

# Visible manifestations of diabetic retinopathy

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Are you sure of the significance of the various retinal lesions of diabetes?

Much of the blindness associated with diabetes can be prevented if retinopathy is detected and treated early enough – that is, before the patient experiences visual symptoms. Changes that might be seen when examining the fundus of a patient with diabetes who is not yet experiencing any loss of vision include red dots, red blots, hard exudates and cotton wool spots (Figure). These are indicators of the progression of diabetic retinopathy.

## Red dots

Red dots are microaneurysms of the retinal arterioles. They are an early indicator of diabetic retinopathy and become more common with increasing diabetes duration. In the 1980s it was thought that virtually everyone with diabetes would develop microaneurysms and other signs of diabetic retinopathy. More recently it has been suggested that diabetic retinopathy is not inevitable and it appears that more people with diabetes are remaining free of eye disease, presumably because of improved glycaemic control. Red dots are clearly defined because they are contained within the vessel wall.

## Red blots

Red blots are small haemorrhages from

retinal arterioles and indicate more serious microvascular disease than red dots. Blots are blood in the retinal layers and are therefore not clearly defined.

Red blots may also occur in hypertensive eye disease but then there is usually more extensive haemorrhage that spreads into the nerve layers. This causes more ‘flame’ haemorrhages radiating from the leaking vessel rather than the more confined blot haemorrhages of diabetic retinopathy.

## Hard exudates

If the retinal vessels leak because of diabetes related damage, lipids and other serum components can accumulate in retinal layers and show as yellow to white hard exudates. They generally have a fairly clearly defined edge and tend to occur in the central areas around the macula and optic disc.

The exudates may track down nerve layers radiating around the macula, causing a spectacular macular star. The star is an ominous sign because the exudates may damage the macula and thus affect the central vision mediated by the cones concentrated there. In the same way, a central hard exudate is much more significant than a more peripheral exudate. Early detection of central exudates is important because early local laser therapy can prevent exudate extension and associated visual loss.

## Cotton wool spots

Retinal tissue will die if retinal vessels are blocked. This is associated with local oedema, as in the brain and other organs when they become ischaemic. In the retina, the excess extravascular fluid radiates into the neural layers, causing an ill defined white cotton wool-like opacity that resolves with time.

Like the blots of retinal haemorrhage, cotton wool spots are not diagnostic of diabetic retinopathy and can occur with hypertensive eye disease (where they reflect the same pathophysiology). In diabetic

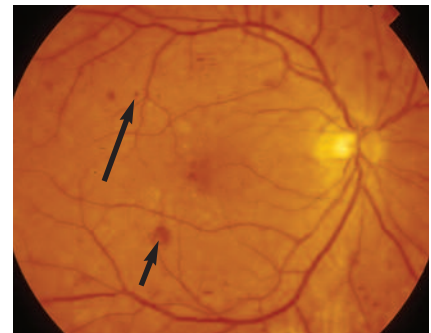


Figure. Red dots (long arrow) and blots (short arrow) in early diabetic retinopathy.

retinopathy, they indicate a more serious stage than haemorrhages because the ischaemia that causes local retinal tissue to die also triggers new vessel growth in an attempt to counteract the ischaemia.

## Symptomatic retinopathy

With time, delicate new retinal vessels may grow into the vitreous where they are not supported by surrounding tissues and are prone to bleeding. This so-called ‘proliferative’ retinopathy is associated with vitreous haemorrhage, scarring, retinal retraction and loss of vision.

## A note on treatment options

Early detection of the pre-proliferative stage associated with the cotton wool spots of ischaemia (this stage is also called advanced nonproliferative retinopathy) allows the opportunity for prophylactic pan retinal laser photocoagulation. This therapy destroys ischaemic retinal tissue, thereby stopping the new vessel growth and reducing the risk of vitreous haemorrhage, scarring and visual loss.

Another possible approach is the use of antagonists to the substances triggering new vessel growth. Antagonists to vascular endothelial growth factor have proved promising in early trials. **MT**

**DECLARATION OF INTEREST:** Dr Phillips has received grants and acted as consultant for a number of pharmaceutical companies; none of these interests are relevant to this article.

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