Approximately 70% of type 2 diabetic patients will develop eye changes at some stage. These may or may not directly affect your vision. Proper follow up with your eye care professional and treatment when necessary can reduce the incidence of serious visual disability in over 90% of cases.

Diabetes primarily attacks the blood vessels of the retina. There are two main stages to the disease. The first or early stage is called background or nonproliferative retinopathy. Small haemorrhages or micro aneurysms in the retinal vessels can be seen on a dilated examination. Fatty deposits (exudates) may also be seen (Figure 1). Treatment is not usually necessary at this stage, however, the patient should be monitored closely. The second stage (proliferative retinopathy) can lead to severe loss of vision if left untreated. This stage is characterised by the growth of small blood vessels. These vessels are fragile and can haemorrhage easily leading to loss of vision. Swelling of the central retina (macular oedema) can arise leading to problems with central vision. Diabetes can also lead to the early progression of

cataracts.

Answer 2

The best thing you can do to reduce risks is to maintain a healthy lifestyle and strict control over your blood sugar levels. Studies have shown that tight control over diabetes will delay the onset and slow the progression of eye problems in the majority of cases. Good control will also slow progression of other diabetic side effects such as kidney damage. Reducing your cholesterol will also help to reduce the likelihood of vision threatening maculopathy due to the build up of intraretinal fat. It is important that you report any changes in your vision immediately.

Several risk factors can contribute to the progression of ocular disease. These include:

- duration - the prevalence increases with time. In type 1 diabetes approximately 40–50% of patients will show some signs after 10–15 years increasing to 100% after 30 years. In type 2 diabetes approximately 20% will be affected after 10 years rising to around 60% after 18 years
- glucose control – strict glucose control

Question 1

My diabetes is only mild. Do I still have a chance of going blind?

Question 2

Can I do anything to reduce these risks?

Question 3

What ocular symptoms should I be aware of?

Question 4

When should I see an eye doctor?

Question 5

What treatment options do I have?

has been shown to slow the progression of retinopathy while poor control can aggravate any changes

- abdominal obesity – has been shown to be a determinant in the development of retinal problems
- hypertension – uncontrolled hypertension can cause further vascular changes which can aggravate pre-existing retinopathy
- hyperlipidaemia – control of lipid levels has been shown to decrease the chance of retinal blood vessel leakage and further exudate formation that can lead to severe visual loss
- pregnancy – women with diabetes run an approximately 10% risk of developing retinopathy during pregnancy
- renal disease – the presence of nephropathy is an almost certain indicator of retinal disease.

Answer 3

Changes to your blood sugar levels can lead to fluctuations in your vision, particularly if the change is sudden. This is often only temporary. In advanced cases the diabetic patient may notice their central or reading vision may deteriorate; similarly you may notice a reduction in your side vision. These changes can occur rapidly and therefore should be reported immediately to your ophthalmologist. It is also possible that you may notice subtle changes in your appreciation of colours and night vision. If you notice floaters or flashes at any stage this represents an ocular emergency so contact your eye doctor.

Sudden changes in blood sugar levels can increase the absorption of fluid into the lens thereby causing temporary fluctuations in the patient's vision. Macular oedema can lead to central vision loss while, depending on the haemorrhaging location, the peripheral vision may be affected. Retinal changes can lead to a decrease in colour vision (particularly blue-green colours) and also cause a drop in night vision. Severe bleeding and subsequent scarring may lead to a retinal detachment that can cause permanent loss

of vision. In this case patients will notice increasing flashes and floaters. Cataracts will cause a generalised loss of vision.

Answer 4

Generally you should consult an ophthalmologist every 1–2 years. You should consult an eye doctor if you notice any changes to your vision. If your eye doctor has noticed changes in your eye they may suggest seeing you more frequently.

Diabetes is the leading cause of blindness under the age of 65 years. Because diabetes is often under diagnosed, many patients will show some subtle changes in their retina at the time of discovery. Approximately 10–15% of type 2 patients have some retinopathy at diagnosis, therefore an eye care practitioner should always see the patient as soon as possible after the initial diagnosis. Follow up is dependent on the condition of the patient and the likelihood of progression of the condition.

Answer 5

Surgical treatment becomes necessary only when the condition is showing signs of progression. Treatment has been shown to greatly reduce the chance of the further advancement of retinopathy. Even in severe cases, a majority of patients will retain vision if treated promptly. Treatment will not significantly return any vision previously lost.

Treatment is dependant on the presenting problem. If macular oedema is present, laser to reduce the swelling and to control the leaking fluid is indicated. Laser is applied either directly to the damaged or leaking blood vessels or in the case of a nonspecific leakage to the affected area in a grid pattern to contain any changes. If new blood vessels have formed (proliferative retinopathy) then laser is used in an attempt to either shrink or control vessel growth. This is done by applying large amounts of laser to areas of capillary closure or ischaemia in the retina. This may take several sessions and can reduce the patient's

peripheral vision as well as affecting night vision. If these blood vessels have ruptured and a large bleed in the vitreous does not clear then removing the vitreous fluid (vitrectomy) is an option. This will remove any blood and reduce vitreo-retinal traction due to scar tissue from the eye (which may lead to retinal detachment). If the bleeding has been severe this has been shown to provide a large benefit to the patient. Cataract formation and glaucoma are noted complications of vitrectomy operations. There is a role for antioxidants in diabetics with associated age related macular degeneration changes, however, further research is still required to determine the benefit in diabetic retinal disease alone. Aspirin has not been shown to help slow the progression.

Conflict of interest: none declared.

Further reading

1. Kowluru R A, Tang J, Kern T S. Abnormalities of retinal metabolism in diabetes and experimental galactosemia. VII. Effect of long term administration of antioxidants on the development of retinopathy. *Diabetes* 2001; 50(8): 1938–1942.
2. Pelzek C, Lim J I. Diabetic macular oedema: review and update. *Ophthalmol Clin North Am* 2002; 15(4):555–563.
3. Klein R. Prevention of visual loss from diabetic retinopathy. *Surv Ophthalmol* 2002; 47 (Suppl 2):S246–S52.

Recommended websites

Diabetes Australia Home Page: <http://www.diabetesaustralia.com.au/>
 Eyes on diabetes: A resource for diabetic retinopathy: <http://www.eyesondiabetes.org.au/>
 Australian Diabetes Society: <http://www.racp.edu.au/ads/>